Appendix II
Appropriate Assessment Natura Impact Report
&
Appropriate Assessment Conclusion Statement

CONSOLIDATED NATURA IMPACT REPORT

IN SUPPORT OF THE

APPROPRIATE ASSESSMENT

FOR THE

CARLOW-GRAIGUECULLEN
JOINT URBAN LOCAL AREA PLAN
2024-2030

for: Carlow and Laois County Councils

CARLOW
COUNTY COUNCIL

I bpáirt Leis an bPobal

by: CAAS Ltd.

CAAS

JULY 2024

Table of Contents

List of Tables

List of Figures

Section 1 Introduction

1.1 Background

This Natura Impact Report (NIR) has been prepared in support of the Appropriate Assessment (AA) of the Carlow-Graiguecullen Joint Urban Local Area Plan 2024-2030 to be adopted[1] in accordance with the requirements of Article 6(3) of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (hereafter referred to as the "Habitats Directive").

In carrying out AA and in preparing this consolidated Natura Impact Report, the Council takes into account the matters specified under Part XAB of the Planning and Development Act 2000 (as amended), including the following:

- The Natura Impact Report prepared for the Draft Plan (an earlier version of this consolidated document);
- AA Screening of Proposed Material Alterations;
- Written submissions made during the Plan preparation process; and
- Ongoing advice on AA from the Council's agents.

This report is part of the ongoing AA process that is being undertaken alongside the preparation of the Plan. It will be considered, alongside other documentation prepared as part of this process, at adoption of the Plan. An AA Conclusion Statement will be prepared following adaption that will include the final AA determination expected to be made at adoption.

1.2 Legislative Context

The Habitats Directive provides legal protection for habitats and species of European importance. The overall aim of the Habitats Directive is to maintain or restore the "favourable conservation status" of habitats and species of European Community Interest. These habitats and species are listed in the Habitats and Birds Directives (Council Directive 2009/147/EC on the conservation of wild birds) with Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated to afford protection to the most vulnerable of them. These two designations are collectively known as European sites (also known as Natura 2000 sites).

AA is required by the Habitats Directive, as transposed into Irish legislation by the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and the Planning and Development Act 2000 (as amended). AA is an assessment of the potential for adverse effects of a plan or project, in combination with other plans or projects, on the conservation objectives of a European site. These sites consist of SACs and SPAs and provide for the protection and long-term survival of Europe's most valuable and threatened species and habitats.

1.3 Approach

The Draft Plan was informed by the AA process. The findings of the AA are detailed in this NIR, an earlier version of which was prepared to accompany the Draft Plan on public display and inform the competent authority on conducting Stage 2 AA. Mitigation was integrated into the Draft Plan that allows the NIR to conclude that that the Draft Plan is not foreseen to give rise to any effect on the integrity of any designated European site, alone or in combination with other plans or projects[2]. The Draft Plan and AA NIR were placed on public display and submissions were invited.

Submissions received resulted in Material Alterations being proposed to the Plan. These alterations were be subject to Screening for AA. Taking into account the measures that were integrated into the

[1] Incorporating: the Draft Plan; all and any alterations; and all and any further modifications considered by the AA process. Note that non-material changes to individual Plan provisions referenced in this report may be updated during the finalisation of the Plan, including numbering, formatting and graphic design.
[2] Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be: a) no alternative solution available, b) imperative reasons of overriding public interest for the plan to proceed; and c) Adequate compensatory measures in place.

Draft Plan, it was determined that the Proposed Material Alterations are not foreseen to give rise to any likely significant effect on any European Site, alone or in combination with other plans or projects[3].

The AA is based on best scientific knowledge and ecological expertise, and is supported by desktop research on national databases including the National Biodiversity Data Centre[4], the National Parks and Wildlife Service (NPWS)[5] and the Environmental Protection Agency (EPA)[6] mapping websites (including data collected for the most recent Article 12 and 17 conservation status reporting cycle, 2019).

The ecological desktop study completed for the AA of the Plan, comprised the following elements:

- Identification of European sites within 15 km of the Plan boundary;
- Examination of European sites hydrologically linked (via direct surface water connection or shared groundwater body) or other ecological links beyond 15 km of the Plan boundary;
- Examination of the NPWS Qualifying Interests (for SACs), Special Conservation Interests (for SPAs) and Conservation Objectives for the above identified sites with potential pathways to the Plan area;
- Examination of available additional information on protected and or designated species as relevant/necessary.

There are four main stages in the AA process as follow:

Stage One: Screening
The process that identifies the likely impacts upon a European site of a project or plan, either alone or in combination with other projects or plans and considers whether these impacts are likely to be significant.

Stage Two: Appropriate Assessment
The consideration of the impact on the integrity of the European site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts. If adequate mitigation is proposed to ensure no significant adverse impacts on European sites, then the process may end at this stage. However, if the likelihood of significant impacts remains, then the process must proceed to Stage Three.

Stage Three: Assessment of Alternative Solutions
The process that examines alternative ways of achieving the objectives of the project or plan that avoids adverse impacts on the integrity of the European site.

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain
An assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed.

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. This approach aims to avoid any impacts on European sites by identifying possible impacts early in the plan-making process and avoiding such impacts. Second, the approach involves the application of mitigation measures, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If potential impacts on European sites remain, the approach requires the consideration of alternative solutions. If no alternative solutions are identified and the plan/project is required for imperative reasons of overriding public interest, then compensation measures are required for any remaining adverse effect(s). The assessment of potential effects on European sites is conducted following a standard source-pathway-receptor[7] model, where, in order for an effect to be established all three elements of this mechanism must be in place. The absence or removal of one of the elements of the model is sufficient to conclude that a potential effect is not of any relevance or significance.

In the interest of this report, receptors are the ecological features that are known to be utilised by the qualifying interests or special conservation interests of a European site. A source is any identifiable element of the Plan provision that is known to interact with ecological processes. The pathways are any connections or links between the source and the receptor. This report provides information on whether direct, indirect and cumulative adverse effects could arise from the Plan.

[3] Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be: a) no alternative solution available, b) imperative reasons of overriding public interest for the plan to proceed; and c) Adequate compensatory measures in place.
[4] Available at: https://maps.biodiversityireland.ie/
[5] Available at: https://www.npws.ie/protected-sites and https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=8f7060450de3485fa1c1085536d477ba
[6] Available at: https://gis.epa.ie/EPAMaps/
[7] Source(s) – e.g., pollutant run-off from proposed works; Pathway(s) – e.g., groundwater connecting to nearby qualifying wetland habitats; and Receptor(s) – qualifying aquatic habitats and species of European sites.

The AA exercise has been prepared taking into account legislation including the aforementioned legislation and guidance including the following:

- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government, 2009;
- "Commission Notice: Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC", European Commission 2018;
- Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission Notice, Journal of the European Union, 2021; and
- Practice Note PN01: Appropriate Assessment Screening for Development Management, Office of the Planning Regulator, 2021.

This evaluation has been made in view of the conservation objectives of the habitats or species, for which the relevant European sites have been designated.

Section 2 Description of the Plan

2.1 Introduction and Content

A mandatory Local Area Plan is required for Carlow Town having regard to Section 19 of the Planning and Development Act 2000 (as amended), which states that a Local Area Plan is required to be prepared in respect of an area that is:

- Designated as a town in the most recent census;
- Has a population in excess of 5,000; and,
- Is situated in the functional area of the planning authority which is the county council.

Carlow-Graiguecullen is a designated Key Town with a recorded population in excess of 27,000 in 2022. In accordance with Section 18(2) of the Act, Carlow County Council and Laois County Council have collaborated in the preparation of the Joint Urban Draft Local Area Plan (JULAP)[8] to be adopted.

The JULAP addresses spatial planning in the Carlow-Graiguecullen area and identifies the various social, economic, and environmental issues of relevance. Policies, objectives, and related provisions are outlined to guide future development in accordance with the proper planning and sustainable development of the area.

2.2 Form and Content of the Plan

The Plan comprises a written statement and combined land use zoning map encompassing Carlow Town, Carlow Town Environs, and Graiguecullen. The land use zonings for Carlow Town (i.e., former Carlow Town Council area), were adopted in May 2022 as part of the preparation of the Carlow County Development Plan 2022-2028 and have been reflected in the Plan.

The written statement and supporting maps comprise the primary policy document for the JULAP and is set out over 12 Chapters as follows:

- Chapter 1 - Plan Review and Context
- Chapter 2 - Carlow-Graiguecullen Strategic Planning and Vision
- Chapter 3 - Core Strategy and Housing
- Chapter 4 - Economic Development, Retail and Tourism
- Chapter 5 - Urban Design, Town Centre and Regeneration
- Chapter 6 - Sustainable Travel and Transportation
- Chapter 7 - Infrastructure and Environmental Services
- Chapter 8 - Sustainable Communities
- Chapter 9 - Built Heritage
- Chapter 10 - Natural Heritage and Amenity
- Chapter 11 - Climate Action
- Chapter 12 - Land Use Zoning Objectives and Implementation

The JULAP includes appendices and associated environmental reports i.e., the SEA Environmental Report, this Appropriate Assessment Natura Impact Report, and a Strategic Flood Risk Assessment. An Area Based Transport Assessment has also been prepared for the Urban Area. These documents complement and contribute to the evidence-led approach to the formulation of the written statement and supporting maps. In the event of any conflict or ambiguity between what is contained within the Written Statement and the supporting maps, the Written Statement shall take precedence. In the full interpretation of all policies and objectives for Carlow-Graiguecullen, it is essential that both the Carlow and Laois County Development Plans, as overarching policy documents, are read in tandem with the Plan. Where conflicting policies and objectives arise between these County Development Plans and the

[8] Incorporating: the Draft Plan; all and any alterations; and all and any further modifications considered by the AA process. Note that non-material changes to individual Plan provisions referenced in this report may be updated during the finalisation of the Plan, including numbering, formatting and graphic design.

JULAP, the policies and objectives of the County Development Plans, as they apply to lands in the functional area of County Carlow or County Laois, shall take precedence.

2.3 Vision and Strategic Objectives

The Vision for the Plan is: "To ensure that Carlow-Graiguecullen maximises and builds on its Key Town designation, strategic accessible location, regional and inter-regional connectivity, and existing inherent strengths, prioritising quality of life considerations, the economic and employment potential of the town, town centre led urban regeneration, focusing on a low carbon and compact pattern of development, while seeking to conserve and enhance the town's existing natural and built heritage assets."

To contribute to the delivery of this vision and in order to maximise on the designation of the urban area as a Key Town a number of cross-cutting strategic objectives and priorities have been identified. These are intended to guide the future growth of the joint urban area in accordance with proper planning and sustainable development. They have been formulated to reflect and build on the town's attributes, while also taking account of key issues and challenges into the future. The Plan's Strategic Objectives are as follow:

- SO. 1: Encourage and support town centre led urban regeneration for Carlow-Graiguecullen, focusing on the appropriate redevelopment and reuse of key derelict, vacant and underutilised sites and buildings, the consolidation of the town through the use of brownfield, infill and backland sites, the conservation of historic building stock, and the implementation of streetscape and public realm improvements.
- SO. 2: Encourage and facilitate balanced economic development and employment opportunities in Carlow-Graiguecullen, ensuring a vibrant local economy that maximises business and investment opportunities and the existing economic attributes of the town, and supports the development of a diverse range of economic sectors.
- SO. 3: Improve the public realm and attractiveness of Carlow-Graiguecullen through the delivery of high-quality urban design outcomes, taking account of the need to respond to the social and physical characteristics of the existing built environment and those features that should be protected and/or enhanced by, and inform, new development.
- SO. 4: Prioritise integrated transport and land use, supported by investment in public transport, active travel networks and shared, low-carbon mobility options, which will improve people's travel choices and support safe, sustainable, and healthy lifestyles.
- SO. 5: Promote Carlow-Graiguecullen as a priority location for regional level community and social infrastructure and support the expansion and enhancement of existing community facilities, the provision of residential development, and a range of new community facilities in tandem with population growth to meet the needs of future residents in the joint urban area.
- SO. 6: Transition Carlow-Graiguecullen to a low-carbon and climate resilient town through a combination of effective mitigation and adaptation measures, in addition to maximising opportunities for energy efficiency, renewables, and decarbonisation.
- SO. 7: Manage the development of Carlow-Graiguecullen in a manner that protects, conserves, and enhances the natural, built and archaeological heritage of the area.
- SO. 8: Support the development of, and investment in new and existing arts, culture and tourism infrastructure and amenities in Carlow-Graiguecullen.

2.4 Strategic work undertaken by the Councils to ensure contribution towards environmental protection and sustainable development

Far in advance of the placing of the Draft Plan on public display, Carlow and Laois County Councils undertook various works in order to inform the preparation of the Plan.

Strategic work undertaken by the Councils includes background work in relation to Plan provisions, including those relating to:

- Core Strategy and Housing;

- Economic Development, Retail and Tourism;
- Urban Design, Town Centre and Regeneration;
- Sustainable Travel and Transportation;
- Infrastructure and Environmental Services;
- Sustainable Communities;
- Built Heritage;
- Natural Heritage, Green Infrastructure and Landscape;
- Climate Action; and
- Land Use Zoning and Implementation.

The undertaking of the AA process was part of this strategic work and contributed towards the integration of mitigation into the Plan as detailed in Section 5 of this report.

2.5 Relationship with other relevant Plans and Programmes

It is acknowledged that many of the major issues affecting Carlow-Graiguecullen's development are contingent on national policy and government funding.

The Plan sits within a hierarchy of statutory documents setting out public policy for, among other things, land use planning, infrastructure, sustainable development, tourism, environmental protection and environmental management. The Plan must comply with relevant higher-level strategic actions and will, in turn, guide lower-level strategic actions. These documents include plans and programmes such as those detailed in Appendix II. These documents have been subject to their own environmental assessment processes, as relevant.

The National Planning Framework sets out Ireland's planning policy direction for the years 2018-2040. The National Planning Framework is to be implemented through Regional Spatial and Economic Strategies and lower tier Development Plans and Local Area Plans. The Regional Spatial and Economic Strategy for the Eastern and Midland Region and the Southern Region set out objectives for land use planning, tourism, infrastructure, sustainable development, environmental protection and environmental management that have been subject to environmental assessment and must, as relevant and appropriate[9], be implemented through the Carlow and Laois County Development Plans, that set out the overarching development strategy for the counties, and the Local Area Plan.

In order to be realised, projects included in the Local Area Plan (in a similar way to other projects from any other sector) will have to comply, as relevant, with various legislation, policies, plans and programmes (including requirements for lower-tier Appropriate Assessment, Environmental Impact Assessment and other licencing requirements as appropriate) that form the statutory decision-making and consent-granting framework.

[9] Carlow-Graiguecullen includes the functional area of two local authorities and two regional assemblies. The area of the town around Graiguecullen in County Laois is in the functional area of the Eastern and Midland Region, while the greater area of Carlow Town within County Carlow is located with the Southern Region.

Section 3 Screening for Appropriate Assessment

3.1 Introduction to Screening

This stage of the process identifies any potential significant affects to European sites from a project or plan, either alone or in combination with other projects or plans.

An important element of the AA process is the identification of the "'Conservation Objectives", "Qualifying Interests" (QIs) and/or "Special Conservation Interests" (SCIs) of European sites requiring assessment. QIs are the habitat features and species listed in Annexes I and II of the Habitats Directive for which each European site has been designated and afforded protection. SCIs are wetland habitats and bird species listed within Annexes I and II of the Birds Directive. It is also vital that the threats to the ecological/environmental conditions that are required to support QIs and SCIs are considered as part of the assessment.

The following NPWS First Order Site-Specific Conservation Objectives have been considered in the screening:

- For SACs, to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected; and
- For SPAs, to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

Where available, Site-Specific Conservation Objectives (SSCOs) designed to define favourable conservation status for a particular habitat[10] or species[11] at that site have been considered.

3.2 Identification of Relevant European Sites

The Department of the Environment (2009) Guidance on AA recommends a 15 km pathway consideration zone to be considered. A review of all sites within this zone, in the context of the nature and scope of the Plan, has allowed a determination to be made that in the absence of significant hydrological links the characteristics of the Plan will not impose effects beyond the 15 km zone.

Details of European sites that occur within the 15 km Pathway Consideration Zone of the Plan area are listed in Table 3.1 and mapped on Figure 3.1. European sites, that have surface hydrological connectivity with and occur within the same groundwater body[12] as the Plan area[13] (these can occur beyond the 15 km Pathway Consideration Zone) are mapped on Figure 3.2 and Figure 3.3 respectively. In addition, ex-situ foraging by SCI species designated for SPAs which occur outside of the 15 km pathway consideration zone can still occur at varying scales and distances, and this potential interaction with the Plan area is also considered in this report.

Information on QIs site-specific vulnerabilities and sensitivities (see Appendix I) and background information (such as that within Ireland's Article 17 Report to the European Commission, site synopses and Natura 2000 standard data forms) has also been considered by both the AA screening assessment (the findings of which are provided under this section) and Stage 2 AA (provided under Section 4). The Conservation Objectives of the European sites that have been considered by the assessment, were sourced from the following NPWS documents:

- NPWS (2011) Conservation Objectives for River Barrow and River Nore SAC [IE0002162] Version 1.
- NPWS (2011) Conservation Objectives for Slaney River Valley SAC [IE0000781] Version 1.
- NPWS (2019) Conservation Objectives for Holdenstown Bog SAC [IE0001757] Version 1.
- NPWS (2019) Conservation Objectives for Blackstairs Mountains SAC [IE0000770] Version 1.
- NPWS (2024) Conservation Objectives for Seas off Wexford SPA [IE0004237] Version 1.
- NPWS (2011) Conservation Objectives for Hook Head SAC [IE0000764] Version 1.

[10] Favourable conservation status of a habitat is achieved when: its natural range, and area it covers within that range, are stable or increasing; the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and the conservation status of its typical species is favourable.
[11] The favourable conservation status of a species is achieved when: population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.
[12] Special Areas of Conservation with groundwater sensitive Qualifying Interests
[13] Source: EPA datasets (https://gis.epa.ie/EPAMaps/). Accessed: October 2023

The assessment considers available conservation objectives. Since conservation objectives focus on maintaining the favourable conservation condition of the QIs/SCIs of each site, the screening process concentrated on assessing the potential effects of the Plan against the QIs/SCIs of each site. The conservation objectives for each site were consulted throughout the assessment process.

3.3 Screening and Potential Significant Effects

All policies and objectives contained within the Plan are considered in this report with respect to the ecological sensitivities of each of the European sites identified. The sensitivities, threats and pressures of the QIs in relation to all potential sources for effects identified, and potential pathways for such effects identified above are then examined in Table 3.1 (Screening stage). Where sources within the Plan and pathways for potential significant effects are identified, the European sites concerned will proceed to Stage 2 AA. Potential effects will be assessed in relation to the Conservation Objectives of each QI and the appropriate corresponding mitigation will be (detailed in Section 5) applied to each potential effect in Table 4.1.

3.3.1 Is the Plan Necessary to the Management of European Sites?

The overarching objective of the Plan is not the nature conservation management of the sites, but to coordinate and plan the future development of Carlow-Graiguecullen. Therefore, the Plan is not considered to be directly connected with or necessary to the management of European sites.

3.3.2 Elements of the Plan with Potential to Give Rise to Significant Effects

All policies and objectives are considered in this assessment with respect to the likelihood for potential significant effects on the QIs and SCIs of each of the European sites identified by the assessment. This is carried out by considering the sensitivities and threats and pressures of each of the QIs and SCIs in relation to all potential sources for effects and potential pathways for such effects. Subsequently, where sources and pathways for effects are identified potential significant effects will be assessed in relation to the SSCOs.

The Plan will provide a framework for the sustainable development of the Carlow-Graiguecullen Plan area. Plan elements that could present sources with pathways for potential significant effects to European sites are:

- The Plan's provisions, including those relating to housing, economic development, retail and tourism, urban design, town centre and regeneration, sustainable travel and transportation, infrastructure and environmental services, sustainable communities, built heritage, natural heritage, green infrastructure and landscape, climate action and land use zoning and implementation, which introduce sources for potential effects through construction phase such as habitat loss, light pollution, disturbance effects and hydrological interactions through surface hydrological connectivity (Figure 3.2) and/or shared groundwater sources (Figure 3.3);
- Loading pressures from the operational phase of developments – these sources could result in habitat loss/fragmentation, light pollution, disturbance effects and interactions with water quality (surface and/or groundwater); and
- Increases in visitor numbers to ecologically sensitive areas during the operational phase of developments which have potential to introduce sources for significant effects, such as recreational and tourism developments.

All policies and objectives within the Plan are considered in this assessment with respect to the ecological sensitivities of each of the European sites identified. Considering the sensitivities/vulnerabilities of the QIs in relation to all potential sources for effects and potential pathways for such effects. Where sources and pathways for potential significant effects are identified, these potential effects will be assessed in relation to the SSCOs.

3.3.3 Screening of Sites

Table 3.1 examines whether there is a likelihood of potential for significant effects on European sites, considering: information on potential effects provided above; the Conservation Objectives for each site; each site's QIs; and their threats and pressures – as provided in Appendix I. Sites are screened based on one or a combination of the following criteria:

- The existence of potential for pathways for likely significant effects, such as hydrological links between Plan proposals and the site to be screened;
- The distance of the relevant site from the Plan boundary; and
- The existence of a link between identified threats or vulnerabilities at a site to potential impacts that may arise from the Plan.

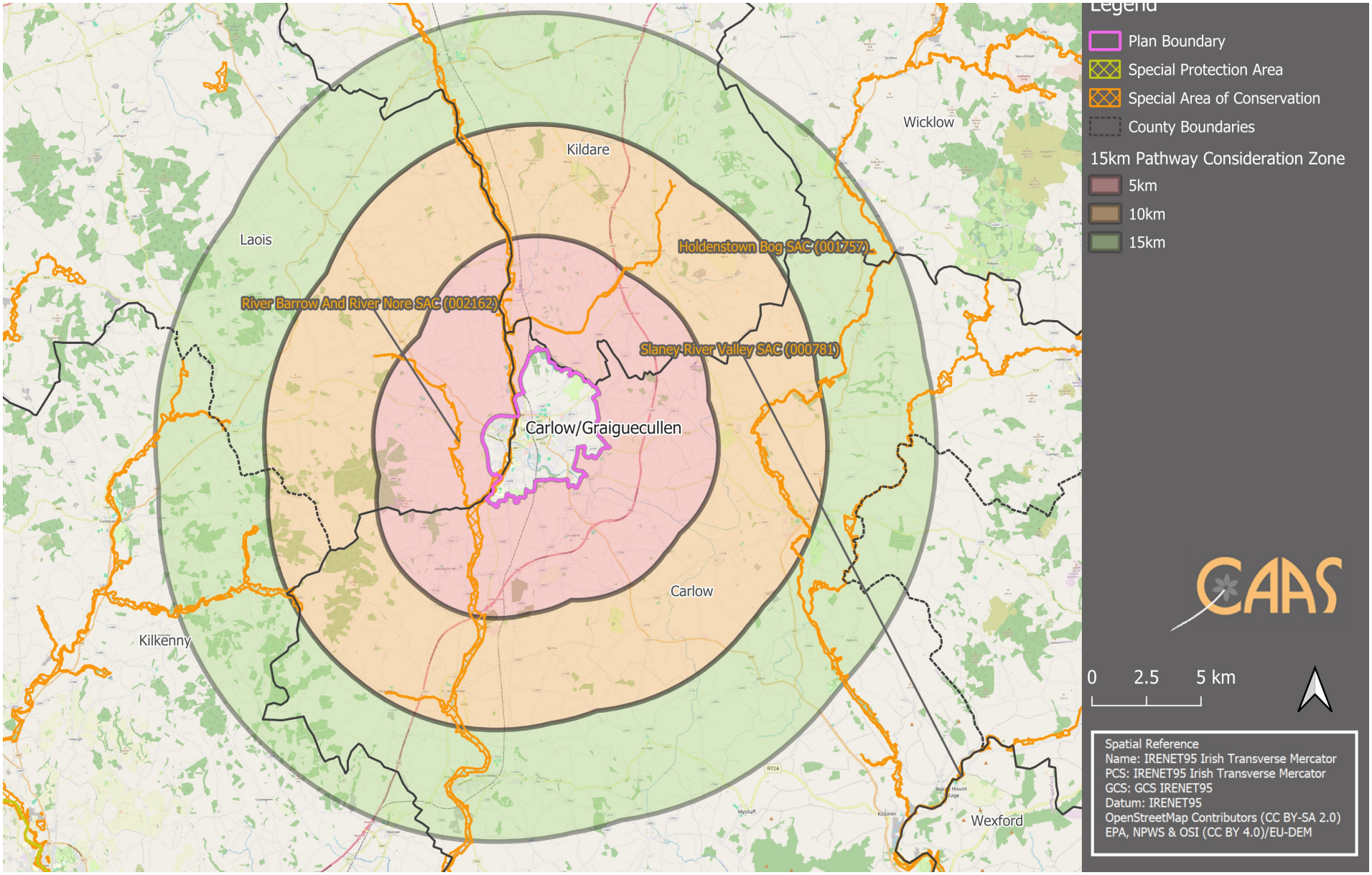


Figure 3.1 European sites within a Pathway Consideration Zone of up to 15 km from Plan boundary[14]

[14] Source: NPWS

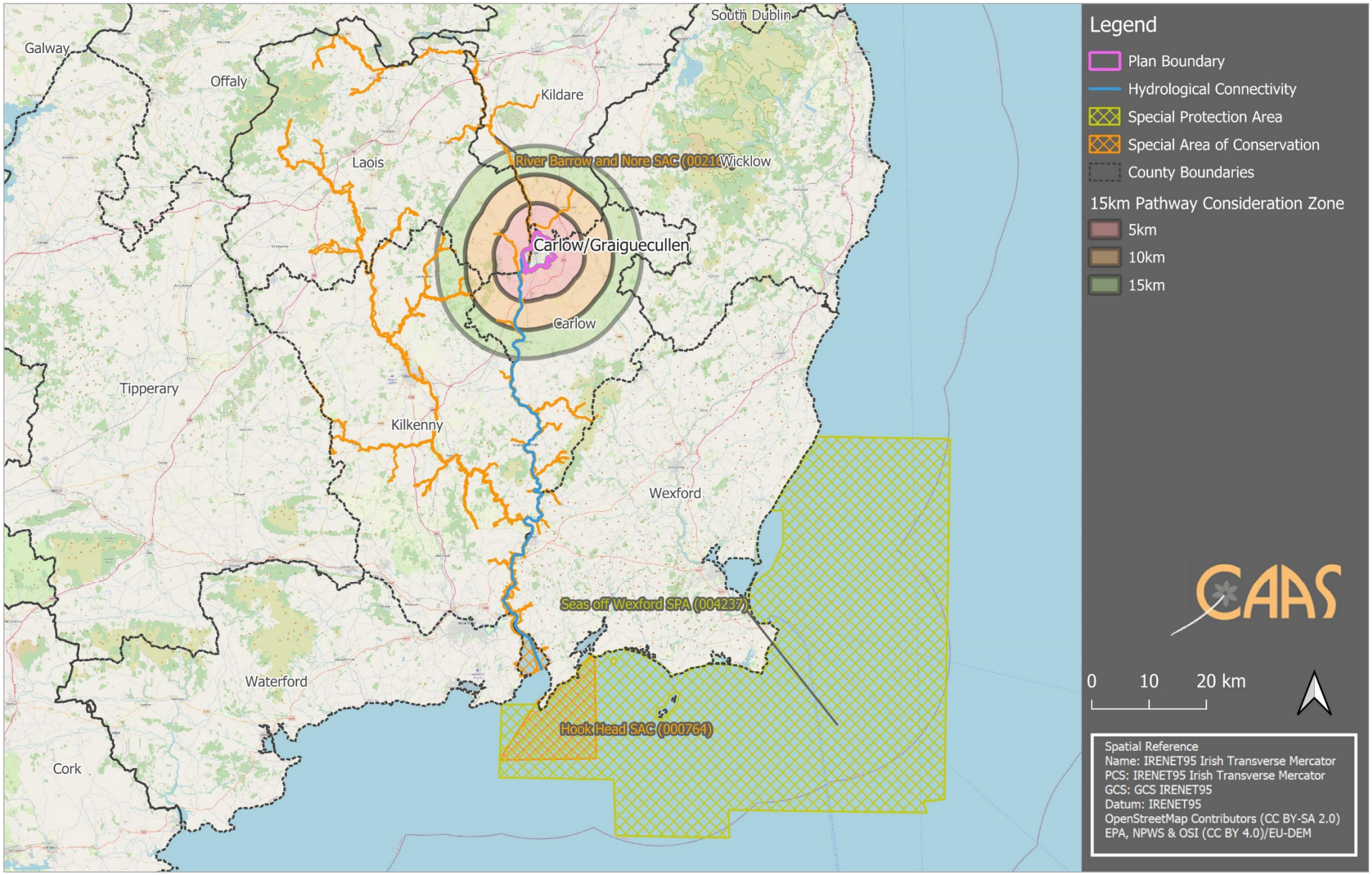


Figure 3.2 European sites with surface hydrological connectivity[15] to Plan boundary

[15] Source: EPA datasets – accessed at: https://gis.epa.ie/EPAMaps/

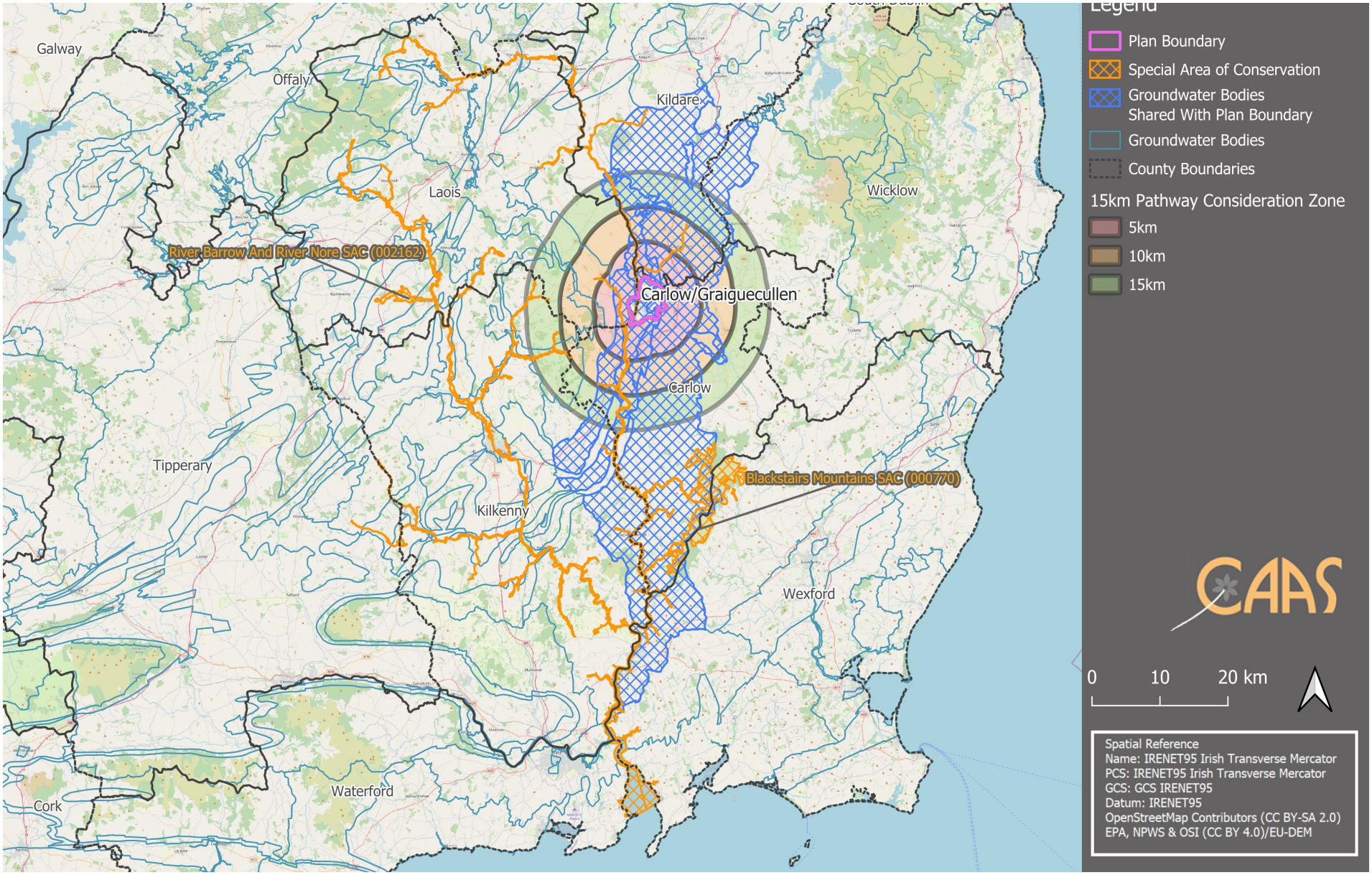


Figure 3.3 European sites[16] occurring within the same groundwater bodies[17] as the Plan area

[16] Special Areas of Conservation and/or Special Protection Areas with groundwater sensitive Qualifying Interests
[17] Source: EPA datasets – accessed at: https://gis.epa.ie/EPAMaps/

Table 3.1 Screening of European sites within 15 km of the Plan boundary

Site Code	Site Name	Distance (km)	Qualifying Feature	Analysis of Likely Significant Effects	Likelihood of Significant Effects	Likelihood of In-Combination Effects
002162	River Barrow and River Nore SAC	Within	Atlantic salmon *(Salmo salar)* [1106], Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)* [1330], Estuaries [1130], European dry heaths [4030], Brook lamprey *(Lampetra planeri)* [1096], Desmoulin`s whorl snail *(Vertigo moulinsiana)* [1016], Killarney fern *(Trichomanes speciosum)* [1421], Mediterranean salt meadows *(Juncetalia maritimi)* [1410], Freshwater pearl mussel *(Margaritifera margaritifera)* [1029], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430], Alluvial forests with Alnus glutinosa and Fraxinus excelsior *(Alno-Padion, Alnion incanae, Salicion albae)* [91E0], Nore Pearl Mussel *(Margaritifera durrovensis)* [1990], Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0], Otter *(Lutra lutra)* [1355], Petrifying springs with tufa formation *(Cratoneurion)* [7220], Reefs [1170], River lamprey *(Lampetra fluviatilis)* [1099], Salicornia and other annuals colonising mud and sand [1310], Sea lamprey *(Petromyzon marinus)* [1095], Twaite shad *(Alosa fallax)* [1103], Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], White-clawed crayfish *(Austropotamobius pallipes)* [1092], Mudflats and sandflats not covered by seawater at low tide [1140]	The Plan provides a framework for land use development and activities with potential for construction and operation source effects throughout the Plan area. This SAC is sensitive to direct land use management activities, hydrological interactions and groundwater interactions. Considering the QIs of this SAC, the nature of the Plan (refer to Section 2), and given that the SAC is partially within the Plan area, sources for potential significant effect have been identified for direct land use management activities and for hydrological interactions, via both groundwater and surface hydrological interactions, within the Plan. Considering groundwater interactions: groundwater is reliant on and interacts with a myriad of hydrogeological and landscape characteristics[18]; and has been shown to be heavily influenced by the direct management of soil, rivers and streams[19]. It has also been shown that the effects from groundwater contaminants are diluted through volume of water[20]. However, given that this SAC exists partially within the Plan area, a pathway for likely significant effects via groundwater has been identified as: the SAC and Plan area are within the same groundwater body[21] (Figure 3.3); and sources for potential effects regarding groundwater interactions have been identified in the Plan. Thus, sources with pathways for likely significant effects to this European site, resulting from the implementation of the Plan, have been identified. As a result, further consideration is required under Article 6(3) of the Habitats Directive and a Natura Impact Report is required.	Yes	Yes
000781	Slaney River Valley SAC	6.5	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], Brook lamprey *(Lampetra planeri)* [1096], Estuaries [1130], Freshwater pearl mussel *(Margaritifera margaritifera)* [1029], Harbour seal *(Phoca vitulina)* [1365], Mediterranean salt meadows *(Juncetalia maritimi)* [1410], Mudflats and sandflats not covered by seawater at low tide [1140], Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0], Otter *(Lutra lutra)* [1355], River lamprey *(Lampetra fluviatilis)* [1099], Sea lamprey *(Petromyzon marinus)* [1095], Twaite shad *(Alosa fallax)* [1103], Alluvial forests with Alnus glutinosa and Fraxinus excelsior *(Alno-Padion, Alnion incanae, Salicion albae)* [91E0], Atlantic salmon *(Salmo salar)* [1106], Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)* [1330]	The Plan provides a framework for land use development and activities with potential for construction and operation source effects throughout the Plan area. This SAC is sensitive to direct land use management activities, hydrological interactions, groundwater interactions. This site exists 6.5 km outside of the Plan area. There is no direct surface hydrological connection between the Plan area and this site and there is no shared groundwater body between the Plan area and this European site. Considering the QIs of this SAC and given the nature of the Plan and the distances involved, there are no potential pathways for direct land use management effects, as the site is outside of the Plan area. In addition, there are no direct surface hydrological or groundwater pathways between the site and the Plan area, therefore, there are no pathways for potential significant effect for hydrological interactions to the SAC. Thus, there are no sources with pathways for likely significant effects identified and no further assessment is required.	No	No

[18] Wehncke, E.V. & Mariano, N.A., 2021. Groundwater and Its Role in Maintaining the Ecological Functions of Ecosystems—A Review. *Intensified Land and Water Use: A Holistic Perspective of Local to Regional Integration*, pp.55-86.
[19] Silva, A.C.F. *et al.* 2012. Estuarine biodiversity as an indicator of groundwater discharge. *Estuarine, Coastal and Shelf Science*, *97*, pp.38-43.
[20] Lasagna, M. *et al.* 2013. Effect of the dilution process on the attenuation of contaminants in aquifers. *Environmental earth sciences*, *70*(6), pp.2767-2784.
[21] EPA groundwater datasets. Available at: https://gis.epa.ie/EPAMaps/

Site Code	Site Name	Distance (km)	Qualifying Feature	Analysis of Likely Significant Effects	Likelihood of Significant Effects	Likelihood of In-Combination Effects
001757	Holdenstown Bog SAC	13.9	Transition mires and quaking bogs [7140]	The Plan provides a framework for land use development and activities with potential for construction and operation source effects throughout the Plan area. This SAC is sensitive to direct land use management activities, hydrological interactions and groundwater interactions. This site exists 13.9 km outside of the Plan area. There is no direct surface hydrological connection between the Plan area and this site and there is no shared groundwater body between the Plan area and this European site. Considering the QI of this SAC and given the nature of the Plan and the distances involved, there are no potential pathways for direct land use management effects, as the site is outside of the Plan area. In addition, there are no direct surface hydrological or groundwater pathways between the site and the Plan area, therefore, there are no pathways for potential significant effect for hydrological interactions to the SAC. Thus, there are no sources with pathways for likely significant effects identified and no further assessment is required.	No	No
000770	Blackstairs Mountains SAC	19.4	European dry heaths [4030], Northern Atlantic wet heaths with Erica tetralix [4010]	The Plan provides a framework for land use development and activities with potential for construction and operation source effects throughout the Plan area. This SAC is sensitive to direct land use management activities, hydrological interactions and groundwater interactions. This site exists 19.4 km outside of the Plan area. There is no direct surface hydrological connection between the Plan area and this site. However, this European site has groundwater sensitive Qualifying Interests and does share the same groundwater body as the Plan area (Figure 3.3). Considering groundwater interactions: groundwater is reliant on and interacts with a myriad of hydrogeological and landscape characteristics[22], and has been shown to be heavily influenced by the direct management of soil, rivers and streams[23]. It has also been shown that the effects from groundwater contaminants are diluted through volume of water[24]. Considering the nature of the Plan, and distance between the Plan area and this SAC, there is considerable dilution effect, and therefore no pathway for potential significant effects to the QIs has been identified. Considering the QIs of this SAC and given the nature of the Plan and the distances involved, there are no pathways for direct land use management effects, as the site is outside of the Plan area. In addition, there are no direct surface hydrological pathways between the site and the Plan area, therefore, there are no pathways for potential significant effect for hydrological interactions to the SAC. Thus, there are no sources with pathways for likely significant effects identified and no further assessment is required.	No	No
004237	Seas off Wexford SPA	55.27	Fulmar *(Fulmarus glacialis)* [A009], Manx Shearwater *(Puffinus puffinus)* [A013], Roseate Tern *(Sterna dougallii)* [A192], Kittiwake *(Rissa tridactyla)* [A188], Little Tern *(Sterna albifrons)* [A195], Shag *(Phalacrocorax aristotelis)* [A018], Herring Gull *(Larus argentatus)* [A184], Lesser Black-backed Gull *(Larus fuscus)* [A183], Puffin *(Fratercula arctica)* [A204], Common Tern *(Sterna hirundo)* [A193], Gannet *(Morus bassanus)* [A016], Guillemot *(Uria aalge)* [A199], Common Scoter *(Melanitta nigra)* [A065], Black-headed Gull *(Chroicocephalus ridibundus)* [A179], Red-throated	The Plan provides a framework for land use development and activities with potential for construction and operation source effects throughout the Plan area. This SPA is sensitive to direct land use management activities, hydrological interactions and disturbance effects. This site exists 55.27 km outside of the Plan area. There is a direct surface hydrological connection between the Draft Plan area and this site. SCI species are sensitive to disturbance effects; in general distances beyond 2 km are seen to be sufficient to preclude such effects[25,26]. These distances can vary due to factors such as species and/or time of year[27,28]. Given the distance between the Draft Plan area and the SPA there are no pathways for disturbance effects identified.	No	No

[22] Wehncke, E.V. & Mariano, N.A., 2021. Groundwater and Its Role in Maintaining the Ecological Functions of Ecosystems—A Review. *Intensified Land and Water Use: A Holistic Perspective of Local to Regional Integration*, pp.55-86.
[23] Silva, A.C.F. *et al*. 2012. Estuarine biodiversity as an indicator of groundwater discharge. *Estuarine, Coastal and Shelf Science*, *97*, pp.38-43.
[24] Lasagna, M. *et al*. 2013. Effect of the dilution process on the attenuation of contaminants in aquifers. *Environmental earth sciences*, *70*(6), pp.2767-2784.
[25] Rudock, M. and Whitfield, D.P., 2007. A review of disturbance distances in selected bird species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage, 181.
[26] Bright, J.A., Langston, R. and Anthony, S., 2009. Mapped and written guidance in relation to birds and onshore wind energy development in England. Sandy: RSPB.
[27] Bötsch, Y., Tablado, Z. and Jenni, L., 2017. Experimental evidence of human recreational disturbance effects on bird-territory establishment. Proceedings of the Royal Society B: Biological Sciences, 284(1858), p.20170846.
[28] Goss-Custard, J.D., Hoppe, C.H., Hood, M.J. and Stillman, R.A., 2020. Disturbance does not have a significant impact on waders in an estuary close to conurbations: importance of overlap between birds and people in time and space. Ibis, 162(3), pp.845-862.

Site Code	Site Name	Distance (km)	Qualifying Feature	Analysis of Likely Significant Effects	Likelihood of Significant Effects	Likelihood of In-Combination Effects
			Diver *(Gavia stellata)* [A001], Sandwich Tern *(Sterna sandvicensis)* [A191], Cormorant *(Phalacrocorax carbo)* [A017], Razorbill *(Alca torda)* [A200], Mediterranean Gull *(Larus melanocephalus)* [A176], Arctic Tern *(Sterna paradisaea)* [A194]	SCI species are highly vagile and therefore may utilise ex-situ ecological resources which may have interactions with the Draft Plan; however, at this scale landscape characteristics and the availability of alternate resources ensure the local scale interactions with ex-situ resources are not likely to have significant effects on the SPA. Considering the SCIs of this SPA, and given the nature of the Draft Plan and the distance involved between the Draft Plan area and the SPA, there are no sources of effect for direct land use management or disturbance effects to the SPA. In addition, there are no sources of effect for hydrological interactions considering the distances involved and the significant dilution effect along the direct surface hydrological connection. Thus, there are no sources with pathways for likely significant effects foreseen and no further assessment is required		
000764	Hook Head SAC	67.78	Vegetated sea cliffs of the Atlantic and Baltic Coasts [1230], Large shallow inlets and bays [1160], Reefs [1170], Common Bottlenose Dolphin (*Tursiops truncatus*) [1349], Harbour Porpoise (*Phocoena phocoena*) [1351]	The Plan provides a framework for land use development and activities with potential for construction and operation source effects throughout the Plan area. This SAC is sensitive to direct land use management activities, hydrological interactions and disturbance effects. This site exists 67.78 km outside of the Plan area. There is a direct surface hydrological connection between the Draft Plan area and this European site. Considering the QIs of this SAC, and given the nature of the Draft Plan and the distance involved between the Draft Plan area and the SAC, there are no sources of effect for direct land use management or disturbance effects to the SAC. In addition, there are no sources of effect for hydrological interactions considering the distances involved and the significant dilution effect along the direct surface hydrological connection. Thus, there are no sources with pathways for likely significant effects foreseen and no further assessment is required.	No	No

3.4 In Combination Effects

Article 6(3) of the Habitats Directive requires an assessment of a plan or project to consider other plans or programmes that might, in combination with the plan or project, have the likelihood for potential significant effects on European sites. Appendix II outlines a selection of plans or projects that may interact with the Plan to cause in-combination effects on European sites, such as: Carlow County Development Plan 2022-2028; Laois County Development Plan 2021-2027; Carlow Noise Action Plan 2018-2023; Laois County Council Noise Action Plan 2019-2022; Carlow County Council Climate Action Plan 2024-2029; Laois County Council Climate Action Plan 2024-2029; Laois County Council Climate Change Adaptation Strategy; Carlow County Council Climate Change Adaptation Strategy; Carlow Biodiversity Action Plan 2023-2028; Carlow Town Biodiversity Strategy and Action Plan 2021-2025; and Laois Heritage and Biodiversity Strategy 2021-2026. These plans and programmes were considered throughout the assessment.

All projects within the Plan area and receiving environment will be considered in combination with any and all lower tiers projects that may arise due to the implementation of the Plan. Given the uncertainties that exist with regard to the scale and location of developments facilitated by the Plan, it is recognised that the identification of in-combination effects is limited and that the assessment of in-combination effects will need to be undertaken in a more comprehensive manner at the project-level.

Additional information on the relationship with other plans and programmes is provided at Appendix II.

3.5 Conclusion

The potential effects that could arise from the Plan have been examined in the context of several factors that could result in likely significant effects to any European site. On the basis of the findings presented above, it is demonstrated that the Plan:

- Is not directly connected with or necessary to the management of any European site; and
- May, if unmitigated, have likely significant effects on 1 (no.) European site.

Therefore, under Article 6(3) of the Habitats Directive, a Stage 2 AA was determined as being required for the Draft Carlow-Graiguecullen Joint Urban Local Area Plan 2024-2030. Section 4 of this report provides information in order to inform the competent authority on carrying out Stage 2 AA. An AA Screening Determination undertaken by the planning authority is provided at Figure 3.4.

COMHAIRLE CONTAE CHEATHARLACH
CARLOW COUNTY COUNCIL

Laois County Council
Áras an Chontae, Portlaoise, Co Laois

Screening for Appropriate Assessment

Determination

under
Section 177U of the Planning and Development Act 2000, as amended,
for the

Emerging Draft Carlow-Graiguecullen Joint Urban Draft Local Area Plan 2024-2030

In order to comply with the requirements of the Planning and Development Act 2000, as amended, this determination has been made by Carlow County Council and Laois County Council relating to the potential for the emerging Draft Carlow-Graiguecullen Joint Urban Draft Joint Local Area Plan 2024-2030 (Draft JULAP) to have effects on the integrity of European Sites.

In making the determination that Appropriate Assessment (AA) is required, the information on the potential effects on the integrity of European Sites arising from the emerging Draft JULAP has been taken into account (this information will be placed on public display in the Natura Impact Report alongside the emerging Draft JULAP). The process of screening for AA began at an early stage in the drafting of the JULAP. The screening process assessed whether the emerging Draft JULAP had the potential to have effects on the integrity of any European Site, either alone or in combination with other plans and projects.

The screening process concluded that an AA of the emerging Draft JULAP would be required, as the Plan is not directly connected with or necessary to the management of European Sites; and may, on the basis of objective information, individually, or in combination with other plans and projects, if unmitigated have adverse effects on the integrity of 1 (no.) European Site.

Factors that could potentially affect the integrity of European Sites include:

- The JULAP's provisions, including those relating to housing, economic development, retail and tourism, urban design, town centre and regeneration, sustainable travel and transportation, infrastructure and environmental services, sustainable communities, built heritage, natural heritage, green infrastructure and landscape, climate action and land use zoning and implementation, which introduce sources for potential effects through construction phase such as habitat loss, light pollution, disturbance effects and hydrological interactions through surface hydrological connectivity and/or shared groundwater sources;
- Loading pressures from the operational phase of developments – these sources could result in habitat loss/fragmentation, light pollution, disturbance effects and interactions with water quality (surface and/or groundwater); and
- Increases in visitor numbers to ecologically sensitive areas during the operational phase of developments which have potential to introduce sources for significant effects, such as recreational and tourism developments.

Therefore, Stage 2 AA (including the preparation of the Natura Impact Report) is required for the emerging Draft JULAP.

The undersigned, having carefully considered the information referred to above agrees with and adopts the reasoning and conclusion presented above. The undersigned hereby determines pursuant to Section 177U of the Planning and Development Act 2000, as amended, and for the purposes of Article 6(3) of the Habitats Directive that it could not be excluded, on the basis of objective information, that the emerging Draft JULAP, individually, or in combination with other plans and projects would have a likely adverse effect on the integrity of a European Site. Therefore, an AA is required.

Signatories:

Carlow county Council Director of Services

Date:

Laois County Council Director of Services

Date: 11th December 2023.

Figure 3.4 Screening for Appropriate Assessment Determination

Section 4 Informing Stage 2 Appropriate Assessment

4.1 Introduction

This Natura Impact Report is compiled to inform the competent authority on Stage 2 of the AA process, and in assessing whether the Plan, alone, or in-combination with other plans, programmes, and/or projects, may result in adverse effects on the integrity of the 1 (no.) European site brought forward from screening (for more information refer to Section 3 above) – i.e., those sites considered in Table 3.1, for which a "Likelihood of Significant Effects" and/or "Likelihood of Significant In-Combination Effects" has been identified, with respect to site structure, function, Qualifying Interests, and Conservation Objectives of each European site considered.

4.2 Characterisation of European sites Potentially Affected

Screening for AA (for more information refer to Section 3 above) identified 1 (no.) European site with pathway receptors for potential effects arising from the implementation of the Plan. Appendix I characterises each of the 1 (no.) European site brought forward from Stage 1 in context of each sites' Qualifying Interests and Conservation Objectives (as listed by the NPWS[29]).

4.3 Identifying and Characterising Potential Adverse Effects[30]

The following parameters can be used when characterising impacts[31]:

Direct and Indirect Impacts - An impact can be caused either as a direct or as an indirect consequence of a Plan/Project.
Magnitude - Magnitude measures the size of an impact, which is described as high, medium, low, very low or negligible.
Extent - The area over that the impact occurs – this should be predicted in a quantified manner.
Duration - The time that the effect is expected to last prior to recovery or replacement of the resource or feature.

- Temporary: Up to 1 Year;
- Short Term: The effects would take 1-7 years to be mitigated;
- Medium Term: The effects would take 7-15 years to be mitigated;
- Long Term: The effects would take 15-60 years to be mitigated; and
- Permanent: The effects would take 60+ years to be mitigated.

Likelihood – The probability of the effect occurring taking into account all available information.

- Certain/Near Certain: >95% chance of occurring as predicted;
- Probable: 50-95% chance as occurring as predicted;
- Unlikely: 5-50% chance as occurring as predicted; and
- Extremely Unlikely: <5% chance as occurring as predicted.

Ecologically Significant Impact - An impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographic area.
Integrity of a Site - The coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.

The Habitats Directive requires the focus of the assessment at this stage to be on the integrity of the site as indicated by its Conservation Objectives. It is an aim of NPWS to draw up conservation management plans for all areas designated for nature conservation. These plans will, among other things, set clear objectives for the conservation of the features of interest within a site.

Site-Specific Conservation Objectives (SSCOs) have been prepared for a number of European sites. These detailed SSCOs aim to define favourable conservation condition for the qualifying habitats and species at that site by setting targets for appropriate attributes that define the character habitat. The available site-specific conservation objectives are the clear objectives for the conservation of the features of interest within a site. The maintenance of the favourable condition for these habitats and species at the site level will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

> ***Favourable conservation status*** *of a* ***species*** *can be described as being achieved when: 'population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced*

[29] Available at https://www.npws.ie/protected-sites .
[30] Note that non-material changes to individual Plan provisions referenced in this report may be updated during the finalisation of the Plan, including numbering, formatting and graphic design.
[31] These descriptions are informed by publications including: Chartered Institute of Ecology and Environmental Management (2016) "Guidelines for ecological impact assessment"; Environmental Protection Agency (2002) "Guidelines on the Information to be contained in Environmental Impact Statements"; and National Roads Authority (2009) "Guidelines for Assessment of Ecological Impacts of National Roads Schemes".

or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.'

Favourable conservation status *of a* ***habitat*** *can be described as being achieved when: 'its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable'.*

A First Order Site-Specific Conservation Objective for SACs:

- To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species that the SAC has been selected.

A First Order Site-Specific Conservation Objective for SPAs:

- To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

4.3.1 Types of potential effects

Assessment of potential effects on European sites is conducted utilising a standard source-pathway model (see approach referred to under Sections 1.3 and 3).

The 2002 European Commission AA guidance outlines the following potential changes that may occur at a designated site, which may result in effects on the integrity and function of that site: loss/reduction of habitat area; habitat or species fragmentation; disturbance to key species; reduction in species density; changes in key indicators of conservation value (water quality etc.); and climate change.

Relevant potential changes are considered in Table 4.1 with reference to the QIs of all of the European sites brought forward from Stage 1 of the AA process (see Section 3).

4.3.1.1 Loss/Reduction of Habitat Area

The Plan provides a framework for granting consent for land use developments and activities across various sectors (see Section 2). Potential effects arising from developments and activities include disturbance effects through light and noise pollution, dust, hydrological interactions, and airborne pollution.

Various measures have been integrated into the Plan, in alignment with the policies and objectives of the existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027, with the objective of ensuring that there are no adverse effects on the ecological integrity of any European site. In addition, the Plan introduces measures that ensure that all projects rising from the implementation of the Plan will undergo AA and EIA assessments where required. These policies ensure that there will be no loss of habitat or supporting habitat for species that are necessary to maintain the ecological integrity of European sites, and are provided in Section 5 below.

4.3.1.2 Habitat or species Fragmentation

The Plan provides a framework for granting consent for land use developments and activities across various sectors (see Plan Description in Section 2). Potential effects arising from developments and activities include the fragmentation of habitat and or species through, for example, light pollution, noise pollution or removal of stepping stone habitats.

The Plan, in alignment with the policies and objectives of the existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027, includes measures to minimise potential fragmentation, via light and noise pollution, and to facilitate the enhancement of ecological corridors such as, planting of native tree species and/or management of habitats such as riverine systems.

Further to the provisions referred to above, there are provisions related to non-designated sites and specific ecological resources and/or habitats such as hedgerows and waterways such as the Barrow and Burren Rivers. These provisions will ensure that habitat or species fragmentation, including barrier effects, does not occur in relation to the connectivity of the ecological resources necessary to maintain the ecological integrity of European sites. A full list of these mitigation measures is provided in Section 5.

4.3.1.3 Disturbance to Key Species

The Plan provides a framework for granting consent for land use developments and activities across various sectors (see Section 2).

Disturbance effects are cause by any activity that has potential to alter the movement patterns or distribution of species, for example direct disturbance through human activity/movement as a result of recreation/tourism or noise pollution. Recreational/tourism activities will be managed through provisions from both the Joint Urban Local Area Plan itself, and the existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027. Further details on the mitigation measures integrated into the Plan is provided at Section 5.

4.3.1.4 Reduction in species density

Species densities are reliant on species distributions, habitat condition, connectivity of ecological resources and availability of resources such as prey/food. The Plan introduces potential sources for effects on affect these four determinant factors for species densities in the form of construction phase effects such as hydrological interaction or operational effects such as disturbance effects, habitat loss, encroachment, or trampling. However, the Plan contains provisions to enhance biodiversity, landscape and the environment within the Plan area.

The Plan includes provisions related to non-designated sites and specific ecological resources and/or habitats such as hedgerows, treelines, and waterways, such as the Barrow and Burren Rivers, that will ensure that habitat or species fragmentation, including barrier effects, does not occur in relation to the connectivity of the ecological resources necessary to maintain the species' densities and ecological integrity of European sites. Measures are also included in the existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027 that will help protect and improve water quality interactions, which can influence species densities, including those relating to water services infrastructure, protective buffer zones and water quality standards.

4.3.1.5 Changes of Indicators of Conservation Value

Indicators of conservation value are identified as key ecological resources such as water quality, air quality, habitat quality, population health of ecosystem engineers or 'keystone species' etc. The protection of these resources is a key focus of the Joint Urban Local Area Plan and the existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027.

The Plan, including its alignment with the policies and objectives of the existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027, has many robust policies and objectives to ensure the protection of ground and surface water quality, riverine systems and habitat quality as provided the full list of mitigation measures in Table 5.1.

4.3.1.6 Climate change

Climate provisions within the existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027 with which the Plan is aligned, provide for policies that will ensure alignment with and adherence to emissions targets locally and nationally. The Joint Urban Local Area Plan includes various provisions, as listed in Section 5 below, that will help to contribute towards climate mitigation, the reduction of emissions and meeting climate targets. Therefore, at the Plan level, greenhouse gas emissions arising from the Plan will not affect changes projected to arise from climate change to the degree that it would affect the QIs or SCIs of the European sites considered.

Table 4.1 Characterisation of Adverse Effects arising from the Plan

Site Code	Site Name	Characterisation of adverse effects against mitigation measures
002162	River Barrow and River Nore SAC	The known threats to this site are: industrial or commercial areas, intensive cattle grazing, sand and gravel quarries, agricultural intensification, peat extraction, dredging or removal of limnic sediments, modifying structures of inland water courses, fishing and harvesting aquatic resources, port areas, use of fertilizers (forestry), invasive non-native species, forest replanting (native trees), netting, leisure fishing, human induced changes in hydraulic conditions, dykes and flooding defence in inland water systems, erosion, water abstractions from surface waters, changes in abiotic conditions, forest and plantation management & use, removal of hedges and copses or scrub, intensive fish farming, intensification, pollution to surface waters (limnic & terrestrial, marine & brackish), reduction in migration or migration barriers. These pressures relate to: direct land use management, built environment, agriculture, extractive industry, flood risk management, hydrological changes, aquaculture, coastal development, invasive species, forestry, leisure activities, land take and pollution. There are no provisions in the Plan that introduce sources for potential effect from aquaculture, coastal development, forestry or extractive industries to this European site as a result of implementation of the Plan, therefore there are no sources for effects in this regard. The Plan does present sources for potential adverse effects from direct land use management, agriculture, flood risk management, hydrological changes, invasive species, amenity and leisure activities, land take, built environment and pollution, and direct pathways have been identified due to presence of the SAC within the Plan boundary. Therefore, the following mitigation measures have been integrated into the Plan to ensure no adverse effects occur to this European site as a result of the implementation of the Plan: • No direct land take or habitat loss will occur due to implementation of the Plan wither within any European sites or any connectivity corridors necessary to support the ecological integrity of the site, due to policies such as NH. P5, NH. P6, NH. P7, NH. P8 and NH. P9 and compliance with the current Carlow County Development Plan's and Laois County Development Plan's policies and objectives regarding maintenance of supporting or connecting habitat for European sites. • The sustainable and appropriate management of agricultural practices will be appropriately managed in Plan area via compliance with the current Carlow County Development Plan's and Laois County Development Plan's policies and objectives regarding maintenance of supporting or connecting habitat for European sites • The provision and maintenance of good water quality standards and services throughout the Plan area is provided for via policies such as: PW. P1, PW. P2, WW. P1 and WW. P2 70 and compliance with the current Carlow County Development Plan's and Laois County Development Plan's policies and objectives regarding maintenance of supporting or connecting habitat for European sites. • Provision for the protection of riverine systems in the Plan area are adequately provided for via policies such as: SG.01 and SG. O2 and compliance with the current Carlow County Development Plan's and Laois County Development Plan's policies and objectives regarding maintenance of supporting or connecting habitat for European sites. • The Plan also provides for the appropriate management of flood risk zones and measures to mitigate against flood risk within the Plan area via policies such as: FR. P3, FR. P4, FR. P5 AND FR. P6 and compliance with the current Carlow County Development Plan's and Laois County Development Plan's policies and objectives regarding maintenance of supporting or connecting habitat for European sites. • Built environment will be appropriately managed in Plan area through policies such SG. O2 surrounding water quality and development proposals; URD. P11 regarding restricting inappropriate development around waterways; and, compliance with the current Carlow County Development Plan's and Laois County Development Plan's policies and objectives regarding maintenance of supporting or connecting habitat for European sites. • The local amenity and leisure use of sites and tourism is encouraged throughout the plan but with due consideration for sustainability, local biodiversity and European sites through policies objectives such as TD. P1, TD. P4, TD. P11 and TD. P12. • The control and management of the spread and occurrence of invasive species is ensured via compliance with the current Carlow County Development Plan's and Laois County Development Plan's policies and objectives regarding maintenance of supporting or connecting habitat for European sites. For further details in relation to mitigation measures/Policy Objectives incorporated into the Plan please refer to Section 5 below.

Section 5 Mitigation Measures

This section outlines measures that have been incorporated into the Plan and associated existing Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027, in order to mitigate against potential significant effects on European sites as identified above.

These mitigation measures have been designed to ensure that there will be no effects on the ecological integrity of any European site resulting from the implementation of the Plan. The mitigation measures that are most relevant to the protection of European sites resulting from the potential sources and pathways effects identified in Section 3.3 are identified in Table 5.1 below.

All mitigation measures apply to all developments and European sites, as relevant, to be determined at project level, when the nature, location, size, layout and operational processes associated with individual and combinations of projects are known.

Table 5.1 Measures that will protect European sites and their sustaining resources integrated into the Plan

Sources and/or pathways for adverse effects[32]	Respective Plan Development Objectives / Mitigation Measure(s)
Alignment with County Development Plans	**Chapter 12, Section 12.0** states the following: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence."
Natural Heritage and Biodiversity	**SO. 7:** Manage the development of Carlow-Graiguecullen in a manner that protects, conserves, and enhances the natural, built and archaeological heritage of the area. **TD. P5:** Protect and conserve the natural and built heritage of Carlow-Graiguecullen upon which the tourism industry is based, including landscapes, designated sites, habitats and species, water quality, archaeology and historic buildings and structures. **TD. P17:** Protect the environmental amenities of Carlow-Graiguecullen from insensitive or inappropriate development, particularly any development that threatens the tourism resources of the joint urban area. **SR. P10:** Protect and develop the connected networks of existing green spaces in the joint urban area to serve the grow NH. P1: Protect, manage, and enhance the natural heritage, biodiversity, landscape, and environment of Carlow-Graiguecullen in recognition of its importance as a non-renewable resource, a unique identifier, as a natural resource, an ecosystem services asset that can contribute towards sustainable urban drainage, flood management, and climate action. **NH. P3:** Ensure that Appropriate Assessment Screening, and if required Appropriate Assessment, is carried out in respect of plans and projects in Carlow-Graiguecullen. Where likely significant effects have been identified in respect of any plan or project not directly connected with or necessary to the management of European sites, in particular the River Barrow and River Nore SAC, either individually or in combination with other plans or projects, ensure Appropriate Assessment in accordance with Article 6(3) of the EU Habitats Directive. Carlow County Council and Laois County Council shall only agree to the plan or project after having ascertained that it will not adversely affect the integrity of any European site, in particular the River Barrow and River Nore SAC, unless the plan or project is subject to the provisions of Article 6(4) of the Habitats Directive. **NH. P4:** Contribute towards the protection, from significant adverse effects, of the ecological integrity, and the visual, recreational, environmental and amenity value of the Oak Park proposed Natural Heritage Area (pNHA) and associated habitats. **NH. P5:** Promote the carrying out of ecological/habitat assessments to inform the layout and design of development proposals and ensure they integrate the protection and enhancement of biodiversity and landscape features wherever possible in Carlow-Graiguecullen, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate. **NH. P6:** Promote increased understanding and awareness of the natural heritage and biodiversity located in the joint urban area of Carlow-Graiguecullen. **NH. P7:** Promote development for recreation and educational purposes that does not conflict with maintaining the favourable conservation status of the River Barrow and River Nore SAC and Oak Park pNHA, including the achievement of their conservation objectives. **NH. P8:** Promote, protect, and enhance sustainable and appropriate access to natural heritage in Carlow-Graiguecullen. **NH. P9:** Identify, protect, conserve, and enhance wherever possible, wildlife habitats and species of local importance in Carlow-Graiguecullen, not otherwise protected by legislation. Such habitats can include woodland, river, wetlands, and grassland areas along with field boundaries (hedgerows, stone walls and ditches). These features form part of a network of habitats and corridors, which allow wildlife to exist and flourish and contribute to compliance with Article 10 of the Habitats Directive **H. P10:** Protect and enhance the natural environment of Carlow-Graiguecullen and recognise the important role of the natural heritage in the area through its diversity, quality, and integrity, and in terms of enhancing the image of the joint urban area and contributing to quality of life and wellbeing, economic growth, tourism and recreation. **GI. P10:** Promote appropriate tree planting and pollinator friendly planting, in accordance with the recommendations of the All-Ireland Pollinator Plan 2021-2025 throughout Carlow-Graiguecullen and in open spaces within new developments, in order to enhance local biodiversity, visual amenity and surface water management. **GI. P11:** Ensure that green areas and open spaces associated with new residential developments and other relevant projects provide multifunctional benefits that enrich quality of life for local communities, ecologically rich areas that enhance biodiversity, and sustainable water management. **GI. P14:** Seek to protect trees and hedgerows in the joint urban area with a particular local amenity or conservation value and encourage the planting of native tree and hedgerow species. **GI. P15:** To have regard to the objectives and targets in the National Biodiversity Action Plan as appropriate in the future development of the Carlow-Graiguecullen Joint Urban Area.

[32] The measures generally benefit multiple environmental components i.e., a measure providing for the protection of water could beneficially impact upon the protection of biodiversity, flora and fauna, for example. All of the measures included in this table would benefit the protection of European sites.

Sources and/or pathways for adverse effects[32]	Respective Plan Development Objectives / Mitigation Measure(s)
	GI. O1: Support the implementation of the Carlow Town Biodiversity Strategy and Action Plan 2021-2025, and any subsequent updated version this document. **GI. O2:** Investigate the feasibility of providing a wetland amenity area on lands comprising the former Sugar Factory lagoons, in conjunction with relevant stakeholders and local community groups, taking account of the environmental sensitivities of the land and the need to ensure impacts to biodiversity and nature conservation interests are avoided while detailing recommendations for the ecological and hydrological management of the site.
Peatlands, wetlands and surface water courses	**URD. P11:** Support the development of underutilised lands along the River Barrow as a strategic natural asset for the town. Any future development of these lands or proposals for an additional bridge should be subject to further studies to inform the exact nature and intensity that could be accommodated without giving rise to adverse effects on sensitive Natura 2000 habitats and consider any in combination effects arising from proposals for a bridge. **PW. P6:** Contribute towards the protection of existing and potential water resources, and their use by humans and wildlife, including rivers, streams, and groundwater, and associated habitats and species, in accordance with the standards and requirements set out in EU and national legislation and guidance. **FR. O2:** Seek to ensure that where flood risk management works take place that the natural and cultural heritage of the River Barrow and Burren River is protected and improved where possible. **SR. O1:** Deliver the River Barrow Water Activity Centre subject to the availability of financing and compliance with all planning and environmental criteria. **NH. P2:** Support the conservation and enhancement of the River Barrow and River Nore SAC, and to protect the SAC from any plans and projects that are likely to have a significant effect on the coherence or integrity of the designated site, in accordance with relevant EU environmental directives and applicable national legislation, policies, plans and guidelines. **GI. P11:** Ensure that green areas and open spaces associated with new residential developments and other relevant projects provide multifunctional benefits that enrich quality of life for local communities, ecologically rich areas that enhance biodiversity, and sustainable water management. **GI. P12:** Take account of Inland Fisheries guidance 'Planning for Watercourses in the Urban Environment, A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate/Flood Risk and Recreational Planning' (2020) when considering development proposals in the vicinity of rivers and streams in Carlow-Graiguecullen. **LC. P6:** Ensure the effective management of lands adjoining the River Barrow and Burren River and in a manner that maximises views and interactions with these important landscape features in the joint urban area, taking account of the environmental sensitivities of these lands and the need to ensure impacts to biodiversity and nature conservation interests are avoided.
Water services, groundwater and water quality	**PW. P1:** Support Uisce Éireann in the provision of a sufficient quantity and quality of water to serve the needs of the existing and future population of Carlow-Graiguecullen over the period of the Plan and in accordance with the Core Strategies of Carlow and Laois County Councils, and to promote the sustainable management of the water supply for the joint urban area. **PW. P2:** Ensure that new developments will be required to connect to the public water supply network in Carlow-Graiguecullen where public water mains are available, and subject to connection agreements with Uisce Éireann and compliance with normal planning and environmental criteria. **WW. P1:** Facilitate and support Uisce Éireann in the delivery of public wastewater services in Carlow-Graiguecullen to serve the needs of the existing and future population of the Plan area, subject to compliance with normal planning and environmental criteria and the standards and requirements set out in EU and national legislation and guidance. **WW. P2:** Encourage the decommissioning of existing on-site private wastewater treatment systems and the connection of properties to the public wastewater network in Carlow-Graiguecullen wherever feasible, to minimise risk of groundwater pollution and subject to connection agreements with Uisce Éireann and compliance with normal planning and environmental criteria and the standards and requirements set out in EU and national legislation and guidance. The provision of individual wastewater treatment systems within the Plan boundary will be strongly discouraged to minimise the risk of groundwater pollution. **WW. O2:** Implement, in conjunction with Uisce Éireann, the relevant recommendations set out in the EPA (2022) publication 'Urban Waste Water Treatment in 2021' and any subsequent update to this document. **SG. P1:** Maintain and enhance the existing surface water drainage systems in Carlow-Graiguecullen and to protect surface and ground water quality in accordance with the Water Framework Directive. **SG. P2:** Require the use of Sustainable Urban Drainage Systems (SuDS) within development proposals and infrastructure projects, in accordance with the DHLGH Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document, 2022' (and any subsequent amendments or revisions to the document), Carlow County Council's SuDS Policy, and Laois County Council's Storm Water Management Policy as appropriate, in order to reduce flood risk, improve water quality and enhance biodiversity and amenity in the joint urban area. **SG. P3:** Ensure that all development proposals maintain surface water discharge at greenfield run-off rate, including an allowance for climate change. **SG. O1:** Maintain, improve, and enhance the environmental and ecological quality of surface waters and groundwater in Carlow-Graiguecullen in conjunction with the Environmental Protection Agency (EPA) and in accordance with the River Basin Management Plan for Ireland 2018-2021 and any subsequent amendments or revisions to the Plan. **SG. O2:** Require applicants, where necessary, to demonstrate that development proposals will not negatively impact on any surface water or groundwater body and be compliant with the requirements of the Water Framework Directive and measures to protect and improve our water bodies set down in the River Basin Management Plan for Ireland 2018 – 2021 and any subsequent amendments or revisions to the Plan.

Sources and/or pathways for adverse effects[32]	**Respective Plan Development Objectives / Mitigation Measure(s)**
	SW. P1: Ensure that all development proposals where viable incorporate Sustainable Urban Drainage Systems (SuDS) and other nature-based surface water drainage solutions.
Tourism	**TD. P1:** Support and facilitate the development of the tourism industry in Carlow-Graiguecullen with an emphasis on utilising and harnessing the potential of the natural and built heritage of the joint urban area, subject to compliance with normal planning and environmental criteria. **TD. P4:** Work with key stakeholders, including Carlow Tourism, Fáilte Ireland, the OPW, the Arts Council, the Heritage Council, and key stakeholders, businesses, and local communities, to support the sustainable development and promotion of heritage tourism in Carlow-Graiguecullen. **TD. P11:** Support the provision of ancillary infrastructure and services that enhance the user experience of the River Barrow and Burren River and which increase tourism activity associated with water-based activities, where appropriate and feasible to do so and subject to normal planning and environmental criteria. **TD. P12:** Facilitate, where appropriate, increased access to the River Barrow and Burren River, subject to compliance with normal planning and environmental criteria. **TD. O1:** Support, promote and maximise the role of Carlow Town as a designated Ireland's Ancient East 'Destination Town', and to engage with Fáilte Ireland in developing and promoting future tourism initiatives in the town, including enhancement of public space, the development of a way finding project and welcome signage, transport links, accommodation, the night-time economy, and the sustainable development of our natural and built heritage, in order to capitalise on the potential benefit of the funding for the town.
Built environment	**CC. P1:** Support and promote the role of Croí Cónaithe (Towns) in delivering the refurbishment of vacant properties in Carlow-Graiguecullen for residential use and as a means of encouraging town centre living in the joint urban area, and subject to compliance with proper planning and environmental considerations. **UVD. P1:** Encourage and facilitate the appropriate regeneration and reuse of underutilised, vacant, and derelict buildings and sites. Both Councils will continue to use their statutory powers, where appropriate, to consider such buildings and sites for inclusion in the Residential Zoned Land Tax or Register of Derelict Sites. **URD. P7:** Support increased building heights for river frontage lands in the joint urban area, including along the River Barrow, subject to compliance with best practice urban design, and proper planning and environmental considerations. **URD. P11:** Support the development of underutilised lands along the River Barrow as a strategic natural asset for the town. Any future development of these lands or proposals for an additional bridge should be subject to further studies to inform the exact nature and intensity that could be accommodated without giving rise to adverse effects on sensitive Natura 2000 habitats and consider any in combination effects arising from proposals for a bridge. **W. O1:** Support and facilitate the delivery of new and improved walking and cycling network in Carlow-Graiguecullen, which delivers permeability enhancements and connections where appropriate as identified in the Area Based Transport Assessment (ABTA) and in Figures 6.4 and 6.5, in conjunction with the National Transport Authority, other statutory agencies, and relevant stakeholders. Final design details shall be subject to appropriate environmental assessment and undergo a separate public consultation process where applicable.
Invasive species	The management of invasive species' occurrence and risk where required is provided for by adherence to the policies and objectives of the current Carlow County Development Plan 2022-2028 and the current Laois County Development Plan 2021-2027, via Section 12.0 of Chapter 12, as outlined below: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence." This statement therefore renders any development or project resulting from the implementation of this Plan subject to compliance with invasive species policy objectives IS. P1, IS. P2, IS. P3, IS. O1, IS. 02 and IS. O3 of the current Carlow County Development Plan 2022-2028 and BNH 5 of the current Laois County Development Plan 2021-2027.
Agriculture	The management of sustainable and appropriate agricultural practices where required is provided for by adherence to the policies and objectives of the current Carlow County Development Plan 2022-2028 and the current Laois County Development Plan 2021-2027, via Section 12.0 of Chapter 12, as outlined below: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence." This statement therefore renders any development or project resulting from the implementation of this Plan subject to compliance with agriculture policy objectives AG. P3 and AG. P4 of the current Carlow County Development Plan 2022-2028 and RL2 and ES32 of the current Laois County Development Plan 2021-2027.

Sources and/or pathways for adverse effects[32]	**Respective Plan Development Objectives / Mitigation Measure(s)**
Flood Risk Management	**FR. P1:** Ensure that all development proposals in Carlow- Graiguecullen comply with the requirements of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (and any future revisions or updates to these Guidelines), in particular through the application of the sequential approach and the Development Management Justification Test. **FR. P2:** Have regard to the findings and recommendations of the Strategic Flood Risk Assessment (SFRA) carried out for this Joint Urban Local Area Plan. **FR. P3:** Carry out flood risk assessment for the purpose of regulating, restricting, and controlling development in areas at risk of flooding in Carlow-Graiguecullen and to minimise the level of flood risk to people, business, infrastructure and the environment through the identification and management of existing and potential future flood risk. **FR. P4:** Require the submission of a Site-Specific Flood Risk Assessments (FRA) in areas at risk of flooding in Carlow-Graiguecullen. The assessment shall be carried out by a suitably qualified and indemnified professional, shall be appropriate to the scale and nature of the risk to the proposed development and shall consider all sources of flooding. The FRA shall be prepared in accordance with the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (and any future revisions or updates to these Guidelines), and shall address climate change, residual risk, avoidance of contamination of water sources and any proposed site-specific flood management measures. **FR. P6:** Maintain a riparian (buffer) zone of not less than 10 metres between all watercourses and any development proposals to mitigate against flood risk, with the full extent of the buffer zone to be determined on a case-by-case basis by the Planning Authority, based on site specific characteristics and sensitivities and consultation with Inland Fisheries Ireland. **FR. O1:** Manage flood risk in Carlow-Graiguecullen in conjunction with the Office of Public Works (OPW) and in accordance with the requirements of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (2009), Circular PL02/2014, and any future revisions or updates to these Guidelines. **SG. P2:** Require the use of Sustainable Urban Drainage Systems (SuDS) within development proposals and infrastructure projects, in accordance with the DHLGH Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document, 2022' (and any subsequent amendments or revisions to the document), Carlow County Council's SuDS Policy, and Laois County Council's Storm Water Management Policy as appropriate, in order to reduce flood risk, improve water quality and enhance biodiversity and amenity in the joint urban area. **FR. P5:** Minimise flood risk arising from pluvial (surface water) flooding in Carlow-Graiguecullen by promoting the use of natural flood risk management measures including the use of Sustainable Urban Drainage Systems (SuDS) and nature-based solutions.
Light, air & noise pollution	The appropriate design of urban centres and hinterlands for the protection of air quality is provided for by adherence to the policies and objectives of the current Carlow County Development Plan 2022-2028 and the current Laois County Development Plan 2021-2027, via Section 12.0 of Chapter 12, as outlined below: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence." This statement therefore renders any development or project resulting from the implementation of this Plan subject to compliance with: • Light pollution objectives LP. P1 and LP. P3 of the current Carlow County Development Plan 2022-2028 and ES 50 ES 51 and ES 52 of the current Laois County Development Plan 2021-2027. • Air pollution objectives AP. P1 and AP. P2 of the current Carlow County Development Plan 2022-2028 and ES 38 - ES 42 of the current Laois County Development Plan 2021-2027; • Noise pollution objectives NP. P1, NP. P2 and NP. P3 of the current Carlow County Development Plan 2022-2028 and ES 43, ES 44, and ES 45 of the current Laois County Development Plan 2021-2027; and, **NH. P11:** Ensure that lighting proposals along water courses, rivers, and streams in the joint urban area, are not in conflict with bat species, and to ensure that expert advice is sought on such lighting proposals in order to mitigate the impacts of lighting on bats and other species and habitats.
Climate	**SO. 4:** Prioritise integrated transport and land use, supported by investment in public transport, active travel networks and shared, low-carbon mobility options, which will improve people's travel choices and support safe, sustainable, and healthy lifestyles. **SO. 6:** Transition Carlow-Graiguecullen to a low-carbon and climate resilient town through a combination of effective mitigation and adaptation measures, in addition to maximising opportunities for energy efficiency, renewables, and decarbonisation. **CS. O6:** Support the transition of Carlow-Graiguecullen to a low-carbon and climate resilient urban area through the promotion of sustainable development patterns, sustainable and active travel, and sustainable energy use, in accordance with the NPF, the RSES' for the Southern Region and Eastern and Midlands Region, and the National Climate Action Plan. **RT. O6:** Introduce measures to improve the accessibility of Carlow Town Centre, including those that prioritise pedestrians and cyclists, and where feasible those that separate pedestrian and cycle traffic from vehicular traffic.

Sources and/or pathways for adverse effects[32]	Respective Plan Development Objectives / Mitigation Measure(s)
	URD. P5: Require that development proposals facilitate a connected network of streets and spaces which prioritise pedestrians and cyclists and provides for the possibility of connections to future development on adjacent lands. **LT. P1:** Actively support an integrated approach to land use and transport planning in Carlow-Graiguecullen that promotes a shift towards a sustainable, healthy, and low carbon joint urban area with a reduced need for car-based travel, and through the prioritisation of development that is within reasonable walking and cycling distances from key employment, service, educational, and recreational areas, and key public transport nodes. **AT. P1:** Support the role of the Councils' Active Travel Teams in the promotion and delivery of sustainable and active travel infrastructure and options in Carlow-Graiguecullen, including the provision of new and enhanced walking and cycling routes, widened footpaths, and pedestrian crossings. **PT. P1:** Promote the sustainable development of Carlow-Graiguecullen by actively engaging with and supporting relevant national transport agencies in their remit to deliver improvements to the public transport network/services for the joint urban area, including at Carlow Railway Station and Carlow Bus Park, and to ensure the provision of integrated public transport services that provide an attractive and convenient alternative to private car travel thereby reducing car dependency for travel purposes. **PW. P5:** Support best practice water conservation measures in development proposals, including the use of rainwater harvesting systems, roof water collection (water butts), and grey water recycling. **CC. P1:** Promote and support the development of connected communities and the attainment of the 10-Minute town, having regard the findings of the 10-Minute Towns Study for Carlow, and with an emphasis on active travel and shorter walking and cycling timeframes to social and community facilities, improving permeability in the built environment, and encouraging a reduction in car dependency. **CA. P1:** Support the transition of Carlow-Graiguecullen to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050, by way of reducing greenhouse gases, increasing renewable energy, and improving energy efficiency and conservation. **CA. P2:** Promote and encourage positive community and/or co-operative led climate action initiatives and projects in Carlow-Graiguecullen that seek to reduce carbon emissions, improve energy efficiency and conservation, enhance green infrastructure, and encourage awareness on climate change issues and impacts. **CA. P3:** Encourage innovation and facilitate the development of pilot schemes that support climate change mitigation and adaptation measures. **CA. P4** Support the implementation of National, Regional and Local Climate Policy including support for the implementation of the National Climate Action Plan, the National Adaptation Framework, the Carlow Action Plan, the Laois Climate Action Plan and any amendments thereto over the period of this Plan. **CA. O1:** Support, in conjunction with key stakeholders, the preparation and implementation of the Climate Action Plans for County Carlow and County Laois, and to facilitate their role as a driver in the mitigation of greenhouse gas emissions and climate change adaptation in Carlow-Graiguecullen, and the translation of national climate policy to local and community levels in the joint urban area. **CA. O2:** Support and facilitate the role of the Carlow Town Decarbonisation Zone in the delivery of effective climate action at a local level, through interventions, projects, and actions aimed at reducing greenhouse gas emissions and increasing energy efficiency and conservation. **LU. P1:** Secure climate resilience and a reduction of greenhouse gas emissions in Carlow-Graiguecullen by actively implementing policies which support integrated land use planning and sustainable travel, and maximise such opportunities through development location, form, layout, and design. **UR. P1:** Secure climate resilience and a reduction of greenhouse gas emissions in Carlow-Graiguecullen through encouragement and support for urban regeneration projects and interventions, including those set out in Project Carlow 2040 – A Vision for Regeneration. **UR. P2:** Support the effective and efficient use of land in Carlow-Graiguecullen, prioritising compact growth in preference to greenfield land consumption, through the development and regeneration of vacant and underutilised brownfield/infill land and buildings within the existing built-up footprint of the joint urban area. **UR. O1:** Leverage all available funding streams which will support and deliver urban regeneration outcomes in Carlow-Graiguecullen which seek to secure climate resilience and a reduction of greenhouse gas emissions in the joint urban area. **EE. P1:** Encourage and promote the consideration of energy efficient and low-carbon design solutions and modern construction methods when carrying out pre-planning discussions for major residential, commercial, and industrial development in Carlow-Graiguecullen. **EE. P2:** Encourage development proposals that are low carbon, well adapted to the impacts of climate change, include mitigation measures, and maximise energy efficiency through renewable energy sources, water conservation, SuDS, siting, layout and design. **EE. P5:** Support and facilitate the installation of district heating systems as a decarbonising technology in new developments, subject to compliance with proper planning and environmental considerations. **EE. O1:** Support the implementation of national energy efficiency standards in Carlow-Graiguecullen, including energy efficiency and conservation measures through: • Improved building design; • Promoting smarter travel; and,

Sources and/or pathways for adverse effects[32]	Respective Plan Development Objectives / Mitigation Measure(s)
	• Raising awareness/benefits of energy conservation. **EE. O3:** Retrofit all non-LED local authority public lighting in Carlow-Graiguecullen to high efficiency LED lanterns to contribute to meeting statutory energy efficiency targets, and to significantly reduce emissions and achieve cost savings with energy and maintenance efficiencies.
Renewable Energy	**RE. P1**: Encourage and support a transition to renewable energy sources in Carlow-Graiguecullen, subject to compliance with proper planning and environmental considerations. **EE. P3:** Promote the use of efficient energy storage systems and infrastructure that support energy efficiency and reusable energy system optimisation, subject to compliance with proper planning and environmental considerations. **EE. P4:** Support the use of blue roofs, green roofs, green walls, photovoltaic and/or solar thermal collector panels and heat pumps on new residential, commercial, industrial, and public buildings **EE. P6:** Promote the use of efficient energy storage systems and infrastructure in Carlow-Graiguecullen that support energy efficiency and reusable energy system optimisation, subject to compliance with proper planning and environmental considerations. **EE. O2:** Reduce dependency on fossil fuels for domestic and commercial heating in Carlow-Graiguecullen by encouraging the use of renewable heat solutions through the development management process.
Green / Blue Infrastructure	**GI. P1:** Protect and enhance the biodiversity and ecological function of the green infrastructure network in Carlow-Graiguecullen. **GI. P2:** Identify, protect, maintain, and enhance existing and planned green infrastructure assets in Carlow-Graiguecullen, and recognise the wide range of environmental, social, and economic benefits of green spaces and nature-based solutions by ensuring the integration of green infrastructure planning and development in the planning process. **GI. P3:** Protect and preserve landscape features which significantly contribute to green infrastructure in Carlow-Graiguecullen, including trees, hedgerows, woodlands, wetlands, watercourses, and other habitats. **GI. P4:** Require the protection and integration of new and existing green infrastructure as an essential component of all new developments in Carlow-Graiguecullen, and to ensure future development does not fragment, damage, or prejudice the integrity of the green infrastructure network in the joint urban area. **GI. P6:** Require development proposals to include an outline of measures to protect the retained green infrastructure of a site during the period of construction. **GI. P7:** Require large scale development proposals in the joint urban area such as residential schemes, industrial development, or retail schemes, to submit a green infrastructure plan as an integral part of a planning application. **GI. P8:** Promote a network of pedestrian and cycle paths to enhance accessibility to the green infrastructure network in Carlow-Graiguecullen, while ensuring that the layout, design, and operation of the routes responds to the ecological protection needs of each site. **GI. P9:** Incorporate elements of green infrastructure into existing areas of hard infrastructure in the joint urban area, where possible, thereby integrating these areas of the existing urban environment into the overall green infrastructure network. **NB. P1:** Actively promote and encourage nature-based approaches and green infrastructure solutions in Carlow-Graiguecullen as viable mitigation and adaptation measures to reduce greenhouse gas emissions, increase the adaptive capacity of ecosystems and optimise the multifaceted benefits through: • Conservation, promotion, and restoration of the natural environment; • Integrating an ecosystem services approach and promote healthy living environments through enhanced connection with nature and recreation/amenity; • Enhancing biodiversity in the joint urban area; • Assist with water and flood risk management; and, • Carbon storage or sequestration.

Sources and/or pathways for adverse effects[32]	**Respective Plan Development Objectives / Mitigation Measure(s)**
Waste Management	**WM. P1:** Promote and support sustainable forms of waste management by households, communities, and businesses, including waste prevention, minimisation, reuse, recycling, and recovery. **WM. P2:** Safeguard the environment of the joint urban area by seeking to ensure that residual waste is disposed of appropriately. **WM. P3:** Ensure that Carlow-Graiguecullen is served by adequately sized public recycling facilities, bring bank recycling facilities, and to adequately maintain existing recycling facilities in the joint urban area. **WM. P4:** Require the incorporation of sustainable waste management measures within developments, including the provision of adequately sized facilities for the storage, separation, and collection of waste and recyclable materials. **WM. O2:** Promote and facilitate communities becoming involved in environmental awareness activities and community-based recycling initiatives or environmental management initiatives in support of local sustainable waste management practices. **WM. O3:** Eliminate unauthorised fly tipping in the joint urban area and to regulate and control the disposal of builder's spoil and rubble.

Section 6 Conclusion

This AA Natura Impact Report demonstrates that implementation of the Plan to be adopted[33] has the potential to result in likely significant effects to the ecological integrity of 1 (no.) European site, if unmitigated.

The risks to the safeguarding and integrity of the Qualifying Interests and Conservation Objectives of the European sites identified have been addressed by the inclusion of mitigation measures into the Draft Plan that will prioritise the avoidance of effects in the first place and mitigate against the identified potential significant effects where these cannot be avoided. In addition, all lower-level plans and projects arising through the implementation of the Plan will themselves be subject to AA/screening for AA when further details of design and location are known.

In-combination effects from interactions with other plans and projects are considered and the mitigation measures incorporated into the Plan are seen to be robust to ensure that there will be no effect on the integrity of any European site as a result of the implementation of the Plan either alone or in-combination with other plans/projects.

Having incorporated mitigation measures into the Plan, it has been demonstrated that the Plan to be adopted[34] is not foreseen to give rise to any effect on the integrity of any designated European site, alone or in combination with other plans or projects[35]. This demonstration has been made in view of the conservation objectives of the habitats and/or species, for which these sites have been designated.

This Natura Impact Report will, alongside any other inputs from the Plan-preparation/AA process, inform the competent authority when it undertakes the final Appropriate Assessment determination at adoption of the Plan.

[33] Incorporating: the Draft Plan; all and any alterations; and all and any further modifications considered by the AA process. Note that non-material changes to individual Plan provisions referenced in this report may be updated during the finalisation of the Plan, including numbering, formatting and graphic design.
[34] Incorporating: the Draft Plan; all and any alterations; and all and any further modifications considered by the AA process. Note that non-material changes to individual Plan provisions referenced in this report may be updated during the finalisation of the Plan, including numbering, formatting and graphic design.
[35] Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be:
a) no alternative solution available,
b) imperative reasons of overriding public interest for the plan to proceed; and
c) Adequate compensatory measures in place.

Appendix I Background information on European sites

List of European sites within 15 km of the Plan boundary; including the Qualifying features (Qualifying Interests or Special Conservation Interests) and Site Vulnerability/Sensitivity

Site Code	Site Name	Qualifying Feature	Pressure Codes	Known Threats and Pressures
000770	Blackstairs Mountains SAC	European dry heaths [4030], Northern Atlantic wet heaths with Erica tetralix [4010]	G01.03.02, A04.01.02, J01.01, K01.01, E03, G01.02, K02.01, B02, A04.02	Off-road motorized driving, intensive sheep grazing, burning down, erosion, discharges, walking, horse-riding and non-motorised vehicles, species composition change (succession), forest and plantation management & use, non-intensive grazing
000781	Slaney River Valley SAC	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], Brook lamprey *(Lampetra planeri)* [1096], Estuaries [1130], Freshwater pearl mussel *(Margaritifera margaritifera)* [1029], Harbour seal *(Phoca vitulina)* [1365], Mediterranean salt meadows *(Juncetalia maritimi)* [1410], Mudflats and sandflats not covered by seawater at low tide [1140], Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0], Otter *(Lutra lutra)* [1355], River lamprey *(Lampetra fluviatilis)* [1099], Sea lamprey *(Petromyzon marinus)* [1095], Twaite shad *(Alosa fallax)* [1103], Alluvial forests with Alnus glutinosa and Fraxinus excelsior *(Alno-Padion, Alnion incanae, Salicion albae)* [91E0], Atlantic salmon *(Salmo salar)* [1106], Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)* [1330]	A01, E03, H01.01, E05, H01.08, C01.01, I01, A08, A09, A10.01, F03.02.04, J02.06, B02, H01, J02.05.02, K01.01, H01.05, J02.06.01, F01.03, J02.11, J02.12.02, D01.01, D01.05, F02.03.01, D03.01.03, J02	Cultivation, discharges, pollution to surface waters by industrial plants, storage of materials, diffuse pollution to surface waters due to household sewage and waste waters, sand and gravel extraction, invasive non-native species, fertilisation, irrigation, removal of hedges and copses or scrub, predator control, water abstractions from surface waters, forest and plantation management & use, pollution to surface waters (limnic & terrestrial, marine & brackish), modifying structures of inland water courses, erosion, diffuse pollution to surface waters due to agricultural and forestry activities, surface water abstractions for agriculture, bottom culture, siltation rate changes, dumping, depositing of dredged deposits, dykes and flooding defence in inland water systems, paths, tracks, cycling tracks, bridge, viaduct, bait digging or collection, fishing harbours, human induced changes in hydraulic conditions
001757	Holdenstown Bog SAC	Transition mires and quaking bogs [7140]	J02.01.03, B01, D02.01.01, A04, A01, X, J02	Infilling of ditches, dykes, ponds, pools, marshes or pits, forest planting on open ground, suspended electricity and phone lines, grazing, cultivation, human induced changes in hydraulic conditions
002162	River Barrow and River Nore SAC	Atlantic salmon *(Salmo salar)* [1106], Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)* [1330], Estuaries [1130], European dry heaths [4030], Brook lamprey *(Lampetra planeri)* [1096], Desmoulin`s whorl snail *(Vertigo moulinsiana)* [1016], Killarney fern *(Trichomanes speciosum)* [1421], Mediterranean salt meadows *(Juncetalia maritimi)* [1410], Freshwater pearl mussel *(Margaritifera margaritifera)* [1029], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430], Alluvial forests with Alnus glutinosa and Fraxinus excelsior *(Alno-Padion, Alnion incanae, Salicion albae)* [91E0], Nore Pearl Mussel *(Margaritifera durrovensis)* [1990], Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0], Otter *(Lutra lutra)* [1355], Petrifying springs with tufa formation *(Cratoneurion)* [7220], Reefs [1170], River lamprey *(Lampetra fluviatilis)* [1099], Salicornia and other annuals colonising mud and sand [1310], Sea lamprey *(Petromyzon marinus)* [1095], Twaite shad *(Alosa fallax)* [1103], Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], White-clawed crayfish *(Austropotamobius pallipes)* [1092], Mudflats and sandflats not covered by seawater at low tide [1140]	E02, A04.01.01, C01.01.01, A02.01, C01.03, J02.02.01, J02.05.02, F02, D03.01, B05, B07, I01, B02.01.01, F02.01.02, F02.03, J02, J02.12.02, K01.01, J02.06, M01, B02, A10.01, F01.01, H01, J03.02.01	Industrial or commercial areas, intensive cattle grazing, sand and gravel quarries, agricultural intensification, peat extraction, dredging or removal of limnic sediments, modifying structures of inland water courses, fishing and harvesting aquatic resources, port areas, use of fertilizers (forestry), forestry activities not referred to above, invasive non-native species, forest replanting (native trees), netting, leisure fishing, human induced changes in hydraulic conditions, dykes and flooding defence in inland water systems, erosion, water abstractions from surface waters, changes in abiotic conditions, forest and plantation management & use, removal of hedges and copses or scrub, intensive fish farming, intensification , pollution to surface waters (limnic & terrestrial, marine & brackish), reduction in migration or migration barriers
000764	Hook Head SAC	Large shallow inlets and bays [1160], Reefs [1170], Vegetated sea cliffs of the Atlantic and Baltic Coasts [1230], Bottlenose Dolphin (*Tursiops truncatus*) [1349], Harbour Porpoise (*Phocoena phocoena*) [1351]	G01.07, J02.11.01, K01.01, X, F02	Scuba diving, snorkelling, dumping, depositing of dredged deposits, erosion, fishing and harvesting aquatic resources
004237	Seas off Wexford SPA	Roseate Tern *(Sterna dougallii)* [A192], Gannet *(Morus bassanus)* [A016], Guillemot *(Uria aalge)* [A199], Manx Shearwater *(Puffinus puffinus)* [A013], Red-throated Diver *(Gavia stellata)* [A001], Sandwich Tern *(Sterna sandvicensis)* [A191], Fulmar *(Fulmarus glacialis)* [A009], Black-headed Gull *(Chroicocephalus ridibundus)* [A179], Shag *(Phalacrocorax aristotelis)* [A018], Herring Gull *(Larus argentatus)* [A184], Kittiwake *(Rissa tridactyla)* [A188], Little Tern *(Sterna albifrons)* [A195], Common Tern *(Sterna hirundo)* [A193], Mediterranean Gull *(Larus melanocephalus)* [A176], Arctic Tern *(Sterna paradisaea)* [A194], Common Scoter *(Melanitta nigra)* [A065], Razorbill *(Alca torda)* [A200], Cormorant *(Phalacrocorax carbo)* [A017], Puffin *(Fratercula arctica)* [A204], Lesser Black-backed Gull *(Larus fuscus)* [A183]	N/A	N/A

List of all Qualifying Interests of SACs that have undergone Assessment including Summaries of Current Threats and Sensitivity to Effects

EU Code	Qualifying Interests	Article 17 Report Summary - Threats and Pressures	Threats and Pressures Codes	Known Threats and Pressures	Sensitivity of Qualifying Interests
[1016]	Desmoulin's Whorl Snail *(Vertigo moulinsiana)*	The main pressures are associated with natural succession resulting in species composition change and drying out of the habitat.	A07, A10, L01, L02	Abandonment of management/use of other agricultural and agroforestry systems (all except grassland), extensive grazing or under grazing by livestock, abiotic natural processes (e.g., erosion, silting up, drying out, submersion, salinization), natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)	Changes to ground vegetation condition, groundwater dependent and is highly sensitive to hydrological changes.
[1029]	Freshwater Pearl Mussel *(Margaritifera margaritifera)*	The pressures facing this species come from a wide variety of sources (e.g., pollution from urban wastewater, development activities, farming and forestry), often quite removed from the species' habitat. Flow changes, caused by land drainage are also a significant pressure facing the species.	A26, A31, B23, B27, C05, D02, F12, F28, F31, F33	Agricultural activities generating diffuse pollution to surface or ground waters, drainage for use as agricultural land, forestry activities generating pollution to surface or ground waters, modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams), peat extraction, hydropower (dams, weirs, run-off-the-river), including infrastructure, discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water, modification of flooding regimes, flood protection for residential or recreational development, other modification of hydrological conditions for residential or recreational development, abstraction of ground and surface waters (including marine) for public water supply and recreational use	Surface water dependent. Highly sensitive to hydrological change. Very highly sensitive to pollution.
[1092]	White-clawed Crayfish *(Austropotamobius pallipes)*	The main pressures facing this species is related to the non-indigenous crayfish species (NICS) and Crayfish Plaque, a waterborne disease specific to freshwater crayfish.	I01, I05	Invasive alien species of union concern, plant and animal diseases, pathogens and pests	Invasive species, disease, surface water dependent. Highly sensitive to hydrological change. Very highly sensitive to pollution.
[1095]	Sea Lamprey *(Petromyzon marinus)*	Most of the pressures on Sea Lampreys are associated with hydropower infrastructure, reduction of prey populations due to overharvesting, drainage and the use of both natural and synthetic fertilisers. Changes in rainfall due to climate change is also considered a significant pressure on the species.	A19, A20, A31, D02, G01, N01, N02, N03, Xo	Application of natural fertilisers on agricultural land, application of synthetic (mineral) fertilisers on agricultural land, drainage for use as agricultural land, hydropower (dams, weirs, run-off-the-river), including infrastructure, marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, temperature changes (e.g., rise of temperature & extremes) due to climate change, increases or changes in precipitation due to climate change, threats and pressures from outside the member state	Marine water dependent. Low sensitivity to hydrological changes. Coastal development, trampling from recreational activity.
[1096]	Brook Lamprey *(Lampetra planeri)*	Most of the pressures on Brook Lampreys are associated with drainage for agriculture, the use of both natural and synthetic fertilisers, tree removal. Infrastructure related to hydropower along with pollution to ground and surface water and the discharge of waste water are also considered pressures.	A19, A20, A31, B09, D02, F11, F12, N01, N02	Application of natural fertilisers on agricultural land, application of synthetic (mineral) fertilisers on agricultural land, drainage for use as agricultural land, clear-cutting, removal of all trees, hydropower (dams, weirs, run-off-the-river), including infrastructure, pollution to surface or ground water due to urban runoffs, discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water, temperature changes (e.g., rise of temperature & extremes) due to climate change	Surface water dependent. Highly sensitive to hydrological change. Availability of suitable spawning ground is a considerable issue for the species.
[1099]	River Lamprey *(Lampetra fluviatilis)*	The main pressures on River Lampreys are associated with hydropower infrastructure and changes in rainfall due to climate change. The use of synthetic and natural fertilisers, drainage and also infrastructure related to shipping are also considered to be pressures on the species.	A19, A20, A31, D02, E03, N01, N02, N03	Application of natural fertilisers on agricultural land, application of synthetic (mineral) fertilisers on agricultural land, drainage for use as agricultural land, hydropower (dams, weirs, run-off-the-river), including infrastructure, shipping lanes, ferry lanes and anchorage infrastructure (e.g., canalisation, dredging), temperature changes (e.g., rise of temperature & extremes) due to climate change, increases or changes in precipitation due to climate change	Surface water dependent. Highly sensitive to hydrological change. Availability of suitable spawning ground is a considerable issue for the species.
[1103]	Twaite Shad *(Alosa fallax fallax)*	There are a number of pressures related to this species, mainly relating to pollution, alteration of flow patterns, and habitat disturbance/	A19, A20, D02, E03, G01, G06, G12, I02, N01, N03	Application of natural fertilisers on agricultural land, application of synthetic (mineral) fertilisers on agricultural land, hydropower (dams, weirs, run-off-the-river), including infrastructure, shipping lanes, ferry lanes and anchorage infrastructure (e.g., canalisation, dredging), marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, freshwater fish and shellfish harvesting (recreational), bycatch and incidental killing (due to fishing and hunting activities), other invasive alien species (other than species of union concern), temperature changes (e.g., rise of temperature & extremes) due to climate change, increases or changes in precipitation due to climate change	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change.
[1106]	Salmon *(Salmo salar)*	Known pressures include exploitation at sea in commercial fisheries, interceptor fisheries in coastal waters, aquaculture and predation. In addition, the negative influence of climate change on prey	A25, A26, B23, D02, F12, F28, G11, G19,	Agricultural activities generating point source pollution to surface or ground waters, agricultural activities generating diffuse pollution to surface or ground waters, forestry activities generating pollution to surface or ground waters, hydropower (dams, weirs, run-off-the-river), including infrastructure, discharge of urban waste water (excluding	Disease, parasites and barriers to movement.

EU Code	Qualifying Interests	Article 17 Report Summary - Threats and Pressures	Threats and Pressures Codes	Known Threats and Pressures	Sensitivity of Qualifying Interests
		structure as well as alterations in habitat and water quality are also pressures on the species.	G20, I02, J01, K05, L06, N01	storm overflows and/or urban run-offs) generating pollution to surface or ground water, modification of flooding regimes, flood protection for residential or recreational development, illegal harvesting, collecting and taking, other impacts from marine aquaculture, including infrastructure, abstraction of water, flow diversion, dams and other modifications of hydrological conditions for freshwater aquaculture, other invasive alien species (other than species of union concern), mixed source pollution to surface and ground waters (limnic and terrestrial), physical alteration of water bodies, interspecific relations (competition, predation, parasitism, pathogens), temperature changes (e.g., rise of temperature & extremes) due to climate change	
[1130]	Estuaries	Most of the pressures on estuaries come from various sources of pollution, including domestic wastewater, agriculture and marine aquaculture. Alien invasive species such as the naturalised Pacific oyster (*Magalana gigas*) are also recognised as a significant pressure	A28, F20, G16, I02, XU	Agricultural activities generating marine pollution, residential or recreational activities and structures generating marine pollution (excl. marine macro- and micro- particular pollution, marine aquaculture generating marine pollution, other invasive alien species (other than species of union concern), unknown pressure	Inappropriate development, changes in turbidity
[1140]	Mudflats and sandflats not covered by seawater at low tide	Pressures on mudflats and sandflats are partly caused by pollution from agricultural, forestry and wastewater sources, as well as impacts associated with marine aquaculture, particularly the Pacific oyster (*Magallana gigas*).	A28, F20, G16	Agricultural activities generating marine pollution, residential or recreational activities and structures generating marine pollution (excl. marine macro- and micro- particular pollution, marine aquaculture generating marine pollution	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Changes to salinity and tidal regime. Coastal development.
[1170]	Reefs	The main pressures on reefs come from fishing methods that damage the seafloor.	G01, G03	Marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats	Sensitive to disturbance and pollution.
[1310]	Salicornia and other annuals colonising mud and sand	Pressures on Salicornia mud are caused by alien species and overgrazing by livestock	A09, I02	Intensive grazing or overgrazing by livestock, other invasive alien species (other than species of union concern)	Marine water dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species.
[1330]	Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)*	The main pressures on Atlantic salt meadows are from agriculture, including ecologically unstable grazing regimes and land reclamation, and the invasive non-native species common cord-grass (*Spartina anglica*).	A09, A33, A36, F07, F08, I02	Intensive grazing or overgrazing by livestock, modification of hydrological flow or physical alternation of water bodies for agriculture (excluding development and operation of dams), agriculture activities not referred to above, sports, tourism and leisure activities, modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures), other invasive alien species (other than species of union concern)	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.
[1355]	Otter *(Lutra lutra)*	There are no pressures facing this species	Xxp, Xxt	No pressures, no threats	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitivity to pollution.
[1365]	Harbour Seal *(Phoca vitulina)*	Pressures on this species in Irish waters mainly involve commercial vessel-based activities such as local/regional prey removal by fisheries or by-catch in fisheries, or geophysical seismic exploration; other possible impacts may occur from coastal tourism and localised human disturbance at haul-out sites.	C09, G01	Geotechnical surveying, marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species	Prey availability, reduction in available habitat and water quality.
[1410]	Mediterranean salt meadows *(Juncetalia maritimi)*	Most of the pressures on Mediterranean salt meadows are associated with agriculture, including overgrazing, under-grazing and land reclamation.	A09, A10, A33, A36	Intensive grazing or overgrazing by livestock, extensive grazing or under grazing by livestock, modification of hydrological flow or physical alternation of water bodies for agriculture (excluding development and operation of dams), agriculture activities not referred to above	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Coastal development and reclamation.

EU Code	Qualifying Interests	Article 17 Report Summary - Threats and Pressures	Threats and Pressures Codes	Known Threats and Pressures	Sensitivity of Qualifying Interests
[1421]	Killarney Fern *(Trichomanes speciosum)*	There are no pressures facing this species.	Xxp, Xxt	No pressures, no threats	Land use management and direct impacts.
[3260]	Water courses of plain to montane levels with vegetation *(Ranunculion fluitantis and Callitricho-Batrachion)*	The majority of pressures on this habitat are caused by damage through hydrological and morphological change, eutrophication and other water pollution.	A25, A26, B23, C05, F11, F12, F13, K01, K04, K05	Agricultural activities generating point source pollution to surface or ground waters, agricultural activities generating diffuse pollution to surface or ground waters, forestry activities generating pollution to surface or ground waters, peat extraction, pollution to surface or ground water due to urban runoffs, discharge of urban waste water (excluding storm overflows and/or urban run-offs) generating pollution to surface or ground water, plants, contaminated or abandoned industrial sites generating pollution to surface or ground water, abstraction from groundwater, surface water or mixed water, modification of hydrological flow, physical alteration of water bodies	Surface water dependent Highly sensitive to hydrological change and direct physical interactions.
[4010]	Northern Atlantic wet heaths with Erica tetralix	Overgrazing, burning, wind farm development and erosion are the main pressures associated with this habitat, along with nitrogen deposition from agricultural activities that generate air pollution.	A09, A11, A27, B01, D01, L01, N01, N02	Intensive grazing or overgrazing by livestock, burning for agriculture, agricultural activities generating air pollution, conversion to forest from other land uses, or afforestation (excluding drainage), wind, wave and tidal power, including infrastructure, abiotic natural processes (e.g., erosion, silting up, drying out, submersion, salinization), temperature changes (e.g., rise of temperature & extremes) due to climate change	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management.
[4030]	European dry heaths	A number of significant pressures were recorded for this habitat in the current reporting period, particularly overgrazing by sheep and burning for agriculture with afforestation and wind farms also being recognised as pressures.	A09, A11, B01, D01, N01, N02	Intensive grazing or overgrazing by livestock, burning for agriculture, conversion to forest from other land uses, or afforestation (excluding drainage), wind, wave and tidal power, including infrastructure, temperature changes (e.g., rise of temperature & extremes) due to climate change	Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status.
[6430]	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Pressures on the habitat include invasive species; and agricultural intensification and drainage in the lowlands.	A09, A31, I01, I02	Intensive grazing or overgrazing by livestock, drainage for use as agricultural land, invasive alien species of union concern, other invasive alien species (other than species of union concern)	Changes in management such as grazing regime. Changes in nutrient or base status. Changes to vegetation composition. Introduction of alien species.
[7140]	Transition mires and quaking bogs	The main pressures facing transition mires in Ireland are afforestation, water pollution, drainage and hydrological changes with grazing/agricultural management also being a pressure.	A06, A09, B01, C05, J01, K01, K02, K04, L02	Abandonment of grassland management (e.g., cessation of grazing or of mowing), intensive grazing or overgrazing by livestock, conversion to forest from other land uses, or afforestation (excluding drainage), peat extraction, mixed source pollution to surface and ground waters (limnic and terrestrial), abstraction from groundwater, surface water or mixed water, drainage, modification of hydrological flow, natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)	Surface water interactions. Groundwater isolated system with sensitivities related to the bog basin. Drainage and land use management are the key things.
[7220]	Petrifying springs with tufa formation *(Cratoneurion)*	Pressures related to this habitat are associated with drainage, pollution to ground and surface waters, recreational activities, infrastructure, overgrazing and abandonment of grassland management.	A06, A10, E01, F07, H08, J01, K02, K04, L02	Abandonment of grassland management (e.g., cessation of grazing or of mowing), extensive grazing or under grazing by livestock, roads, paths, railroads and related infrastructure (e.g., bridges, viaducts, tunnels), sports, tourism and leisure activities, other human intrusions and disturbance not mentioned above (dumping, accidental and deliberate disturbance of bat roosts (e.g., caving)), mixed source pollution to surface and ground waters (limnic and terrestrial), drainage, modification of hydrological flow, natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution.
[91A0]	Old sessile oak woods with Ilex and Blechnum in the British Isles	The significant pressure facing this habitat are associated with invasive non-native species such as Rhododendron ponticum, cherry laurel *(Prunus laurocerasus)* and beech *(Fagus sylvatica)* and overgrazing by deer.	A09, B09, I02, I04, M07	Intensive grazing or overgrazing by livestock, clear-cutting, removal of all trees, other invasive alien species (other than species of union concern), problematic native species, storm, cyclone	Changes in management. Changes in nutrient or base status. Introduction of alien species.
[91E0]	Alluvial forests with Alder and Ash *(Alnus glutinosa, Fraxinus excelsior, Alno-Padion, Alnion incanae, Salicion albae)*	Many of the pressures facing this habitat include invasive species, particularly sycamore *(Acer pseudoplatanus)*, beech *(Fagus sylvatica)*, Indian balsam *(Impatiens glandulifera)* and currant species *(Ribes nigrum* and *R. rubrum)* as well as some native species such as brambles *(Rubus fruticoses agg.)* and common nettle, along with over felling.	B09, I02, I04, I05	Clear-cutting, removal of all trees, other invasive alien species (other than species of union concern), problematic native species, plant and animal diseases, pathogens and pests	Surface and groundwater dependent. Highly sensitive to hydrological changes. Changes in management.

EU Code	Qualifying Interests	Article 17 Report Summary - Threats and Pressures	Threats and Pressures Codes	Known Threats and Pressures	Sensitivity of Qualifying Interests
[1349]	Bottlenose Dolphin *(Tursiops truncatus)*	Pressures on this species in Irish waters mainly involve commercial vessel-based activities such as impacts arising from geophysical seismic exploration or from local/regional prey removal by fisheries.	C09, G01	Geotechnical surveying, marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species	Large vessel movement effecting distributions. Prey availability, reduction in available habitat and water quality.
[1351]	Harbour Porpoise *(Phocoena phocoena)*	Pressures acting on this species in Irish waters mainly involve commercial vessel-based activities such as impacts arising from geophysical seismic exploration or from local/regional prey removal by fisheries.	C09, G01	Geotechnical surveying, marine fishing and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species	Sensitive to disturbance, prey availability and pollution.

List of all Special Conservation Interest of SPAs that have undergone Assessment including Summaries of Current Threats and Sensitivity to Effects

Species Code	Common Name	Scientific Name	Threats and Pressures Codes	Known Threats and Pressures
A001	Red-throated Diver	*Gavia stellata*	I02, F07, C05, G06, L06, N03, A11, B01, I05, N05, G01, D01	Other invasive alien species (other than species of union concern), sports, tourism and leisure activities, peat extraction, freshwater fish and shellfish harvesting (recreational), interspecific relations (competition, predation, parasitism, pathogens), increases or changes in precipitation due to climate change, burning for agriculture, conversion to forest from other land uses, or afforestation (excluding drainage), plant and animal diseases, pathogens and pests, change of habitat location, size, and / or quality due to climate change, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, wind, wave and tidal power, including infrastructure
A009	Fulmar	*Fulmarus glacialis*	I02, N06, N07, F22, F23, G12, D01, G01	Other invasive alien species (other than species of union concern), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), bycatch and incidental killing (due to fishing and hunting activities), wind, wave and tidal power, including infrastructure, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species
A013	Manx Shearwater	*Puffinus puffinus*	A09, F22, F23, G12, I02, N07, G01, N06	Intensive grazing or overgrazing by livestock, residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), bycatch and incidental killing (due to fishing and hunting activities), other invasive alien species (other than species of union concern), decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, desynchronisation of biological / ecological processes due to climate change
A016	Gannet	*Morus bassanus*	F22, F23, G12, D01, F07, J02, N06, N07	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), bycatch and incidental killing (due to fishing and hunting activities), wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, mixed source marine water pollution (marine and coastal), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change
A017	Cormorant	*Phalacrocorax carbo carbo*	G12, D01, F07, G10, J02, N06, N07, N01	Bycatch and incidental killing (due to fishing and hunting activities), wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, illegal shooting/killing, mixed source marine water pollution (marine and coastal), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, temperature changes (e.g. rise of temperature & extremes) due to climate change
A018	Shag	*Phalacrocorax aristotelis*	F22, F23, G12, D01, F07, I02, J02, N06, N07	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), bycatch and incidental killing (due to fishing and hunting activities), wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, other invasive alien species (other than species of union concern), mixed source marine water pollution (marine and coastal), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change
A065	Common Scoter	*Melanitta nigra*	L06, A06, I02, I04, A26, F07, G12, G01, D01, E02	Interspecific relations (competition, predation, parasitism, pathogens), abandonment of grassland management (e.g. cessation of grazing or mowing), other invasive alien species (other than species of union concern), problematic native species, agricultural activities generating diffuse pollution to surface or ground waters, sports, tourism and leisure activities, bycatch and incidental killing (due to fishing and hunting activities), marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, wind, wave and tidal power, including infrastructure, shipping lanes and ferry lanes transport operations
A176	Mediterranean Gull	*Larus melanocephalus*	I02, I04	Other invasive alien species (other than species of union concern), problematic native species
A179	Black-headed Gull	*Larus ridibundus*	F22, F23, I02, I04, D01, M08	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), other invasive alien species (other than species of union concern), problematic native species, wind, wave and tidal power, including infrastructure, flooding (natural processes)
A183	Lesser Black-backed Gull	*Larus fuscus*	F22, F23, D01, I02	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), wind, wave and tidal power, including infrastructure, other invasive alien species (other than species of union concern)
A184	Herring Gull	*Larus argentatus argenteus*	F22, F23, D01, I02	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), wind, wave and tidal power, including infrastructure, other invasive alien species (other than species of union concern)
A188	Kittiwake	*Rissa tridactyla*	F22, F23, G12, D01, G01, L06, N06, N07	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), bycatch and incidental killing (due to fishing and hunting activities), wind, wave and tidal power, including infrastructure, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, interspecific relations (competition, predation, parasitism, pathogens), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change
A191	Sandwich Tern	*Thalasseus sandvicensis*	G12, I02, A09, D01, F07, I04, M08, N06, N07	Bycatch and incidental killing (due to fishing and hunting activities), other invasive alien species (other than species of union concern), intensive grazing or overgrazing by livestock, wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, problematic native species, flooding (natural processes), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change
A192	Roseate Tern	*Sterna dougallii*	G12, N07, I02, I04, L06, M08, N06, D01, F07, G01	Bycatch and incidental killing (due to fishing and hunting activities), decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, other invasive alien species (other than species of union concern), problematic native species, interspecific relations (competition, predation, parasitism, pathogens), flooding (natural processes), desynchronisation of biological / ecological processes due to climate change, wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species
A193	Common Tern	*Sterna hirundo*	A09, G12, I02, I04, J02, L06, M08, D01, F07, G01, N06, N07	Intensive grazing or overgrazing by livestock, bycatch and incidental killing (due to fishing and hunting activities), other invasive alien species (other than species of union concern), problematic native species, mixed source marine water pollution (marine and coastal), interspecific relations (competition, predation, parasitism, pathogens), flooding (natural processes), wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change
A194	Arctic Tern	*Sterna paradisaea*	A09, G12, I02, I04, L06, M08, N06, N07, D01, F07, G01	Intensive grazing or overgrazing by livestock, bycatch and incidental killing (due to fishing and hunting activities), other invasive alien species (other than species of union concern), problematic native species, interspecific relations (competition, predation, parasitism, pathogens), flooding (natural processes), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species
A195	Little Tern	*Sternula albifrons*	A09, G12, I02, I04, D01, N06, N07, F07, L06, N04	Intensive grazing or overgrazing by livestock, bycatch and incidental killing (due to fishing and hunting activities), other invasive alien species (other than species of union concern), problematic native species, wind, wave and tidal power, including infrastructure, desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, sports, tourism and leisure activities, interspecific relations (competition, predation, parasitism, pathogens), sea-level and wave exposure changes due to climate change

Species Code	Common Name	Scientific Name	Threats and Pressures Codes	Known Threats and Pressures
A199	Guillemot	*Uria aalge*	F22, F23, G12, D01, J02, N06, N07	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), bycatch and incidental killing (due to fishing and hunting activities), wind, wave and tidal power, including infrastructure, mixed source marine water pollution (marine and coastal), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change
A200	Razorbill	*Alca torda*	F22, F23, G01, G12, J02, N06, N07, D01, F07	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, bycatch and incidental killing (due to fishing and hunting activities), mixed source marine water pollution (marine and coastal), desynchronisation of biological / ecological processes due to climate change, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities
A204	Puffin	*Fratercula arctica*	F22, F23, G12, I02, D01, F07, N07, G01, N06	Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, styrofoam), bycatch and incidental killing (due to fishing and hunting activities), other invasive alien species (other than species of union concern), wind, wave and tidal power, including infrastructure, sports, tourism and leisure activities, decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change, marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species, desynchronisation of biological / ecological processes due to climate change

Appendix II Relationship with Other Plans and Programmes

This appendix is not intended to be a full and comprehensive review of EU Directives, the transposing regulations or the regulatory framework for environmental protection and management. The information is not exhaustive and it is recommended to consult the Directive, Regulation, Plan or Programme to become familiar with the full details of each.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
European Level			
SEA Directive (2001/42/EC)	• Contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development. • Provide for a high level of protection of the environment by carrying out an environmental assessment of plans and programmes which are likely to have significant effects on the environment.	• Carry out and environmental assessment for plans or programmes referred to in Articles 2 to 4 of the Directive. • Prepare an environmental report which identifies, describes and evaluates the likely significant effects on the environment of implementing the plan or programme and reasonable alternatives that consider the objectives and the geographical scope of the plan or programme. • Consult with relevant authorities, stakeholders and public allowing sufficient time to make a submission. • Consult other Member States where the implementation of a plan or programme is likely to have transboundary environmental effects. • Inform relevant authorities and stakeholders on the decision to implement the plan or programme. • Issue a statement to include requirements detailed in Article 9 of the Directive. • Monitor and mitigate significant environmental effects identified by the assessment.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EIA Directive (2011/92/EU as amended by 2014/52/EU)	• Requires the assessment of the environmental effects of public and private projects which are likely to have significant effects on the environment. • Aims to assess and implement avoidance or mitigation measures to eliminate environmental effects, before consent is given of projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects. Those projects are defined in Article 4.	• All projects listed in Annex I are considered as having significant effects on the environment and require an EIA. • For projects listed in Annex II, a "screening procedure" is required to determine the effects of projects on the basis of thresholds/criteria or a case by case examination. This should take into account Annex III. • The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 12, the direct and indirect effects of a project on the following factors: human beings, fauna and flora, soil, water, air, climate and the landscape, material assets and the cultural heritage, the interaction between each factor. • Consult with relevant authorities, stakeholders and public allowing sufficient time to make a submission before a decision is made.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Habitats Directive (92/43/EEC)	• Promote the preservation, protection and improvement of the quality of the environment, including the conservation of natural habitats and of wild fauna and flora. • Contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora. • Maintain or restore to favourable conservation status, natural habitats and species of wild fauna and flora of community interest. • Promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements.	• Propose and protect sites of importance to habitats, plant and animal species. • Establish a network of European sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II, to enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range. • Carry out comprehensive assessment of habitat types and species present. • Establish a system of strict protection for the animal species and plant species listed in Annex IV.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Birds Directive (2009/147/EC)	• Conserve all species of naturally occurring birds in the wild state including their eggs, nests and habitats. • Protect, manage and control these species and comply with regulations relating to their exploitation. • The species included in Annex I shall be the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.	• Preserve, maintain or re-establish a sufficient diversity and area of habitats for all the species of birds referred to in Annex 1. • Preserve, maintain and establish biotopes and habitats to include the creation of protected areas (Special Protection Areas). • Ensure the upkeep and management in accordance with the ecological needs of habitats inside and outside the protected zones, re-establish destroyed biotopes and creation of biotopes. • Measures for regularly occurring migratory species not listed in Annex I is required as regards their breeding, moulting and wintering areas and staging posts along their migration routes. The protection of wetlands and particularly wetlands of international importance.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU Nitrates Directive (91/676/EC)	• Reducing water pollution caused or induced by nitrates from agricultural sources and - preventing further such pollution.	Ireland's Nitrates Action Programme is designed to prevent pollution of surface waters and ground water from agricultural sources and to protect and improve water quality. Ireland's third NAP came into operation in 2014. Each Member State's NAP must include: • a limit on the amount of livestock manure applied to the land each year • set periods when land spreading is prohibited due to risk • set capacity levels for the storage of livestock manure	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
EU Integrated Pollution Prevention Control Directive (2008/1/EC)	• The purpose of this Directive is to achieve integrated prevention and control of pollution arising from the activities listed in Annex I. It lays down measures designed to prevent or, where that is not practicable, to reduce emissions in the air, water and land from the abovementioned activities, including measures concerning waste, in order to achieve a high level of protection of the environment taken as a whole, without prejudice to Directive 85/337/EEC and other relevant Community provisions.	The IPPC Directive is based on several principles: • an integrated approach • best available techniques, • flexibility; and • public participation	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU Plant Protection (products) Directive 2009/127/EC	• The Directive aims at reducing the risks and impacts of pesticide use on human health and • the environment by introducing different targets, tools and measures such as Integrated Pest • Management (IPM) or National Action Plans (NAPs).	• The Framework Directive applies to pesticides which are plant protection products. • Regarding pesticide application equipment already in professional use, the Framework Directive introduces requirements for the inspection and maintenance to be carried out on such equipment.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU Renewables Directive (2009/28/EC)	• The Renewable Energy Directive establishes an overall policy for the production and promotion of energy from renewable sources in the EU. • It requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020 – to be achieved through the attainment of individual national targets. • All EU countries must also ensure that at least 10% of their transport fuels come from renewable sources by 2020.	• The Directive promotes cooperation amongst EU countries (and with countries outside the EU) to help them meet their renewable energy targets. • The Directive specifies national renewable energy targets for each country, taking into account its starting point and overall potential for renewables. • EU countries set out how they plan to meet these targets and the general course of their renewable energy policy in national renewable energy action plans. • Progress towards national targets is measured every two years when EU countries publish national renewable energy progress reports.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Indirect Land Use Change Directive (2012/0288(COD))	• Article 3(4) of Directive 2009/28/EC of the European Parliament and of the Council (3) requires Member States to ensure that the share of energy from renewable energy sources in all forms of transport in 2020 is at least 10 % of their final energy consumption. • The blending of biofuels is one of the methods available for Member States to meet this target, and is expected to be the main contributor. • Other methods available to meet the target are the reduction of energy consumption, which is imperative because a mandatory percentage target for energy from renewable sources is likely to become increasingly difficult to achieve sustainably if overall demand for energy for transport continues to rise, and the use of electricity from renewable energy sources.	• Limit the contribution that conventional biofuels (with a risk of ILUC emissions) make towards attainment of the targets in the Renewable Energy Directive; • Improve the greenhouse gas performance of biofuel production processes (reducing associated emissions) by raising the greenhouse gas saving threshold for new installations subject to protecting installations already in operation on 1st July 2014; • Encourage a greater market penetration of advanced (low-ILUC) biofuels by allowing such fuels to contribute more to the targets in the Renewable Energy Directive than conventional biofuels; • Improve the reporting of greenhouse gas emissions by obliging Member States and fuel suppliers to report the estimated indirect land-use change emissions of biofuels.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Alternative Fuels Infrastructure Directive (2014/94/EU)	• This Directive establishes a common framework of measures for the deployment of alternative fuels infrastructure in the Union in order to minimise dependence on oil and to mitigate the environmental impact of transport.	• This Directive sets out minimum requirements for the building-up of alternative fuels infrastructure, including recharging points for electric vehicles and refuelling points for natural gas (LNG and CNG) and hydrogen, to be implemented by means of Member States' national policy frameworks, as well as common technical specifications for such recharging and refuelling points, and user information requirements.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU Energy Efficiency Directive (2012/27/EU)	• Establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. • Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain, from production to final consumption.	• Energy distributors or retail energy sales companies have to achieve 1.5% energy savings per year through the implementation of energy efficiency measures • EU countries can opt to achieve the same level of savings through other means, such as improving the efficiency of heating systems, installing double glazed windows or insulating roofs • The public sector in EU countries should purchase energy efficient buildings, products and services • Every year, governments in EU countries must carry out energy efficient renovations on at least 3% (by floor area) of the buildings they own and occupy • Energy consumers should be empowered to better manage consumption. This includes easy and free access to data on consumption through individual metering • National incentives for SMEs to undergo energy audits • Large companies will make audits of their energy consumption to help them identify ways to reduce it • Monitoring efficiency levels in new energy generation capacities.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
EU Seveso Directive (2012/18/EU)	• This Directive lays down rules for the prevention of major accidents which involve dangerous substances, and the limitation of their consequences for human health and the environment, with a view to ensuring a high level of protection throughout the Union in a consistent and effective manner.	The Seveso Directive is well integrated with other EU policies, thus avoiding double regulation or other administrative burden. This includes the following related policy areas: • Classification, labelling and packaging of chemicals; • The Union's Civil Protection Mechanism; • The Security Union Agenda including CBRN-E and Protection of critical infrastructure; • Policy on environmental liability and on the protection of the environment through criminal law; • Safety of offshore oil and gas operations.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Biodiversity Strategy for 2030 - Bringing nature back into our lives (European Commission, 2020)	• The EU's biodiversity strategy for 2030 is a comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems. The strategy aims to put Europe's biodiversity on a path to recovery by 2030, and contains specific actions and commitments.	The Strategy contains specific commitments and actions to be delivered by 2030, including: • Establishing a larger EU-wide network of protected areas on land and at sea, building upon existing Natura 2000 areas, with strict protection for areas of very high biodiversity and climate value. • An EU Nature Restoration Plan - a series of concrete commitments and actions to restore degraded ecosystems across the EU by 2030, and manage them sustainably, addressing the key drivers of biodiversity loss. • A set of measures to enable the necessary transformative change: setting in motion a new, strengthened governance framework to ensure better implementation and track progress, improving knowledge, financing and investments and better respecting nature in public and business decision-making. • Measures to tackle the global biodiversity challenge, demonstrating that the EU is ready to lead by example towards the successful adoption of an ambitious global biodiversity framework under the Convention on Biological Diversity.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU Green Infrastructure Strategy	Aims to create a robust enabling framework in order to promote and facilitate Green Infrastructure (GI) projects.	• Promoting GI in the main EU policy areas. • Supporting EU-level GI projects. • Improving access to finance for GI projects. • Improving information and promoting innovation.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
UN Kyoto Protocol (2nd Kyoto Period), the Second European Climate Change Programme (ECCP II), Paris climate conference (COP21) 2015 (Paris Agreement)	The UN Kyoto Protocol set of policy measures to reduce greenhouse gas emissions. The Second European Climate Change Programme (ECCP II) aims to identify and develop all the necessary elements of an EU strategy to implement the Kyoto Protocol. At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C.	• The Kyoto Protocol is implemented through the European Climate Change Programme (ECCP II). • EU member states implement measures to improve on or compliment the specified measures and policies arising from the ECCP. • Under COP21, governments agreed to come together every 5 years to set more ambitious targets as required by science; report to each other and the public on how well they are doing to implement their targets; track progress towards the long-term goal through a robust transparency and accountability system.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU 2020 Climate and Energy Package	• Binding legislation which aims to ensure the European Union meets its climate and energy targets for 2020. • Aims to achieve a 20% reduction in EU greenhouse gas emissions from 1990 levels. • Aims to raise the share of EU energy consumption produced from renewable resources to 20%. • Achieve a 20% improvement in the EU's energy efficiency.	Four pieces of complimentary legislation: • Reform of the EU Emissions Trading System (EU ETS) to include a cap on emission allowances in addition to existing system of national caps. • Member States have agreed national targets for non-EU ETS emissions from countries outside the EU. • Meet the national renewable energy targets of 16% for Ireland by 2020. • Preparing a legal framework for technologies in carbon capture and storage.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU 2030 Framework for Climate and Energy	• A 2030 Framework for climate and energy, including EU-wide targets and policy objectives for the period between 2020 and 2030 that has been agreed by European countries.	To meet the targets, the European Commission has proposed the following policies for 2030: • A reformed EU emissions trading scheme (ETS).	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
	• Targets include a 40% cut in greenhouse gas emissions compared to 1990 levels, at least a 27% share of renewable energy consumption and at least 27% energy savings compared with the business-as-usual scenario.	• New indicators for the competitiveness and security of the energy system, such as price differences with major trading partners, diversification of supply, and interconnection capacity between EU countries. • First ideas for a new governance system based on national plans for competitive, secure, and sustainable energy. These plans will follow a common EU approach. They will ensure stronger investor certainty, greater transparency, enhanced policy coherence and improved coordination across the EU.	combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
The Clean Air for Europe Directive (2008/50/EC) **(EU Air Framework Directive)** **Fourth Daughter Directive (2004/107/EC)**	• The CAFE Directive merges existing legislation into a single directive (except for the fourth daughter directive). • Sets new air quality objectives for $PM_{2.5}$ (fine particles) including the limit value and exposure related objectives. • Accounts for the possibility to discount natural sources of pollution when assessing compliance against limit values. • Allows the possibility for time extensions of three years (PM_{10}) or up to five years (NO_2, benzene) for complying with limit values, based on conditions and the assessment by the European Commission. • The Fourth Daughter Directive lists pollutants, target values and monitoring requirements for the following: arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.	• Sets objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole. • Aims to assess the ambient air quality in Member States on the basis of common methods and criteria. • Obtains information on ambient air quality in order to help combat air pollution and nuisance and to monitor long-term trends and improvements resulting from national and community measures. • Ensures that such information on ambient air quality is made available to the public. • Aims to maintain air quality where it is good and improving it in other cases. • Aims to promote increased cooperation between the Member States in reducing air pollution.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Noise Directive (2002/49/EC)	The Noise Directive - Directive 2002/49/EC relating to the assessment and management of environmental noise - is part of an EU strategy setting out to reduce the number of people affected by noise in the longer term and to provide a framework for developing existing Community policy on noise reduction from source.	The Directive requires competent authorities in Member States to: • Draw up strategic noise maps for major roads, railways, airports and agglomerations, using harmonised noise indicators and use these maps to assess the number of people which may be impacted upon as a result of excessive noise levels; • Draw up action plans to reduce noise where necessary and maintain environmental noise quality where it is good; and • Inform and consult the public about noise exposure, its effects, and the measures considered to address noise. The Directive does not set any limit value, nor does it prescribe the measures to be used in the action plans, which remain at the discretion of the competent authorities.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Floods Directive (2007/60/EC)	• Establishes a framework for the assessment and management of flood risks • Reduce adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community	• Assess all water courses and coast lines at risk from flooding through Flood Risk Assessment • Prepare flood hazard maps and flood risk maps outlining the extent or potential of flooding and assets and humans at risk in these areas at River Basin District level (Article 3(2) (b)) and areas covered by Article 5(1) and Article 13(1) (b) in accordance with paragraphs 2 and 3. • Implement flood risk management plans and take adequate and coordinated measures to reduce flood risk for the areas covered by the Articles listed above. • Inform the public and allow the public to participate in planning process.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Water Framework Directive (2000/60/EC)	• Establish a framework for the protection of water bodies to include inland surface waters, transitional waters, coastal waters and groundwater and their dependent wildlife and habitats. • Preserve and prevent the deterioration of water status and where necessary improve and maintain "good status" of water bodies. • Promote sustainable water usage. • The Water Framework Directive repealed the following Directives: o The Drinking Water Abstraction Directive o Sampling Drinking Water Directive o Exchange of Information on Quality of Surface Freshwater Directive o Shellfish Directive o Freshwater Fish Directive o Groundwater (Dangerous Substances) Directive o Dangerous Substances Directive	• Protect, enhance and restore all water bodies and meet the environmental objectives outlined in Article 4 of the Directive. • Achieve "good status" for all waters. • Manage water bodies based on identifying and establishing river basins districts. • Involve the public and streamline legislation. • Prepare and implement a River Basin Management Plan for each river basin districts identified and a Register of Protected Areas. • Establish a programme of monitoring for surface water status, groundwater status and protected areas. • Recover costs for water services.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Groundwater Directive (2006/118/EC)	• Protect, control and conserve groundwater. • Prevent the deterioration of the status of all bodies of groundwater. • Implements measures to prevent and control groundwater pollution, including criteria for assessing good groundwater chemical status and criteria for the identification of significant and sustained upward trends and for the definition of starting points for trend reversals.	• Meet minimum groundwater standards listed in Annex 1 of Directive. • Meet threshold values adopted by national legislation for the pollutants, groups of pollutants and indicators of pollution which have been identified as contributing to the characterisation of bodies or groups of bodies of groundwater as being at risk, also taking into account Part B of Annex II.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
Drinking Water Directive (98/83/EC)	• Improve and maintain the quality of water intended for human consumption. • Protect human health from the adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean.	• Set values applicable to water intended for human consumption for the parameters set out in Annex I. • Set values for additional parameters not included in Annex I, where the protection of human health within national territory or part of it so requires. The values set should, as a minimum, satisfy the requirements of Article 4(1) (a). • Implement all measures necessary to ensure that regular monitoring of the quality of water intended for human consumption is carried out, in order to check that the water available to consumers meets the requirements of this Directive and in particular the parametric values set in accordance with Article 5. • Ensure that any failure to meet the parametric values set in accordance with Article 5 is immediately investigated in order to identify the cause. • Ensure that the necessary remedial action is taken as soon as possible to restore its quality and shall give priority to their enforcement action. • Undertake remedial action to restore the quality of the water where necessary to protect human health. • Notify consumers when remedial action is being undertaken except where the competent authorities consider the non-compliance with the parametric value to be trivial.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Urban Waste Water Treatment Directive (91/271/EEC)	• This Directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors. • The objective of the Directive is to protect the environment from the adverse effects of waste water discharges.	• Urban waste water entering collecting systems shall before discharge, be subject to secondary treatment. • Annex II requires the designation of areas sensitive to eutrophication which receive water discharges. • Establishes minimum requirements for urban waste water collection and treatment systems in specified agglomerations to include special requirements for sensitive areas and certain industrial sectors.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Environmental Liability Directive (2004/35/EC) as amended by Directive 2006/21/EC, Directive 2009/31/EC and Directive 2013/30/EU	• Establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage.	• Relates to environmental damage caused by any of the occupational activities listed in Annex III, and to any imminent threat of such damage occurring by reason of any of those activities; damage to protected species and natural habitats caused by any occupational activities other than those listed in Annex III, and to any imminent threat of such damage occurring by reason of any of those activities, whenever the operator has been at fault or negligent. • Where environmental damage has not yet occurred but there is an imminent threat of such damage occurring, the operator shall, without delay, take the necessary preventive measures. • Where environmental damage has occurred the operator shall, without delay, inform the competent authority of all relevant aspects of the situation and take all practicable steps to immediately control, contain, remove or otherwise manage the relevant contaminants and/or any other damage factors in order to limit or to prevent further environmental damage and adverse effects on human health or further impairment of services and the necessary remedial measures, in accordance with Article 7. • The operator shall bear the costs for the preventive and remedial actions taken pursuant to this Directive. • The competent authority shall be entitled to initiate cost recovery proceedings against the operator. • The operator may be required to provide financial security guarantees to ensure their responsibilities under the directive are met. • The Environmental Liability Directive has been amended through a number of Directives. Implementation of the Environmental Liability Directive is contributed towards by a Multi-Annual Work Programme (MAWP) 'Making the Environmental Liability Directive more fit for purpose' that is updated annually to changing developments, growing knowledge and new needs.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Convention on the Protection of the Archaeological Heritage (Valletta 1992)	• The aim of this (revised) Convention is to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study.	The Valletta Convention makes the conservation and enhancement of the archaeological heritage one of the goals of urban and regional planning policies. The Convention sets guidelines for the funding of excavation and research work and publication of research findings. It also deals with public access, in particular to archaeological sites, and educational actions to be undertaken to develop public awareness of the value of the archaeological heritage. It also constitutes an institutional framework for pan-European co-operation on the archaeological heritage, entailing a systematic exchange of experience and experts among the various States.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Convention of the Protection of the Architectural Heritage of Europe (Granada 1995)	• The main purpose of the Convention is to reinforce and promote policies for the conservation and enhancement of Europe's heritage. It also affirms the need for European solidarity with regard to heritage	• The reinforcement and promotion of policies for protecting and enhancing the heritage within the territories of the parties.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
	conservation and is designed to foster practical co-operation among the Parties. It establishes the principles of "European co-ordination of conservation policies" including consultations regarding the thrust of the policies to be implemented.	• The affirmation of European solidarity with regard to the protection of the heritage and the fostering of practical co-operation between states and regions.	combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Council of Europe Framework Convention on the Value of Cultural Heritage for Society (Faro 2005)	• Cultural heritage is a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time. • A heritage community consists of people who value specific aspects of cultural heritage which they wish, within the framework of public action, to sustain and transmit to future generations.	• Recognise that rights relating to cultural heritage are inherent in the right to participate in cultural life, as defined in the Universal Declaration of Human Rights. • Recognise individual and collective responsibility towards cultural heritage. • Emphasise that the conservation of cultural heritage and its sustainable use have human development and quality of life as their goal. • Take the necessary steps to apply the provisions of this Convention concerning the role of cultural heritage in the construction of a peaceful and democratic society. • Greater synergy of competencies among all the public, institutional and private actors concerned.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Landscape Convention 2000	• The developments in agriculture, forestry, industrial and mineral production techniques, together with the practices followed in town and country planning, transport, networks, tourism and recreation, and at a more general level, changes in the world economy, have in many cases accelerated the transformation of landscapes. The Convention expresses a concern to achieve sustainable development based on a balanced and harmonious relationship between social needs, economic activity and the environment. It aims to respond to the public's wish to enjoy high quality landscapes.	• Promote protection, management and planning of landscapes. • Organise European co-operation on landscape issues.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
The Seventh Environmental Action Programme (EAP) of the European Community (2013-2020)	It identifies three key objectives: • to protect, conserve and enhance the Union's natural capital • to turn the Union into a resource-efficient, green, and competitive low-carbon economy • to safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing	Four so called "enablers" will help Europe deliver on these objectives (goals): • Better implementation of legislation. • Better information by improving the knowledge base. • More and wiser investment for environment and climate policy. • Full integration of environmental requirements and considerations into other policies. Two additional horizontal priority objectives complete the programme: • To make the Union's cities more sustainable. • To help the Union address international environmental and climate challenges more effectively.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats)	The convention has three main aims: • to conserve wild flora and fauna and their natural habitats • to promote cooperation between states • to give particular attention to endangered and vulnerable species including endangered and vulnerable migratory species	The Parties under the convention recognise the intrinsic value of nature, which needs to be preserved and passed to future generations, they also: • Seek to ensure the conservation of nature in their countries, paying particular attention to planning and development policies and pollution control. • Look at implementing the Bern Convention in central Eastern Europe and the Caucus. • Take account of the potential impact on natural heritage by other policies. • Promote education and information of the public, ensuring the need to conserve species is understood and acted upon. • Develop an extensive number of species action plans, codes of conducts, and guidelines, at their own initiative or in co-operation with other organisations. • Created the Emerald Network, an ecological network made up of Areas of Special Conservation Interest.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Bali Road Map (2007)	The overall goals of the project are twofold: • To increase national capacity to co-ordinate ministerial views, participate in the UNFCCC process, and negotiate positions within the timeframe of the Bali Action Plan; and • To assess investment and financial flows to address climate change for up to three key sectors and/or economic activities.	The Bali Action Plan is centred on four main building Blocks: • mitigation • adaptation • technology • financing	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Cancun Agreements (2010)	Set of decisions taken at the COP 16 Conference in Cancun in 2010 which addresses a series of key issues in the fight against climate change. Cancun Agreements' main objectives cover: • Mitigation • Transparency of actions • Technology • Finance • Adaptation	Among the most prominent agreements is the establishment of a Green Climate Fund to transfer money from the developed to developing world to tackle the impacts of climate change.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
	• Forests • Capacity building		regulatory framework for environmental protection and management.
Doha Climate Gateway (2012)	Set of decisions taken at the COP 18 meeting in Doha in 2012 which pave the way for a new agreement in Paris in 2015.	• Set out a timetable to adopt a universal climate agreement by 2015 (to come into effect in 2020); • Complete the work under Bali Action Plan and to focus on new completing new targets; • Strengthen the aim to cut greenhouse gases and help vulnerable countries to adapt; • Amend Kyoto Protocol to include a new commitment period for cutting down the greenhouse gases emissions; and • Provide the financial and technology support and new institutions to allow clean energy investment and sustainable growth in developing countries.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU Common Agricultural Policy	• To improve agricultural productivity, so that consumers have a stable supply of affordable food; and • To ensure that EU farmers can make a reasonable living.	• ensuring viable food production that will contribute to feeding the world's population, which is expected to rise considerably in the future; • Climate change and sustainable management of natural resources; • Looking after the countryside across the EU and keeping the rural economy alive.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EU REACH Regulation (EC 1907/2006)	• Aims to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances.	The aims are achieved by applying REACH, namely: • Registration, • Evaluation, • Authorisation; and • Restriction of chemicals. REACH also aims to enhance innovation and competitiveness of the EU chemicals industry.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Stockholm Convention	• The objective of the Stockholm Convention is to protect human health and the environment from persistent organic pollutants.	• Prohibit and/or eliminate the production and use, as well as the import and export, of the intentionally produced POPs that are listed in Annex A to the Convention • Restrict the production and use, as well as the import and export, of the intentionally produced POPs that are listed in Annex B to the Convention • Reduce or eliminate releases from unintentionally produced POPs that are listed in Annex C to the Convention • Ensure that stockpiles and wastes consisting of, containing or contaminated with POPs are managed safely and in an environmentally sound manner • Other provisions of the Convention relate to the development of implementation plans, information exchange, public information, awareness and education, research, development and monitoring, technical assistance, financial resources and mechanisms, reporting, effectiveness evaluation and non-compliance	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Ramsar Convention	The Convention's mission is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".	Under the "three pillars" of the Convention, the Contracting Parties commit to: • Work towards the wise use of all their wetlands; • Designate suitable wetlands for the list of Wetlands of International Importance (the "Ramsar List") and ensure their effective management; • Cooperate internationally on transboundary wetlands, shared wetland systems and shared species.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European 2020 Strategy for Growth	Europe 2020 sets out a vision of Europe's social market economy for the 21st century and puts forward three mutually reinforcing priorities: • Smart growth: developing an economy based on knowledge and innovation; • Sustainable growth: promoting a more resource efficient, greener and more competitive economy; • Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.	In order to reach these priorities, the Commission proposes five quantitative targets to fulfil by 2020: 1. 75 % of the population aged 20-64 should be employed; 2. 3% of the EU's GDP should be invested in R&D; 3. the "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right); 4. the share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree; 5. 20 million less people should be at risk of poverty.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Level			

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
Ireland 2040 - Our Plan, the National Planning Framework, and the National Development Plan	The National Planning Framework is the Government's high-level strategic plan for shaping the future growth and development of to the year 2040. It is a framework to guide public and private investment, to create and promote opportunities for people, and to protect and enhance the environment - from villages to cities, and everything around and in between. The National Development Plan sets out the investment priorities that will underpin the successful implementation of the new National Planning Framework. This will guide national, regional and local planning and investment decisions in Ireland over the next two decades, to cater for an expected population increase of over 1 million people.	National Strategic Outcomes as follows: 1. Compact Growth 2. Enhanced Regional Accessibility 3. Strengthened Rural Economies and Communities 4. Sustainable Mobility 5. A Strong Economy, supported by Enterprise, Innovation and Skills 6. High-Quality International Connectivity 7. Enhanced Amenity and Heritage 8. Transition to a Low-Carbon and Climate-Resilient Society 9. Sustainable Management of Water and other Environmental Resources 10. Access to Quality Childcare, Education and Health Services	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Planning, Land Use and Transport Outlook 2040 [in preparation]	The PLUTO will take account of forecasted future economic and demographic scenarios, affordability considerations and relevant Government policies and will: 1. Quantify in broad terms the appropriate scale of financial investment in land transport over the long term; 2. Consider how fiscal, environmental and technological developments might impact on this investment; and, 3. Identify strategic priorities for future investment to ensure land transport infrastructure provision facilitates the objectives of Project Ireland 2040.	In preparation	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Planning and Development Act 2000 (as amended)	• The core principal objectives of this Act are to amend the Planning Acts of 2000 – 2009 with specific regard given to supporting economic renewal and sustainable development.	• Development, with certain exceptions, is subject to development control under the Planning Acts and the local authorities grant or refuse planning permission for development, including ones within protected areas. • There are, however, a range of exemptions from the planning system. Use of land for agriculture, peat extraction and afforestation, subject to certain thresholds, is generally exempt from the requirement to obtain planning permission. • Additionally, Environmental Impact Assessment (EIA) is required for a range of classes and large-scale projects. • Under planning legislation, Development Plans must include mandatory objectives for the conservation of the natural heritage and for the conservation of European sites and any other sites which may be prescribed. There are also discretionary powers to set objectives for the conservation of a variety of other elements of the natural heritage.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Communities (Environmental Assessment of Certain Plans and Programmes Regulations 2004 (S.I. 435 of 2004), as amended by S.I. 200 of 2011	• The purpose of these Regulations is to transpose into Irish law Directive 2001/42/EC of 27 June 2001 (O.J. No. L 197, 21 July 2001) on the assessment of the effects of certain plans and programmes on the environment — commonly known as the Strategic Environmental Assessment (SEA) Directive.	• The Regulations cover plans and programmes in all of the sectors listed in article 3(2) of the Directive except land-use planning. • These Regulations also amend certain provisions of the Planning and Development Act 2000 to provide the statutory basis for the transposition of the Directive in respect of land-use planning. • Transposition in respect of the land-use planning sector is contained in the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. No. 436 of 2004).	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011, as amended)	• These Regulations provide a new for the implementation in Ireland of Council Directive 92/43/EEC on habitats and protection of wild fauna and flora (as amended) and for the implementation of Directive 2009/147/EC of the European Parliament and of the Council on the protection of wild birds.	• They provide, among other things, for: the appointment and functions of authorized officers; identification, classification and other procedures relative to the designation of Community sites. • The Regulations have been prepared to address several judgments of the CJEU against Ireland, notably cases C-418/04 and C-183/05, in respect of failure to transpose elements of the Birds Directive and the Habitats Directive into Irish law.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Waste Management Act 1996, as amended	• To make provision in relation to the prevention, management and control of waste; to give effect to provisions of certain acts adopted by institutions of the European communities in respect of those matters; to amend the Environmental Protection Agency Act, 1992, and to repeal certain enactments and to provide for related matters.	• The Waste Management Act contains a number of key legal obligations, including requirements for waste management planning, waste collection and movement, the authorisation of waste facilities, measures to reduce the production of waste and/or promote its recovery.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Communities Environmental Objectives (FPM) Regulations 2009 (S.I 296 of 2009)	• The purpose of these Regulations is to support the achievement of favourable conservation status for freshwater pearl mussels	• Set environmental quality objectives for the habitats of the freshwater pearl mussel populations named in the First Schedule to these Regulations that are within the boundaries of a site notified in a candidate list of European sites, or designated as a	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
		Special Area of Conservation, under the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94/1997). • Require the production of sub-basin management plans with programmes of measures to achieve these objectives. • Set out the duties of public authorities in respect of the sub-basin management plans and programmes of measure.	Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. 9 of 2010), as amended (S.I. No. 366 of 2016)	• To amend the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010) to make further provision to implement Commission Directive 2014/80/EU of 20 June 2014 amending Annex II to Directive 2006/118/EC of the European Parliament and of the Council on the protection of groundwater against pollution and deterioration.	The substances and threshold values set out in Schedule 5 to S.I. No. 9 of 2010 have been reviewed and amended where necessary, based on existing monitoring information and international guidelines on appropriate threshold values. • Part A of Schedule 6 has been amended to include changes to the rules governing the determination of background levels for the purposes of establishing threshold values for groundwater pollutants and indicators of pollution. • Part B of Schedule 6 has been amended to include nitrites and phosphorus (total) / phosphates among the minimum list of pollutants and their indicators which the Environmental Protection Agency (EPA) must consider when establishing threshold values. • Part C of Schedule 6 amends the information to be provided to the Minister by the EPA with regard to the pollutants and their indicators for which threshold values have been established.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2014 (S.I. No. 31 of 2014)	• These Regulations, which give effect to Ireland's 3rd Nitrates Action Programme, provide statutory support for good agricultural practice to protect waters against pollution from agricultural sources	The Regulations include measures such as: • Periods when land application of fertilisers is prohibited • Limits on the land application of fertilisers • Storage requirements for livestock manure; and • Monitoring of the effectiveness of the measures in terms of agricultural practice and impact on water quality.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Climate Action and Low Carbon Development Act 2015, as amended	• An Act to provide for the approval of plans by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy.	When considering a plan or framework, for approval, the Government shall endeavour to achieve the national transition objective within the period to which the objective relates and shall, in endeavouring to achieve that objective, ensure that such objective is achieved by the implementation of measures that are cost effective and shall, for that purpose, have regard to: • The ultimate objective specified in Article 2 of the United Nations Framework Convention on Climate Change done at New York on 9 May 1992 and any mitigation commitment entered into by the European Union in response or otherwise in relation to that objective, • The policy of the Government on climate change, • Climate justice, • Any existing obligation of the State under the law of the European Union or any international agreement referred to in section 2; and • The most recent national greenhouse gas emissions inventory and projection of future greenhouse gas emissions, prepared by the Agency.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Climate Action Plan 2024	The National Climate Action Plan provides a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting Ireland on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021.	The Climate Action Plans list the actions needed to deliver on Ireland's climate targets and sets indicative ranges of emissions reductions for each sector of the economy. It will be updated periodically to ensure alignment with Ireland's legally binding economy-wide carbon budgets and sectoral ceilings.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
The Sustainable Development Goals National Implementation Plan (2018 – 2020)	• National Implementation Plan 2018 - 2020 is in direct response to the 2030 Agenda for Sustainable Development and provides a whole-of-government approach to implement the 17 Sustainable Development Goals (SDGs). • The Plan provides a 'SDG Matrix' which identifies the responsible Government Departments for each of the 169 targets. It also includes a 'SDG Policy Map' indicating the relevant national policies for each of the targets.	The Plan identifies four strategic priorities to guide implementation: • Awareness: raise public awareness of the SDGs; • Participation: provide stakeholders opportunities to engage and contribute to follow-up and review processes, and further develop national implementation of the Goals; • Support: encourage and support efforts of communities and organisations to contribute towards meeting the SDGs, and foster public participation; and • Policy alignment: develop alignment of national policy with the SDGs and identify opportunities for policy coherence.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Infrastructure and Capital Investment Plan (2016-2021)	• €27 billion multi-annual Exchequer Capital Investment Plan, which is supported by a programme of capital investment in the wider State	• This Capital Plan reflects the Government's commitment to supporting strong and sustainable economic growth and raising welfare and living standards for all.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
	sector, and which over the period 2016 to 2021 will help to lay the foundations for continued growth in Ireland.	• It includes allocations for new projects across a number of key areas and funding to ensure that the present stock of national infrastructure is refreshed and maintained.	combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Union (Birds and Natural Habitats) (Sea-Fisheries) Regulations 2013 (S.I. 290 of 2013)	These regulations have been drafted to implement the responsibilities of the Minister for Agriculture Food and the Marine in relation to sea fisheries in Natura 2000 sites, in accordance with the Habitats and Birds Directives as transposed by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011).	• Regulation 3 provides for the submission of a Fisheries Natura Plan in relation to planned fisheries; • Regulation 4 provides for a screening of a Fisheries Natura Plan to determine whether or not an appropriate assessment is required; • Regulation 5 provides for an appropriate assessment of a Fisheries Natura Plan and also provides for public and statutory consultation; • Regulation 6 provides for the Minister to make a determination to adopt a Fisheries Natura Plan. The Minister may amend, withdraw or revoke a plan; • Regulation 7 provides for publication of the adopted Fisheries Natura Plan; • Regulation 8 provides for a Risk Assessment of unplanned fisheries and also provides for public and statutory consultation on the assessment; • Regulation 9 provides for the issue of a Natura Declaration to prohibit, restrict including restricting by permit, control, etc. of sea fishing activities; • Regulation 10 provides for Natura Permits to be issued where required by Natura Declarations; and • Regulations 11 to 31 deal with functions of authorised officers and related matters, offences, etc.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Ireland's National Renewable Energy Action Plan 2010 (Irish Government submission to the European Commission)	• The National Renewable Energy Action Plan (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's 16% target under Directive 2009/28/EC.	• The NREAP sets out the Member State's national targets for the share of energy from renewable sources to be consumed in transport, electricity and heating and cooling in 2020, and demonstrates how the Member State will meet its overall national target established under the Directive.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Strategy for Renewable Energy (2012-2020)	• The Government's overarching strategic objective is to make renewable energy an increasingly significant component of Ireland's energy supply by 2020, so that at a minimum it will achieve its legally binding 2020 target in the most cost-efficient manner for consumers. • Of critical importance is the role which the renewable energy sector plays in job creation and economic activity as part of the Government's action plan for jobs.	This document sets out five strategic goals, reflecting the key dimensions of the renewable energy challenge to 2020: • Increasing on and offshore wind, • Building a sustainable bioenergy sector, • Fostering R&D in renewables such as wave & tidal, • Growing sustainable transport; and • Building out robust and efficient networks.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Climate Mitigation Plan 2017	• The Plan represents an initial step to set Ireland on a pathway to achieve the deep decarbonisation required in Ireland by mid-century in line with the Government's policy objectives.	The National Mitigation Plan focuses on the following issues: • Climate Action Policy Framework • Decarbonising Electricity Generation • Decarbonising the Built Environment • Decarbonising Transport • An Approach to Carbon Neutrality for Agriculture, Forest and Land Use Sectors	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Clean Air Strategy [in preparation]	• The Clean Air Strategy will provide the strategic policy framework necessary to identify and promote integrated measures across government policy that are required to reduce air pollution and promote cleaner air while delivering on wider national objectives.	• Having a National Strategy will provide a policy framework by which Ireland can develop the necessary policies and measures to comply with new and emerging EU legislation. • The Strategy should also help tackle climate change. • The Strategy will consider a wider range of national policies that are relevant to clean air policy such as transport, energy, home heating and agriculture. • In any discussion relating to clean air policy, the issue of people's health is paramount and this will be a strong theme of the Strategy.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
EirGrid's Grid25 Strategy and associated Grid25 Implementation Programme 2017-2022	• EirGrid's mission is to develop, maintain and operate a safe, secure, reliable, economical and efficient transmission system for Ireland; "*Our vision is of a grid developed to match future needs, so it can safely and*	• Grid25, EirGrid's roadmap to uprate the electricity transmission grid by 2025, continues to be implemented so as to increase the capacity of the grid, to satisfy future demand,	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
	reliably carry power all over the country to the major towns and cities and onwards to every home, farm and business where the electricity is consumed and so it can meet the needs of consumers and generators in a sustainable way."	and to help Ireland meet its target of 40 per cent of electricity from renewable energy by 2020.	combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Strategy for the Future Development of National and Regional Greenways (2018)	• The objective of this Strategy is to assist in the strategic development of nationally and regionally significant Greenways in appropriate locations constructed to an appropriate standard in order to deliver a quality experience for all Greenways users. • It also aims to increase the number and geographical spread of Greenways of scale and quality around the country over the next 10 years with a consequent significant increase in the number of people using Greenways as a visitor experience and as a recreational amenity.	• A Strategic Greenway network of national and regional routes, with a number of high capacity flagship routes that can be extended and/or link with local Greenways and other cycling and walking infrastructure; • Greenways of scale and appropriate standard that have significant potential to deliver an increase in activity tourism to Ireland and are regularly used by overseas visitors, domestic visitors and locals thereby contributing to a healthier society through increased physical activity; • Greenways that provide a substantially segregated off road experience linking places of interest, recreation and leisure in areas with beautiful scenery of different types with plenty to see and do; and • Greenways that provide opportunities for the development of local businesses and economies, and • Greenways that are developed with all relevant stakeholders in line with an agreed code of practice.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Water Resources Plan [in preparation]	• The NWRP is a plan on how to provide a safe, secure and reliable water supply to customers for the next 25 years, without causing adverse impact on the environment. • The objective of the NWRP is to set out how we intend to maintain the supply and demand for drinking water over the short, medium and long term whilst minimising the impact on the environment. • The preparation of the NWRP has been divided into two phases, the combination of which will become the final NWRP. The NWRP Framework Plan (Phase 1) has now been adopted. Phase 2 of the NWRP (four Regional Water Resources Plans), currently in preparation, will address the needs across the 535 individual water supplies and identify the solutions to address these needs.	The key objectives of the plan are to: • Identify areas where there are current and future potential water supply shortfalls, taking into account normal and extreme weather conditions • Assess the current and future water demand from homes, businesses, farms, and industry • Consider the impacts of climate change on Ireland's water resources • Develop a drought plan advising measures to be taken before and during drought events • Develop a plan detailing how we deal with the material that is produced as a result of treating drinking water • Assess the water resources available at a national level including lakes, rivers and groundwater	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Strategic Plan for Aquaculture Development (2014-2020)	Vision: *"Aquaculture in RC is economically, socially and ecologically sustainable, with a developed infrastructure, strong human potentials and an organized market. The consumption of aquaculture products is equal or above EU average, while the technological development of the sector is among the best in the EU."*	General development and growth objectives of marine and freshwater aquaculture (2014 – 2020): • Strengthen the social, business and administrative environment for aquaculture development • Increase in the total production to 24,050 tonnes while adhering to the principles of economic, social and ecological sustainability • Improvement of the perception and increase in the national consumption of National products	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Construction 2020, A Strategy for a Renewed Construction Sector	• Construction 2020 sets out a package of measures agreed by the Government and is aimed at stimulating activity in the building industry. • The Strategy aims both to increase the capacity of the sector to create and maintain jobs, and to deliver a sustainable sector, operating at an appropriate level. It seeks to learn the lessons of the past and to ensure that the right structures and mechanisms are in place so that they are not repeated.	This Strategy therefore addresses issues including: • A strategic approach to the provision of housing, based on real and measured needs, with mechanisms in place to detect and act when things are going wrong; • Continuing improvement of the planning process, striking the right balance between current and future requirements; • The availability of financing for viable and worthwhile projects; • Access to mortgage finance on reasonable and sustainable terms; • Ensuring we have the tools we need to monitor and regulate the sector in a way that underpins public confidence and worker safety; • Ensuring a fit for purpose sector supported by a highly skilled workforce achieving high quality and standards; and • Ensuring opportunities are provided to unemployed former construction workers to contribute to the recovery of the sector.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Sustainable Development: A Strategy for Ireland (1997)	• The overall aim of this Strategy is to ensure that economy and society in Ireland can develop to their full potential within a well-protected environment, without compromising the quality of that environment, and with responsibility towards present and future generations and the wider international community.	• The Strategy addresses all areas of Government policy, and of economic and societal activity, which impact on the environment. It seeks to re-orientate policies as necessary to ensure that the strong growth Ireland enjoys and seeks to maintain will be environmentally sustainable.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
National Landscape Strategy for Ireland 2015-2025 and National Landscape Character Assessment (pending preparation)	• The National Landscape Strategy will be used to ensure compliance with the European Landscape Convention and to establish principles for protecting and enhancing the landscape while positively managing its change. It will provide a high-level policy framework to achieve balance between the protection, management and planning of the landscape by way of supporting actions. • Landscape Strategy Vision: *"Our landscape reflects and embodies our cultural values and our shared natural heritage and contributes to the well-being of our society, environment and economy. We have an obligation to ourselves and to future generations to promote its sustainable protection, management and planning."*	The objectives of the National Landscape Strategy are to: • Implement the European Landscape Convention by integrating landscape into the approach to sustainable development; • Establish and embed a public process of gathering, sharing and interpreting scientific, technical and cultural information in order to carry out evidence-based identification and description of the character, resources and processes of the landscape; • Provide a policy framework, which will put in place measures at national, sectoral - including agriculture, tourism, energy, transport and marine - and local level, together with civil society, to protect, manage and properly plan through high quality design for the sustainable stewardship of the landscape; • Ensure that we take advantage of opportunities to implement policies relating to landscape use that are complementary and mutually reinforcing and that conflicting policy objectives are avoided in as far as possible.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Hazardous Waste Management Plan (EPA) 2014-2020 and new National Hazardous Waste Management Plan 2021-2027	This Plan sets out the priorities to be pursued over the next six years and beyond to improve the management of hazardous waste, taking into account the progress made since the previous plan and the waste policy and legislative changes that have occurred since the previous plan was published. Section 26 of the Waste Management Act 1996 as amended, sets out the overarching objectives for the National Hazardous Waste Management Plan. In this context, the following objectives are included as priorities for the revised Plan period: • To prevent and reduce the generation of hazardous waste by industry and society generally; • To maximise the collection of hazardous waste with a view to reducing the environmental and health impacts of any unregulated waste; • To strive for increased self-sufficiency in the management of hazardous waste and to minimise hazardous waste export; • To minimise the environmental, health, social and economic impacts of hazardous waste generation and management.	The revised Plan makes 27 recommendations under the following topics: • Prevention • Collection • Self-sufficiency • Regulation • Legacy issues • North-south cooperation • Guidance and awareness • Implementation	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Ministerial Guidelines such as Sustainable Rural Housing Guidelines and Flood Risk Management Guidelines	• The Department produces a range of guidelines designed to help planning authorities, An Bord Pleanála, developers and the general public and cover a wide range of issues amongst others, architectural heritage, child care facilities, landscape, quarries and residential density.	• The Minister issues statutory guidelines under Section 28 of the Act which planning authorities and An Bord Pleanála are obliged to have regard to in the performance of their planning functions.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
HSE Healthy Ireland Framework for Improved Health and Wellbeing 2013-2025	• The vision is: *"A Healthy Ireland, where everyone can enjoy physical and mental health and wellbeing to their full potential, where wellbeing is valued and supported at every level of society and is everyone's responsibility."*	These four goals are interlinked, interdependent and mutually supportive: • Goal 1: Increase the proportion of people who are healthy at all stages of life • Goal 2: Reduce health inequalities • Goal 3: Protect the public from threats to health and wellbeing • Goal 4: Create an environment where every individual and sector of society can play their part in achieving a healthy Ireland	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Our Sustainable Future: A framework for Sustainable Development for Ireland 2012	A medium to long term framework for advancing sustainable development and the green economy in Ireland. It identifies spatial planning as a key challenge for sustainable development and sets a series of measures to address these challenges.	• Sets out the challenges facing us and how we might address them in making sure that quality of life and general wellbeing can be improved and sustained in the decades to come.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Smarter Travel – A Sustainable Transport Future – A New Transport Policy for Ireland 2009 – 2020 (2009)	• Outlines a policy for how a sustainable travel and transport system can be achieved. • Sets out five key goals: o To reduce overall travel demand. o To maximise the efficiency of the transport network. o To reduce reliance on fossil fuels. o To reduce transport emissions. o To improve accessibility to transport.	• Others lower level aims include: o reduce distance travelled by private car and encourage smarter travel, including focusing population growth in areas of employment and to encourage people to live in close proximity to places of employment o ensuring that alternatives to the car are more widely available, mainly through a radically improved public transport service and through investment in cycling and walking o improving the fuel efficiency of motorised transport through improved fleet structure, energy efficient driving and alternative technologies	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
		○ strengthening institutional arrangements to deliver the targets	regulatory framework for environmental protection and management.
Investing in our Future: A Strategic Framework for Investment in Land Transport (SFILT) – Department of Transport, Tourism and Sport	• SFILT sets out a set of priorities to guide the allocation of the State's investment to best develop and manage Ireland's land transport network over the coming decades.	The three priorities stated in SFILT are: • Priority 1: Achieve steady state maintenance (meaning that the maintenance and renewal of the existing transport system is at a sufficient level to maintain the system in an adequate condition); • Priority 2: Address urban congestion; and • Priority 3: Maximise the value of the road network. In delivering on the steady state maintenance objective set out in SFILT, the Plan includes for: • Planned replacement programme for the bus fleet operated under Public Service Obligation ("PSO") contracts; • Tram refurbishment and asset renewal in the case of light rail; and • To the extent within the Authority' remit, support for the operation of the existing rail network within the GDA.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Delivering a Sustainable Energy Future for Ireland – The Energy Policy Framework 2007 – 2020 (2007)	• White paper setting out a framework for delivering a sustainable energy future in Ireland. • Outlines strategic Goals for: ○ Security of Supply ○ Sustainability of Energy ○ Competitiveness of Energy Supply	The underpinning Strategic Goals are: • Ensuring that electricity supply consistently meets demand • Ensuring the physical security and reliability of gas supplies to Ireland • Enhancing the diversity of fuels used for power generation • Delivering electricity and gas to homes and businesses over efficient, reliable and secure networks • Creating a stable attractive environment for hydrocarbon exploration and production • Being prepared for energy supply disruptions	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Adaptation Framework 2024 and associated regional, local and sectoral adaptation plans	• The Framework is mandated by the Climate Action and Low Carbon Development Act of 2015, as amended, and aims to create a unified approach involving both government and society to adapt to climate change.	• The Framework outlines how various sectors and local authorities can implement adaptation measures to minimise Ireland's vulnerability to climate change's adverse effects while taking advantage of any beneficial impacts. The Framework emphasises the importance of integrating adaptation strategies into all levels of policy making, infrastructure development, and local planning.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Renewable Energy Action Plan (2010)	• Sets out the Member State's national targets for the share of energy from renewable sources to be consumed in transport, electricity and heating and cooling in 2020, and demonstrates how the Member State will meet its overall national target established under the Directive.	Including Ireland's 16% target of gross final consumption to come from renewables by 2020.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Energy Efficiency Action Plan for Ireland (2009 – 2020)	• This is the second National Energy Efficiency Action Plan for Ireland.	• The Plan reviews the original 90 actions outlined in the first Plan and updates/renews/removes them as appropriate.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Wildlife Act of 1976 **Wildlife (Amendment) Act, 2000**	• The act provides protection and conservation of wild flora and fauna.	• Provides protection for certain species, their habitats and important ecosystems • Give statutory protection to NHAs • Enhances wildlife species and their habitats • Includes more species for protection	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
Actions for Biodiversity (2017-2021) Ireland's National Biodiversity Plan	• Sets out strategic objectives, targets and actions to conserve and restore Ireland's biodiversity and to prevent and reduce the loss of biodiversity in Ireland and globally.	• To mainstream biodiversity in the decision-making process across all sectors. • To substantially strengthen the knowledge base for conservation, management and sustainable use of biodiversity. • To increase awareness and appreciation of biodiversity and ecosystems services. • To conserve and restore biodiversity and ecosystem services in the wider countryside. • To conserve and restore biodiversity and ecosystem services in the marine environment. • To expand and improve on the management of protected areas and legally protected species. • To substantially strengthen the effectiveness of international governance for biodiversity and ecosystem services.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Broadband Plan (2012)	• Sets out the strategy to deliver high speed broadband throughout Ireland.	The Plan sets out: • A clear statement of Government policy on the delivery of High-Speed Broadband. • Specific targets for the delivery and rollout of high-speed broadband and the speeds to be delivered. • The strategy and interventions that will underpin the successful implementation of these targets. • A series of specific complementary measures to promote implementation of Government policy in this area.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Communities (Water Policy) Regulations of 2003 (SI 722 of 2003) **European Communities (Water Policy) Regulations of 2003 (SI 350 of 2014)** **European Communities Environmental Objectives (Surface waters) Regulations of 2009 (SI 272 of 2009)**	• Transpose the Water Framework Directive into legislation. • Outlines the general duty of public authorities in relation to water. • Identifies the competent authorities in charge of water policy (amended to Irish Water in 2013) and gives EPA and the CER the authority to regulate and supervise their actions.	• Implements River basin districts and characterisation of RBDs and River Basin Management Plans. • Requires the public to be informed and consulted on the Plan and for progress reports to be published on RBDs. • Implements a Register of protected areas, Classification systems and Monitoring programmes for water bodies. • Allows the competent authority to recover the cost of damage/destruction of status of water body. • Outlines environmental objectives and programme of measures and environmental quality standards for priority substances. • Outlines criteria for assessment of groundwater. • Outlines environmental objectives to be achieved for surface water bodies. • Outlines surface water quality standards. • Establishes threshold values for the classification and protection of surface waters against pollution and deterioration in quality.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
European Communities Environmental Objectives (Groundwater) Regulations of 2010 (SI 9 of 2010)	• Transpose the requirements of the Groundwater Directive 2006/118/EC into Irish Legislation.	• Outlines environmental objectives to be achieved for groundwater bodies of groundwater against pollution and deterioration in quality. • Sets groundwater quality standards. • Outlines threshold values for the classification and protection of groundwater.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Water Pollution Acts 1977 to 1990	• The Water Pollution Acts allow Local Authorities the authority regulate and supervise actions relating to water in their division.	The Water Pollution Acts enable local authorities to: • Prosecute for water pollution offences. • Attach appropriate pollution control conditions in the licensing of effluent discharges from industry, etc., made to waters. • Issue notices ("section 12 notices") to farmers, etc., specifying measures to be taken within a prescribed period to prevent water pollution. • issue notices requiring a person to cease the pollution of waters and requiring the mitigation or remedying of any effects of the pollution in the manner and within the period specified in such notices.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Water Services Act 2007 **Water Services (Amendment) Act 2012** **Water Services Act (No. 2) 2013**	• Provides the water services infrastructure. • Outlines the responsibilities involved in delivering and managing water services. • Identifies the authority in charge of provision of water and waste water supply. • Irish Water was given the responsibility of the provision of water and waste water services in the amendment act during 2013, therefore these services are no longer the responsibility of the 34 Local Authorities in Ireland.	Key strategic objectives include: • Ensuring Irish Water delivers infrastructural projects that meet key public health, environmental and economic objectives in the water services sector. • Ensuring the provision of adequate water and sewerage services in the gateways and hubs listed in the National Spatial Strategy, and in other locations where services need to be enhanced. • Ensuring good quality drinking water is available to all consumers of public and group water supplies, in compliance with national and EU drinking water standards • Ensuring the provision of the remaining infrastructure needed to provide secondary waste water treatment, for compliance with the requirements of the EU Urban Waste water Treatment Directive.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
Irish Water's Water Services Strategic Plan 2015 and associated Proposed Capital Investment Plan (2014-2016)	• This Water Services Strategic Plan sets out strategic objectives for the delivery of water services over the next 25 years up to 2040. It details current and future challenges which affect the provision of water services and identifies the priorities to be tackled in the short and medium term.	Six strategic objectives as follows: • Meet Customer Expectations. • Ensure a Safe and Reliable Water Supply. • Provide Effective Management of Waste water. • Protect and Enhance the Environment. • Support Social and Economic Growth. • Invest in the Future.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Agri-Food Strategy 2030	This 10-year Strategy sets out four high-level "Missions" to be achieved in order to develop such a system in Ireland: 1. A Climate Smart, Environmentally Sustainable Agri-Food Sector 2. Viable and Resilient Primary Producers with Enhanced Wellbeing 3. Food that is Safe, Nutritious and Appealing, Trusted and Valued at Home and Abroad 4. An Innovative, Competitive and Resilient Sector, driven by Technology and Talent	Each of the Missions has a set of Goals which are underpinned by a series of Actions.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Agri-vision 2015 Action Plan	Outlines the vision for agricultural industry to improve competitiveness and response to market demand while respecting and enhancing the environment	not applicable	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Rural Environmental Protection Scheme (REPS) **Agri-Environmental Options Scheme (AEOS)** **Green, Low-Carbon, Agri-environment Scheme (GLAS)**	• Agri-environmental funding schemes aimed at rural development for the environmental enhancement and protection. • GLAS is the new replacement for REPS and AEOS which are both expiring.	• Establish best practice farming methods and production methods in order to protect landscapes and maximise conservation. • Protect biodiversity, endangered species of flora and fauna and wildlife habitats. • Ensure food is produced with the highest regard to the environment. • Implement nutrient management plans and grassland management plans. • Protect and maintain water bodies, wetlands and cultural heritage.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Rural Development Programme	• The National Rural Development Programme, prepared by the Department of Agriculture, Fisheries and Food, sets out a national programme based on the EU framework for rural development and prioritises improving the competitiveness of agriculture, improving the environment and improving the quality of life in rural areas	At a more detailed level, the programme also: • Supports structural change at farm level including training young farmers and encouraging early retirement, support for restructuring, development and innovation; • Aims to improve the environment, biodiversity and the amenity value of the countryside by support for land management through funds such as Natura 2000 payments etc.; and • Aims to improve quality of life in rural areas and encouraging diversification of economic activity through the implementation of local development strategies such as non-agricultural activities	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Forestry Programme (2014-2020)	Represents Ireland's proposals for 100% State aid funding for a new Forestry Programme for the period 2014 – 2020.	Measures include the following: • Afforestation and Creation of Woodland • NeighbourWood Scheme • Forest Roads • Reconstitution Scheme • Woodland Improvement Scheme • Native Woodland Conservation Scheme • Knowledge Transfer and Information Actions • Producer Groups • Innovative Forest Technology • Forest Genetic Reproductive Material • Forest Management Plans	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
River Basin Management Plan for Ireland 2022-2027 3rd Cycle [in preparation]	This draft River Basin Management Plan sets out the measures that are necessary to protect and restore water quality in Ireland. The overall aim of the plan is to ensure that our natural waters are sustainably managed and that freshwater resources are protected so as to maintain and improve Ireland's water environment.	The River Basin Management Plan sets out the measures necessary to protect and improve the quality of Ireland's waters. These plans are prepared in 6-year cycles, during which a programme of measures must be implemented so as to achieve water quality objectives. Good water quality contributes to protecting human health by improving the quality of drinking water sources and bathing waters.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
			and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Peatlands Strategy (2015-2025)	This Strategy aims to provide a long-term framework within which all of the peatlands within the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations.	Objectives of the Strategy include: • To give direction to Ireland's approach to peatland management. • To apply to all peatlands, including peat soils. • To ensure that the relevant State authorities and state-owned companies that influence such decisions contribute to meeting cross-cutting objectives and obligations in their policies and actions. • To ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsible.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Flood Risk Management Plans arising from National Catchment Flood Risk Assessment and Management Programme	• The national Catchment Flood Risk Assessment and Management (CFRAM) programme commenced in Ireland in 2011 and is being overseen by the Office of Public Works. The CFRAM Programme is intended to deliver on core components of the National Flood Policy, adopted in 2004, and on the requirements of the EU Floods Directive.	CFRAM Studies have been undertaken for all River Basin Districts. The studies are 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. Flood Risk and Hazard mapping, including Flood Extent Mapping, was finalised in 2017. The final outputs from the studies are the CFRAM Plans, finalised in 2018. The Plans define the current and future flood risk in the River Basin Districts and set out how this risk can be managed.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft National Bioenergy Plan 2014 - 2020	The Draft Bioenergy Plan sets out a vision as follows: • Bioenergy resources contributing to economic development and sustainable growth, generating jobs for citizens, supported by coherent policy, planning and regulation, and managed in an integrated manner.	Three high level goals, of equal importance, based on the concept of sustainable development are identified: • To harness the market opportunities presented by bioenergy in order to achieve economic development, growth and jobs. • To increase awareness of the value, opportunities and societal benefits of developing bioenergy. • To ensure that bioenergy developments do not adversely impact the environment and its living and non-living resources.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft Renewable Electricity Policy and Development Framework (DCCAE) 2016	Goal: To optimise the opportunities in Ireland for renewable electricity development on land at significant scale, to serve both the All Island Single Electricity Market and any future regional market within the European Union, in accordance with European and Irish law, including Directive 2009/28/EC: On the promotion of the use of energy from renewable resources.	Objective: To develop a Policy and Development Framework for renewable electricity generation on land to serve both the All Island Single Electricity Market and any future regional market within the European Union, with particular focus on large scale projects for indigenous renewable electricity generation. This will, inter alia, provide guidance for planning authorities and An Bord Pleanála.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Alternative Fuels Infrastructure for the Transport Sector (DTTAS) 2017- 2030	This Framework sets targets to achieve an appropriate level of alternative fuels infrastructure for transport, which is relative to national policy and Irish market needs. Non-infrastructure-based incentives to support the use of the infrastructure and the uptake of alternative fuels are also included within the scope of the Framework.	Targets for alternative fuel infrastructure include the following: • AFV forecasts • Electricity targets • Natural gas (CNG, LNG) targets • Hydrogen targets • Biofuels targets • LPG targets • Synthetic and paraffinic fuels targets	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Food Wise 2025 (DAFM)	Food Wise 2025 sets out a ten-year plan for the agri-food sector. It underlines the sector's unique and special position within the Irish economy, and it illustrates the potential which exists for this sector to grow even further.	Food Wise 2025 identifies ambitious and challenging growth projections for the industry over the next ten years including: • 85% increase in exports to €19 billion. • 70% increase in value added to €13 billion. • 60% increase in primary production to €10 billion. • The creation of 23,000 additional jobs all along the supply chain from producer level to high-end value-added product development.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Cycle Network Scoping Study 2010	• Outlines objectives and actions aimed at developing a strong cycle network in Ireland	• Sets a target where 10% of all journeys will be made by bike by 2020	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc.,

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
	• Sets out 19 specific objectives, and details the 109 actions, aimed at ensuring that a cycling culture is developed	• Proposes the planning, infrastructure, communication, education and stakeholder participations measures required to implement the initiative	individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Policy Framework for Alternative Fuels Infrastructure for Transport in Ireland 2017 to 2030	• This National Policy Framework on Alternative Fuels Infrastructure for Transport represents the first step in communicating our longer-term national vision for decarbonising transport by 2050, the cornerstone of which is our ambition that by 2030 all new cars and vans sold in Ireland will be zero-emissions capable. • By 2030 it is envisaged that the movement in Ireland to electrically-fuelled cars and commuter rail will be well underway, with natural gas and biofuels developing as major alternatives in the freight and bus sectors.	This policy set out to achieve five key goals in transport: • Reduce overall travel demand • Maximise the efficiency of the transport network • Reduce reliance on fossil fuels • Reduce transport emissions • Improve accessibility to transport These goals remain the cornerstone of transport policy and are fully aligned to the objectives of this National Policy Framework.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Tourism Action Plan 2019-2021	The Tourism Action Plan 2019-2021 sets out actions that the Tourism Leadership Group has identified as priorities to be progressed until 2021 in order to maintain sustainable growth in overseas tourism revenue and employment. Each action involves specific tourism stakeholders, both in the public and private sectors, all of whom we expect to proactively work towards the completion of actions within the specified timeframe.	The Plan contains 27 actions focusing on the following areas: • Policy Context • Marketing Ireland as a Visitor Destination • Enhancing the Visitor Experience • Research in the Irish Tourism Sector • Supporting Local Communities in Tourism • Wider Government Policy • International Context • Co-ordination Structures	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Tourism Policy Statement: People, Place and Policy – Growing Tourism to 2025	The main goal of this policy statement is to have a vibrant, attractive tourism sector that makes a significant contribution to employment across the country; is economically, socially and environmentally sustainable; helps promote a positive image of Ireland overseas, and is a sector in which people want to work.	The Tourism Policy Statement sets three headline targets to be achieved by 2025: • Overseas tourism revenue of €5 billion per year • net of inflation excluding carrier receipts; • 250,000 people employed in tourism; and • 10 million overseas visitors to Ireland per year.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft Renewable Electricity Policy and Development Framework (DCCAE)	Goal: To optimise the opportunities in Ireland for renewable electricity development on land at significant scale, to serve both the All Island Single Electricity Market and any future regional market within the European Union, in accordance with European and Irish law, including Directive 2009/28/EC: On the promotion of the use of energy from renewable resources.	Objective: To develop a Policy and Development Framework for renewable electricity generation on land to serve both the All Island Single Electricity Market and any future regional market within the European Union, with particular focus on large scale projects for indigenous renewable electricity generation. This will, inter alia, provide guidance for planning authorities and An Bord Pleanála. Methodology: Development of the Policy and Development Framework is to be informed by the carrying out of an SEA, including widespread consultation with stakeholders and public, and with AA under the Habitats Directive.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
All Ireland Pollinator Plan 2021-2025	The All-Ireland Pollinator Plan is an island-wide attempt to reverse declines in pollinating insects to ensure the sustainability of our food, avoid additional economic impacts on agriculture, and protect the health of the environment. The main objectives include: • Making farmland, public land and private land in Ireland pollinator friendly; • Raising awareness of pollinators and how to protect them; • Managed pollinators – supporting beekeepers and growers; • Expanding our knowledge of pollinators and pollination service; and • Collecting evidence to track change and measure success.	This voluntary Plan identified 81 actions, shared out between over 100 governmental and non-governmental organisations. A large focus of the Plan is to identify actions to improve the quality and amount of flower-rich habitat. Actions range from creating pollinator highways along our transport routes, to supporting pollinators on farmland, in gardens, businesses, and on public land.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Guidelines on Sustainable Residential Development in Urban Areas (DEHLG 2009)	The aim of these guidelines is to set out the key planning principles which should be reflected in development plans and local area plans, and which should guide the preparation and assessment of planning applications for residential development in urban areas.	The objective is to produce high quality sustainable developments: • quality homes and neighbourhoods, • places where people actually want to live, to work and to raise families, and • places that work for our children and for our children's children.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
			regulatory framework for environmental protection and management.
Town Centre First	The Town Centre First policy aims to create town centres that function as viable, vibrant and attractive locations for people to live, work and visit, while also functioning as the service, social, cultural and recreational hub for the local community.	The policy sets out a framework to facilitate and resource each town to chart their own future through a tailored plan, developed by a collaborative Town Team, and supported by their Local Authority.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Waste Management Plan for a Circular Economy 2024	The Regional Waste Management Planning Offices, under the auspices of the County and City Management Association National Oversight Group, have co-ordinated the preparation of this plan which is the first National Waste Management Plan for a Circular Economy. This Plan sets out a framework for the prevention and management of waste in Ireland for the period 2024 to 2030.	The Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
National Biodiversity Action Plan 2023 – 2030	Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature.	This National Biodiversity Action Plan 2023-2030 builds upon the achievements of the previous Plan. It will continue to implement actions within the framework of five strategic objectives, while addressing new and emerging issues: Objective 1 - Adopt a Whole of Government, Whole of Society Approach to Biodiversity Objective 2 - Meet Urgent Conservation and Restoration Needs Objective 3 - Secure Nature's Contribution to People Objective 4 - Enhance the Evidence Base for Action on Biodiversity Objective 5 - Strengthen Ireland's Contribution to International Biodiversity	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Regional/ County/Local Level			
Southern Regional Economic and Spatial Strategy 2019-2031	The Regional Spatial and Economic Strategy provides a long-term strategic planning and economic framework for the Southern Region in order to support the implementation of the National Planning Framework.	The Southern Regional Economic and Spatial Strategy includes provisions for its 10 constituent local authorities: Carlow County Council; Tipperary County Council; Waterford City & County Council; Wexford County Council; Kilkenny County Council; Cork City Council; Cork County Council; Kerry County Council; Clare County Council; and Limerick City and County Council.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Eastern and Midland Regional Economic and Spatial Strategy 2019-2031	The Regional Spatial and Economic Strategy provides a long-term strategic planning and economic framework for the Eastern and Midland Region in order to support the implementation of the National Planning Framework.	The Eastern and Midland Regional Economic and Spatial Strategy includes provisions for its 11 constituent local authorities: Dublin City Council; Dún Laoghaire County Council; South Dublin County Council; Longford County Council; Louth County Council; Wicklow City Council; Offaly County Council; Laois County Council; Meath County Council; Fingal County Council; and Westmeath County Council.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Integrated Implementation Plan 2019-2024	The Transport Strategy for the Greater Dublin Area 2016-2035, which established an overall framework for transport investment over the next two decades and was subject to full SEA and Stage 2 AA, is a key policy shaping the six-year Integrated Infrastructure Plan. The priorities in the Integrated Infrastructure Plan align with the objectives and priorities set out in the Transport Strategy, focused on improving public and sustainable transport.	The Implementation Plan identifies investment proposals for a number of areas including: • Bus; • Light Rail; • Heavy Rai; • Integration Measures and Sustainable Transport Investment; • Integrated Service Plan; and • Integration and Accessibility.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
NPWS Conservation Plans and/or Conservation Objectives for SACs and SPAs	Management planning for nature conservation sites has a number of aims. These include: • To identify and evaluate the features of interest for a site	• Conservation objectives for SACs and SPAs (i.e. sites within the Natura 2000 network) have to be set for the habitats and species for which the sites are selected.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
	• To set clear objectives for the conservation of the features of interest • To describe the site and its management • To identify issues (both positive and negative) that might influence the site To set out appropriate strategies/management actions to achieve the objectives	• These objectives are used when carrying out appropriate assessments for plans and projects that might impact on these sites.	combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Groundwater Protection Schemes	A Groundwater Protection Scheme provides guidelines for the planning and licensing authorities in carrying out their functions, and a framework to assist in decision-making on the location, nature and control of developments and activities in order to protect groundwater.	A Groundwater Protection Scheme aims to maintain the quantity and quality of groundwater, and in some cases improve it, by applying a risk assessment-based approach to groundwater protection and sustainable development.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Local Economic and Community Plans (LECPs), including the Carlow LECP and the Laois LECP	The overarching vision for each LECP is: "to promote the well-being and quality of life of citizens and communities	The purpose of the LECP, as provided for in the Local Government Reform Act 2014, is to set out, for a six-year period, the objectives and actions needed to promote and support the economic development and the local and community development of the relevant local authority area, both by itself directly and in partnership with other economic and community development stakeholders.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Carlow County Development Plan 2022-2028 and Laois County Development Plan 2021-2027 and other Land Use Plans in force within Carlow and Laois and in other adjoining planning authorities. This includes Development Plans, Local Area Plans and Planning Schemes.	• Outline planning objectives for land use development. • Strategic framework for planning and sustainable development including those set out in National Planning Framework and Regional Economic and Spatial Strategies. • Set out the policies and proposals to guide development in the specific Local Authority area.	• Identify future infrastructure, development and zoning required. • Protect and enhances amenities and environment. • Guide planning authority in assessing proposals. • Aim to guide development in the area and the amount of nature of the planned development. • Aim to promote sustainable development. • Provide for economic development and protect natural environmental, heritage.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft Carlow Biodiversity Action Plan 2023-2028	Aims to protect, conserve, enhance and restore heritage, biodiversity and ecosystem services across all spectrums.	Plan's objectives include: • gathering information on the biodiversity resource • managing the resource • education and awareness • cooperation to achieve objectives	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Laois Heritage and Biodiversity Strategy 2021 - 2026	Aims to protect, conserve, enhance and restore heritage, biodiversity and ecosystem services across all spectrums.	The aims of the Laois Heritage and Biodiversity Strategy 2021-2026 are to: a) Conserve and enhance the heritage and biodiversity of Laois; b) Commemorate the people and events of historical significance for Laois; c) Integrate our work across built, natural and cultural heritage, where possible; and d) Celebrate and promote the heritage and biodiversity of Laois.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
County Carlow and County Laois Character Assessment and Landscape Character Assessments in adjoining local authorities	Characterises the geographical dimension of the landscape.	Identifies the quality, value, sensitivity and capacity of the landscape area. Guides strategies and guidelines for the future development of the landscape.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
Carlow County Council's Noise Action Plan 2018-2023 and Draft Noise Action Plan 2024 **Laois County Council's Noise Action Plan 2019-2022 and Draft Noise Action Plan 2024**	Noise Action Plans are prepared in accordance with the requirements of the Environmental Noise Regulations 2006, Statutory Instrument 140 of 2006. These Regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise. This Directive sets out a process for managing environmental noise in a consistent manner across the EU and the Noise Regulations set out the approach to meeting the requirements of the Directive in Ireland.	The main purpose of Noise Action Plans is to: Inform and consult the public about noise exposure, its effects and the measures which may be considered to address noise problems Address strategic noise issues by requiring competent authorities to draw up action plans to manage noise issues and their effects Reduce noise, where possible, and maintain the environmental acoustic quality where it is good	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Carlow County Council's Climate Adaption Strategy 2019-2024 **Laois County Council's Climate Adaption Strategy 2019-2024**	The Carlow County Council Climate Change Adaptation Strategy 2019-2024 and Laois County Council Climate Change Adaptation Strategy 2019-2024 feature a range of actions across sectors including: agriculture, forestry, biodiversity, built and archaeological heritage, transport infrastructure, electricity and gas networks, communication networks, flood risk management, water quality, water services infrastructure and health.	The Strategies seek to: • Ensure a proper comprehension of the key risks and vulnerabilities of climate change; • Bring forward the implementation of climate resilient actions in a planned and proactive manner; and • Ensure that climate adaptation considerations are mainstreamed into all plans and policies and integrated into all operations and functions of Carlow and Laois County Councils.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Carlow County Council's Climate Action Plan 2024-2029 **Laois County Council's Draft Climate Action Plan 2024-2029**	Under the National Climate Action Plan 2023, Carlow and Laois County Councils are required to prepare a locally specific climate action plan for their administrative areas. Once adopted, these plans will be valid for five years, and is subject to update at least every five years. Carlow and Laois County Councils' Climate Action Plans are being prepared and are required to be adopted before 24th February 2024. These plans will contribute towards addressing the mitigation of greenhouse gas emissions, climate change adaptation, and strengthening the alignment between national climate policy and the delivery of local climate action.	Through the development and implementation of specific, action-focused, time-bound and measurable actions, local authority climate action plans will: • Provide a strong emphasis on a place-based approach to climate action, delivering a better understanding of greenhouse gas emissions and climate-related risks at a local level, while addressing context-specific conditions and support for locally tailored policy making. • Deliver and promote evidence-based and integrated climate action by way of adaptation and mitigation measures, centred around a strong understanding of the role and remit of the local authority on climate action. • Translate and provide strategic direction at local and community levels on the delivery of the national climate objective which is seeking to curb further global warming and to transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy by no later than the end of 2050.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Draft Carlow County Council Renewable Energy Strategy	The Strategy sets out the framework for the delivery of sustainable and renewable energies throughout the County.	The LARES outlines the potential for a range of renewable energy resources and developments and acknowledges the significant contribution that they can make to the county in terms of energy security, reduced reliance on traditional fossil fuels, enabling future energy exports, meeting assigned national targets and the transition to a low carbon economy	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
County Carlow Tourism Strategy and Action Plan 2020-2025	Key strategic principles for tourism development identified, include: • The natural and built heritage of the County as a primary tourism asset. • The requirement to align with Ireland's Ancient East. • The long-standing need to develop a flagship attraction for the County. • The opportunity for experience and product development. • The imbalance in the County arising from location of tourism product in the north of the county and areas of attractive scenery which are generally located toward the South of the County.	County Carlow Tourism Strategy and Action Plan was commissioned by Carlow Tourism, and has been prepared in the context of Ireland's Ancient East. The purpose of the strategy is to: • improve the profile of Carlow as a holiday destination; • maximise the economic outputs for tourism; • grow tourism related employment; and improve the product offering and visitor experience.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
A Strategic Plan for Tourism in Laois 2018-2023	The Strategy sets out a collaborative approach to tourism that enables Laois to harness the potential of its built and natural heritage to become an all year-round tourism destination	The Vision will be achieved through the fulfilment of the following key objectives: · Attract visitors into the heart of Ireland's story through quality authentic Irish heritage and outdoor activity experiences. · Grow tourism visitor numbers and value of tourism through the enhancement of the Laois tourism product and service base supported by the structures that contribute to the strategic	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
		development of the tourism sector across the county · Tourism leadership and partnership increased visitor numbers increase tourism spend increased tourism employment.	and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Project Carlow 2040: A Vision for Regeneration	The Project Carlow 2040 Regeneration Strategy sets the long-term strategy and approach to the spatial pattern of development in Carlow Town over the next 20 years. As a long term plan it informs and will drive the economic, social and physical development of Carlow Town as an investment location and place to live, setting the direction for the development of strategic sites.	The long-term vision of this Regeneration Strategy is to transform Carlow Town into a regional powerhouse of sustainable economic growth that will offer business opportunities and a better quality of life for all.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
County Laois Draft Retail Strategy 2021-2027 **County Carlow Draft Retail Strategy 2022-2028**	The key objectives of this retail strategy are as follows: • Define the retail hierarchy in the County and related retail core boundaries; • Undertake a health check appraisal of the key retail centres in Laois, to ascertain the need for interventions in these areas; • Identify the broad requirement for additional retail floorspace development in the County over the plan period, to support the established settlement hierarchy, and; Provide guidance on policy recommendations and criteria for the future assessment of retail development proposals over the Development Plan Period 2021-2027.	The overriding aim of the strategy is to create the appropriate conditions necessary to foster a healthy and vibrant retail environment in County Laois over the Development Plan period of 2021-2027. It does so through retail policy recommendations which are framed in the context of national and regional plans, strategies and guidelines. The strategy provides important information on the quantum, scale and types of retail development required over the period to 2027, with further outlook to 2031.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
County Laois Storm Water Management Policy	This document sets out a countywide policy for storm water management relating to planning applications for single domestic properties, residential developments and commercial and industrial developments in both rural and urban environments.	This policy sets out the minimum requirements and practices to achieve an acceptable design of storm water management systems for developments to be taken in charge by Laois County Council.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Carlow County Council Draft Litter Management Plan 2021-2023 **Laois County Council Litter Management Plan 2022-2024**	The objectives of this Plan are to improve, protect, enhance and promote the natural and built environment in the interests of present and future generations.	The objectives of the Litter Plan 2022 – 2024 are: 1. Promotion of Education and Awareness Campaigns 2. Litter Prevention & Enforcement 3. Partnership with Communities and Business 4. Provision of Waste Facilities 5. Management of Litter	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Carlow Town Biodiversity Strategy and Action Plan 2021-2025	The new Carlow Town Biodiversity Strategy & Action Plan provides a strategic plan and specific actions for protecting and enhancing biodiversity in Carlow Town, including tackling invasive non-native species and protecting ecosystem services.	With this new strategy, Carlow are striving to ensure that biodiversity and the various and multiple eco-systems in Carlow Town are identified, preserved and improved for the benefit of future generations.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.
Fáilte Ireland Tourism plans, strategies, including those relating to 'Ireland's Ancient East' Regional Tourism Development Strategy and Destination Experience Development Plans	Fáilte Ireland's work includes preparing various plans and strategies for Ireland's Ancient East and other brands and initiatives. These plans are subject to their own environmental assessment processes and any project arising is required to be consistent with and conform with the provisions of all adopted/approved Statutory Policies, Strategies, Plans and Programmes, including provisions for the protection and management of the environment.	Some of Fáilte Ireland's plans and strategies include various projects relating to land use and infrastructural development, including those relating to development of land or on land and the carrying out of land use activities. Many of these projects exist already while some are not currently in existence.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

Legislation, Plan, etc.	Summary of high-level aim/ purpose/ objective	Summary of lower level objectives, actions etc.	Relevance to the Plan
Various existing, planned and emerging projects provided for by the above plans and programmes	These projects have been provided for by higher-level plans and programmes.	These projects will contribute towards the development of the area to which the Plan relates and/or wider area and will contribute towards environmental protection and management.	Where new land use developments or activities occur as a result of this legislation, plan, programme, etc., individually or in combination with others, potential in-combination effects may arise. Implementation of the Plan needs to comply with all environmental legislation and align with and cumulatively contribute towards – in combination with other users and bodies and their plans etc. – the achievement of the objectives of the regulatory framework for environmental protection and management.

APPROPRIATE ASSESSMENT
CONCLUSION STATEMENT

FOR THE

CARLOW-GRAIGUECULLEN
JOINT URBAN LOCAL AREA PLAN
2024-2030

for: Carlow and Laois County Councils

CARLOW
COUNTY COUNCIL

I bpáirt Leis an bPobal

by: CAAS Ltd.

CAAS

AUGUST 2024

Table of Contents

List of Tables

Section 1 Introduction and Background

1.1 Introduction

This is the Appropriate Assessment (AA) Conclusion Statement for the Carlow-Graiguecullen Joint Urban Local Area Plan 2024-2030. The obligation to undertake AA derives from Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC as transposed into Irish legislation by, inter alia, the Planning and Development Act 2000, as amended. AA is a focused and detailed impact assessment of the implications of a strategic action (such as a plan or programme) or project, alone and in combination with other strategic actions and projects, on the integrity of any European Site in view of its conservation objectives. This AA Conclusion Statement should be read in conjunction with the Plan and associated documents including the AA Natura Impact Report (NIR).

1.2 Legislative Requirements in relation to AA

In carrying out the AA for the Plan, the Planning and Development Act 2000, as amended, requires, inter alia, that the Councils consider the matters arrayed in the first column on Table 1.1 below. The second column identifies how these issues have been addressed.

Table 1.1 Matters taken into account by the AA

Matter specified by the Regulations	How addressed by AA
(a) the Natura Impact Report	An AA NIR accompanies this AA Conclusion Statement and the Plan.
(b) any supplemental information furnished in relation to any such report	This AA Conclusion Statement accompanies the NIR that provides additional detail on European Sites. Submissions made during the Plan preparation/AA process were taken into account when preparing the final Consolidated AA NIR and finalising the AA. Proposed Material Alterations were screened for the need to undertake Stage 2 AA (Stage 2 AA was not required for the Alterations).
(c) if appropriate, any additional information sought by the authority and furnished by the applicant in relation to a Natura Impact Report	
(d) any information or advice obtained by the public authority	
(e) if appropriate, any written submissions or observations made to the public authority in relation to the application for consent for proposed plan or project	
(f) any other relevant information	

In addition to the above, the Regulations require that the Councils make available for inspection a determination regarding the outcome of the assessment with respect to whether or not the Plan would adversely affect the integrity of a European site (a copy of this determination is provided at Appendix I).

1.3 AA Conclusion Statement

Non-Statutory AA guidance (Department of Environment, Heritage and Local Government, 2009) states that (Section 4.14) it "*is recommended that planning authorities include a clear and discrete AA Conclusion Statement as a distinct section in the written statement of the plan separate to the SEA statement*." This guidance recommends that the following issues are addressed by the AA Conclusion Statement:

- Summary of how the findings of the AA were factored into the Plan (see Section 2);
- Reasons for choosing the Plan as adopted, in the light of other reasonable alternatives considered as part of the AA process (see Section 3);
- A declaration that the Plan as adopted will not have an adverse effect on the integrity of European Sites (provided at Appendix I); and
- The NIR (the AA NIR is accompanied by this AA Conclusion Statement and has informed the AA Determination – see Appendix I).

Furthermore, as stated in the Draft "Development Plans Guidelines for Planning Authorities" (Department of Housing, Local Government and Heritage, 2021):

> *"….There is a similar requirement to publish a determination relating to the AA that may have been undertaken. Under Article 6.3 of the Habitats Directive the determination (often termed an 'AA Conclusion Statement') must state as to whether or not the Draft Plan would adversely affect the integrity of a European site. However as stated in Section 3.5, this determination must have been made prior to the adoption of the Draft Plan."*

This AA Conclusion Statement addresses the above issues, including the signed AA Determination included at Appendix I.

Section 2 How the findings of the AA were factored into the Plan

The SEA and AA team worked with the Plan-preparation team at the Councils in order to integrate requirements for environmental protection and management into the Plan.

The Plan was prepared in an iterative manner whereby the Plan and AA documents have informed subsequent versions of the other. The findings of the AA were integrated into the Plan through mitigation measures. These mitigation measures ensure that the Plan will not affect the integrity of the European Sites, alone or in combination with other plans or projects.[1] The mitigation measures included in the Local Area Plan that most relevant to the protection of European sites are identified in Table 2.1 below. Also included are relevant measures from the higher-level County Development Plans.

Table 2.1 Measures that will protect European sites and their sustaining resources integrated into the Plan

Sources and/or pathways for adverse effects[2]	Respective Plan Development Objectives / Mitigation Measure(s)
Alignment with County Development Plans	**Chapter 12, Section 12.0** states the following: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence."
Natural Heritage and Biodiversity	**SO. 7:** Manage the development of Carlow-Graiguecullen in a manner that protects, conserves, and enhances the natural, built and archaeological heritage of the area. **TD. P5:** Protect and conserve the natural and built heritage of Carlow-Graiguecullen upon which the tourism industry is based, including landscapes, designated sites, habitats and species, water quality, archaeology and historic buildings and structures. **TD. P17:** Protect the environmental amenities of Carlow-Graiguecullen from insensitive or inappropriate development, particularly any development that threatens the tourism resources of the joint urban area. **SR. P10:** Protect and develop the connected networks of existing green spaces in the joint urban area to serve the grow NH. P1: Protect, manage, and enhance the natural heritage, biodiversity, landscape, and environment of Carlow-Graiguecullen in recognition of its importance as a non-renewable resource, a unique identifier, as a natural resource, an ecosystem services asset that can contribute towards sustainable urban drainage, flood management, and climate action. **NH. P3:** Ensure that Appropriate Assessment Screening, and if required Appropriate Assessment, is carried out in respect of plans and projects in Carlow-Graiguecullen. Where likely significant effects have been identified in respect of any plan or project not directly connected with or necessary to the management of European sites, in particular the River Barrow and River Nore SAC, either individually or in combination with other plans or projects, ensure Appropriate Assessment in accordance with Article 6(3) of the EU Habitats Directive. Carlow County Council and Laois County Council shall only agree to the plan or project after having ascertained that it will not adversely affect the integrity of any European site, in particular the River Barrow and River Nore SAC, unless the plan or project is subject to the provisions of Article 6(4) of the Habitats Directive. **NH. P4:** Contribute towards the protection, from significant adverse effects, of the ecological integrity, and the visual, recreational, environmental and amenity value of the Oak Park proposed Natural Heritage Area (pNHA) and associated habitats. **NH. P5:** Promote the carrying out of ecological/habitat assessments to inform the layout and design of development proposals and ensure they integrate the protection and enhancement of biodiversity and landscape features wherever possible in Carlow-Graiguecullen, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate. **NH. P6:** Promote increased understanding and awareness of the natural heritage and biodiversity located in the joint urban area of Carlow-Graiguecullen. **NH. P7:** Promote development for recreation and educational purposes that does not conflict with maintaining the favourable conservation status of the River Barrow and River Nore SAC and Oak Park pNHA, including the achievement of their conservation objectives. **NH. P8:** Promote, protect, and enhance sustainable and appropriate access to natural heritage in Carlow-Graiguecullen. **NH. P9:** Identify, protect, conserve, and enhance wherever possible, wildlife habitats and species of local importance in Carlow-Graiguecullen, not otherwise protected by legislation. Such habitats can include woodland, river, wetlands, and grassland areas along with field boundaries (hedgerows, stone walls and ditches). These features form part of a network of habitats and corridors, which allow wildlife to exist and flourish and contribute to compliance with Article 10 of the Habitats Directive **H. P10:** Protect and enhance the natural environment of Carlow-Graiguecullen and recognise the important role of the natural heritage in the area through its diversity, quality, and integrity, and in terms of enhancing the image of the joint urban area and contributing to quality of life and wellbeing, economic growth, tourism and recreation. **GI. P10:** Promote appropriate tree planting and pollinator friendly planting, in accordance with the recommendations of the All-Ireland Pollinator Plan 2021-2025 throughout Carlow-Graiguecullen and in open

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

[2] The measures generally benefit multiple environmental components i.e., a measure providing for the protection of water could beneficially impact upon the protection of biodiversity, flora and fauna, for example. All of the measures included in this table would benefit the protection of European sites.

Sources and/or pathways for adverse effects[2]	Respective Plan Development Objectives / Mitigation Measure(s)
	spaces within new developments, in order to enhance local biodiversity, visual amenity and surface water management. **GI. P11:** Ensure that green areas and open spaces associated with new residential developments and other relevant projects provide multifunctional benefits that enrich quality of life for local communities, ecologically rich areas that enhance biodiversity, and sustainable water management. **GI. P14:** Seek to protect trees and hedgerows in the joint urban area with a particular local amenity or conservation value and encourage the planting of native tree and hedgerow species. **GI. P15:** To have regard to the objectives and targets in the National Biodiversity Action Plan as appropriate in the future development of the Carlow-Graiguecullen Joint Urban Area. **GI. O1:** Support the implementation of the Carlow Town Biodiversity Strategy and Action Plan 2021-2025, and any subsequent updated version this document. **GI. O2:** Investigate the feasibility of providing a wetland amenity area on lands comprising the former Sugar Factory lagoons, in conjunction with relevant stakeholders and local community groups, taking account of the environmental sensitivities of the land and the need to ensure impacts to biodiversity and nature conservation interests are avoided while detailing recommendations for the ecological and hydrological management of the site.
Peatlands, wetlands and surface water courses	**URD. P11:** Support the development of underutilised lands along the River Barrow as a strategic natural asset for the town. Any future development of these lands or proposals for an additional bridge should be subject to further studies to inform the exact nature and intensity that could be accommodated without giving rise to adverse effects on sensitive Natura 2000 habitats and consider any in combination effects arising from proposals for a bridge. **PW. P6:** Contribute towards the protection of existing and potential water resources, and their use by humans and wildlife, including rivers, streams, and groundwater, and associated habitats and species, in accordance with the standards and requirements set out in EU and national legislation and guidance. **FR. O2:** Seek to ensure that where flood risk management works take place that the natural and cultural heritage of the River Barrow and Burren River is protected and improved where possible. **SR. O1:** Deliver the River Barrow Water Activity Centre subject to the availability of financing and compliance with all planning and environmental criteria. **NH. P2:** Support the conservation and enhancement of the River Barrow and River Nore SAC, and to protect the SAC from any plans and projects that are likely to have a significant effect on the coherence or integrity of the designated site, in accordance with relevant EU environmental directives and applicable national legislation, policies, plans and guidelines. **GI. P11:** Ensure that green areas and open spaces associated with new residential developments and other relevant projects provide multifunctional benefits that enrich quality of life for local communities, ecologically rich areas that enhance biodiversity, and sustainable water management. **GI. P12:** Take account of Inland Fisheries guidance 'Planning for Watercourses in the Urban Environment, A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate/Flood Risk and Recreational Planning' (2020) when considering development proposals in the vicinity of rivers and streams in Carlow-Graiguecullen. **LC. P6:** Ensure the effective management of lands adjoining the River Barrow and Burren River and in a manner that maximises views and interactions with these important landscape features in the joint urban area, taking account of the environmental sensitivities of these lands and the need to ensure impacts to biodiversity and nature conservation interests are avoided.
Water services, groundwater and water quality	**PW. P1:** Support Uisce Éireann in the provision of a sufficient quantity and quality of water to serve the needs of the existing and future population of Carlow-Graiguecullen over the period of the Plan and in accordance with the Core Strategies of Carlow and Laois County Councils, and to promote the sustainable management of the water supply for the joint urban area. **PW. P2:** Ensure that new developments will be required to connect to the public water supply network in Carlow-Graiguecullen where public water mains are available, and subject to connection agreements with Uisce Éireann and compliance with normal planning and environmental criteria. **WW. P1:** Facilitate and support Uisce Éireann in the delivery of public wastewater services in Carlow-Graiguecullen to serve the needs of the existing and future population of the Plan area, subject to compliance with normal planning and environmental criteria and the standards and requirements set out in EU and national legislation and guidance. **WW. P2:** Encourage the decommissioning of existing on-site private wastewater treatment systems and the connection of properties to the public wastewater network in Carlow-Graiguecullen wherever feasible, to minimise risk of groundwater pollution and subject to connection agreements with Uisce Éireann and compliance with normal planning and environmental criteria and the standards and requirements set out in EU and national legislation and guidance. The provision of individual wastewater treatment systems within the Plan boundary will be strongly discouraged to minimise the risk of groundwater pollution. **WW. O2:** Implement, in conjunction with Uisce Éireann, the relevant recommendations set out in the EPA (2022) publication 'Urban Waste Water Treatment in 2021' and any subsequent update to this document. **SG. P1:** Maintain and enhance the existing surface water drainage systems in Carlow-Graiguecullen and to protect surface and ground water quality in accordance with the Water Framework Directive. **SG. P2:** Require the use of Sustainable Urban Drainage Systems (SuDS) within development proposals and infrastructure projects, in accordance with the DHLGH Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document, 2022' (and any subsequent amendments or revisions to the document), Carlow County Council's SuDS Policy, and Laois County Council's Storm Water Management Policy as appropriate, in order to reduce flood risk, improve water quality and enhance biodiversity and amenity in the joint urban area. **SG. P3:** Ensure that all development proposals maintain surface water discharge at greenfield run-off rate, including an allowance for climate change. **SG. O1:** Maintain, improve, and enhance the environmental and ecological quality of surface waters and groundwater in Carlow-Graiguecullen in conjunction with the Environmental Protection Agency (EPA) and in accordance with the River Basin Management Plan for Ireland 2018-2021 and any subsequent amendments or revisions to the Plan. **SG. O2:** Require applicants, where necessary, to demonstrate that development proposals will not negatively impact on any surface water or groundwater body and be compliant with the requirements of the Water Framework Directive and measures to protect and improve our water bodies set down in the River Basin Management Plan for Ireland 2018 – 2021 and any subsequent amendments or revisions to the Plan. **SW. P1:** Ensure that all development proposals where viable incorporate Sustainable Urban Drainage Systems (SuDS) and other nature-based surface water drainage solutions.

Sources and/or pathways for adverse effects[2]	Respective Plan Development Objectives / Mitigation Measure(s)
Tourism	**TD. P1:** Support and facilitate the development of the tourism industry in Carlow-Graiguecullen with an emphasis on utilising and harnessing the potential of the natural and built heritage of the joint urban area, subject to compliance with normal planning and environmental criteria. **TD. P4:** Work with key stakeholders, including Carlow Tourism, Fáilte Ireland, the OPW, the Arts Council, the Heritage Council, and key stakeholders, businesses, and local communities, to support the sustainable development and promotion of heritage tourism in Carlow-Graiguecullen. **TD. P11:** Support the provision of ancillary infrastructure and services that enhance the user experience of the River Barrow and Burren River and which increase tourism activity associated with water-based activities, where appropriate and feasible to do so and subject to normal planning and environmental criteria. **TD. P12:** Facilitate, where appropriate, increased access to the River Barrow and Burren River, subject to compliance with normal planning and environmental criteria. **TD. O1:** Support, promote and maximise the role of Carlow Town as a designated Ireland's Ancient East 'Destination Town', and to engage with Fáilte Ireland in developing and promoting future tourism initiatives in the town, including enhancement of public space, the development of a way finding project and welcome signage, transport links, accommodation, the night-time economy, and the sustainable development of our natural and built heritage, in order to capitalise on the potential benefit of the funding for the town.
Built environment	**CC. P1:** Support and promote the role of Croí Cónaithe (Towns) in delivering the refurbishment of vacant properties in Carlow-Graiguecullen for residential use and as a means of encouraging town centre living in the joint urban area, and subject to compliance with proper planning and environmental considerations. **UVD. P1:** Encourage and facilitate the appropriate regeneration and reuse of underutilised, vacant, and derelict buildings and sites. Both Councils will continue to use their statutory powers, where appropriate, to consider such buildings and sites for inclusion in the Residential Zoned Land Tax or Register of Derelict Sites. **URD. P7:** Support increased building heights for river frontage lands in the joint urban area, including along the River Barrow, subject to compliance with best practice urban design, and proper planning and environmental considerations. **URD. P11:** Support the development of underutilised lands along the River Barrow as a strategic natural asset for the town. Any future development of these lands or proposals for an additional bridge should be subject to further studies to inform the exact nature and intensity that could be accommodated without giving rise to adverse effects on sensitive Natura 2000 habitats and consider any in combination effects arising from proposals for a bridge. **W. O1:** Support and facilitate the delivery of new and improved walking and cycling network in Carlow-Graiguecullen, which delivers permeability enhancements and connections where appropriate as identified in the Area Based Transport Assessment (ABTA) and in Figures 6.4 and 6.5, in conjunction with the National Transport Authority, other statutory agencies, and relevant stakeholders. Final design details shall be subject to appropriate environmental assessment and undergo a separate public consultation process where applicable.
Invasive species	The management of invasive species' occurrence and risk where required is provided for by adherence to the policies and objectives of the current Carlow County Development Plan 2022-2028 and the current Laois County Development Plan 2021-2027, via Section 12.0 of Chapter 12, as outlined below: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence." This statement therefore renders any development or project resulting from the implementation of this Plan subject to compliance with invasive species policy objectives IS. P1, IS. P2, IS. P3, IS. O1, IS. 02 and IS. O3 of the current Carlow County Development Plan 2022-2028 and BNH 5 of the current Laois County Development Plan 2021-2027.
Agriculture	The management of sustainable and appropriate agricultural practices where required is provided for by adherence to the policies and objectives of the current Carlow County Development Plan 2022-2028 and the current Laois County Development Plan 2021-2027, via Section 12.0 of Chapter 12, as outlined below: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence." This statement therefore renders any development or project resulting from the implementation of this Plan subject to compliance with agriculture policy objectives AG. P3 and AG. P4 of the current Carlow County Development Plan 2022-2028 and RL2 and ES32 of the current Laois County Development Plan 2021-2027.
Flood Risk Management	**FR. P1:** Ensure that all development proposals in Carlow- Graiguecullen comply with the requirements of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (and any future revisions or updates to these Guidelines), in particular through the application of the sequential approach and the Development Management Justification Test. **FR. P2:** Have regard to the findings and recommendations of the Strategic Flood Risk Assessment (SFRA) carried out for this Joint Urban Local Area Plan. **FR. P3:** Carry out flood risk assessment for the purpose of regulating, restricting, and controlling development in areas at risk of flooding in Carlow-Graiguecullen and to minimise the level of flood risk to people, business, infrastructure and the environment through the identification and management of existing and potential future flood risk. **FR. P4:** Require the submission of a Site-Specific Flood Risk Assessments (FRA) in areas at risk of flooding in Carlow-Graiguecullen. The assessment shall be carried out by a suitably qualified and indemnified professional, shall be appropriate to the scale and nature of the risk to the proposed development and shall consider all sources of flooding. The FRA shall be prepared in accordance with the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (and any future revisions or updates to these Guidelines), and shall address climate change, residual risk, avoidance of contamination of water sources and any proposed site-specific flood management measures. **FR. P6:** Maintain a riparian (buffer) zone of not less than 10 metres between all watercourses and any development proposals to mitigate against flood risk, with the full extent of the buffer zone to be determined on a case-by-case basis by the Planning Authority, based on site specific characteristics and sensitivities and consultation with Inland Fisheries Ireland.

Sources and/or pathways for adverse effects[2]	Respective Plan Development Objectives / Mitigation Measure(s)
	FR. O1: Manage flood risk in Carlow-Graiguecullen in conjunction with the Office of Public Works (OPW) and in accordance with the requirements of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (2009), Circular PL02/2014, and any future revisions or updates to these Guidelines. **SG. P2:** Require the use of Sustainable Urban Drainage Systems (SuDS) within development proposals and infrastructure projects, in accordance with the DHLGH Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document, 2022' (and any subsequent amendments or revisions to the document), Carlow County Council's SuDS Policy, and Laois County Council's Storm Water Management Policy as appropriate, in order to reduce flood risk, improve water quality and enhance biodiversity and amenity in the joint urban area. **FR. P5:** Minimise flood risk arising from pluvial (surface water) flooding in Carlow-Graiguecullen by promoting the use of natural flood risk management measures including the use of Sustainable Urban Drainage Systems (SuDS) and nature-based solutions.
Light, air & noise pollution	The appropriate design of urban centres and hinterlands for the protection of air quality is provided for by adherence to the policies and objectives of the current Carlow County Development Plan 2022-2028 and the current Laois County Development Plan 2021-2027, via Section 12.0 of Chapter 12, as outlined below: "Taking account of the foregoing, the policies and objectives of this JULAP are specific to Carlow-Graiguecullen. However, the overarching county level policies and objectives of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027 will also apply", "Where conflict arises between this JULAP and these County Development Plans, the provisions of the respective County Development Plan will take precedence." This statement therefore renders any development or project resulting from the implementation of this Plan subject to compliance with: Light pollution objectives LP. P1 and LP. P3 of the current Carlow County Development Plan 2022-2028 and ES 50 ES 51 and ES 52 of the current Laois County Development Plan 2021-2027. Air pollution objectives AP. P1 and AP. P2 of the current Carlow County Development Plan 2022-2028 and ES 38 - ES 42 of the current Laois County Development Plan 2021-2027; Noise pollution objectives NP. P1, NP. P2 and NP. P3 of the current Carlow County Development Plan 2022-2028 and ES 43, ES 44, and ES 45 of the current Laois County Development Plan 2021-2027; and, **NH. P11:** Ensure that lighting proposals along water courses, rivers, and streams in the joint urban area, are not in conflict with bat species, and to ensure that expert advice is sought on such lighting proposals in order to mitigate the impacts of lighting on bats and other species and habitats.
Climate	**SO. 4:** Prioritise integrated transport and land use, supported by investment in public transport, active travel networks and shared, low-carbon mobility options, which will improve people's travel choices and support safe, sustainable, and healthy lifestyles. **SO. 6:** Transition Carlow-Graiguecullen to a low-carbon and climate resilient town through a combination of effective mitigation and adaptation measures, in addition to maximising opportunities for energy efficiency, renewables, and decarbonisation. **CS. O6:** Support the transition of Carlow-Graiguecullen to a low-carbon and climate resilient urban area through the promotion of sustainable development patterns, sustainable and active travel, and sustainable energy use, in accordance with the NPF, the RSES' for the Southern Region and Eastern and Midlands Region, and the National Climate Action Plan. **RT. O6:** Introduce measures to improve the accessibility of Carlow Town Centre, including those that prioritise pedestrians and cyclists, and where feasible those that separate pedestrian and cycle traffic from vehicular traffic. **URD. P5:** Require that development proposals facilitate a connected network of streets and spaces which prioritise pedestrians and cyclists and provides for the possibility of connections to future development on adjacent lands. **LT. P1:** Actively support an integrated approach to land use and transport planning in Carlow-Graiguecullen that promotes a shift towards a sustainable, healthy, and low carbon joint urban area with a reduced need for car-based travel, and through the prioritisation of development that is within reasonable walking and cycling distances from key employment, service, educational, and recreational areas, and key public transport nodes. **AT. P1:** Support the role of the Councils' Active Travel Teams in the promotion and delivery of sustainable and active travel infrastructure and options in Carlow-Graiguecullen, including the provision of new and enhanced walking and cycling routes, widened footpaths, and pedestrian crossings. **PT. P1:** Promote the sustainable development of Carlow-Graiguecullen by actively engaging with and supporting relevant national transport agencies in their remit to deliver improvements to the public transport network/services for the joint urban area, including at Carlow Railway Station and Carlow Bus Park, and to ensure the provision of integrated public transport services that provide an attractive and convenient alternative to private car travel thereby reducing car dependency for travel purposes. **PW. P5:** Support best practice water conservation measures in development proposals, including the use of rainwater harvesting systems, roof water collection (water butts), and grey water recycling. **CC. P1:** Promote and support the development of connected communities and the attainment of the 10-Minute town, having regard the findings of the 10-Minute Towns Study for Carlow, and with an emphasis on active travel and shorter walking and cycling timeframes to social and community facilities, improving permeability in the built environment, and encouraging a reduction in car dependency. **CA. P1:** Support the transition of Carlow-Graiguecullen to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050, by way of reducing greenhouse gases, increasing renewable energy, and improving energy efficiency and conservation. **CA. P2:** Promote and encourage positive community and/or co-operative led climate action initiatives and projects in Carlow-Graiguecullen that seek to reduce carbon emissions, improve energy efficiency and conservation, enhance green infrastructure, and encourage awareness on climate change issues and impacts. **CA. P3:** Encourage innovation and facilitate the development of pilot schemes that support climate change mitigation and adaptation measures. **CA. P4** Support the implementation of National, Regional and Local Climate Policy including support for the implementation of the National Climate Action Plan, the National Adaptation Framework, the Carlow Action Plan, the Laois Climate Action Plan and any amendments thereto over the period of this Plan. **CA. O1:** Support, in conjunction with key stakeholders, the preparation and implementation of the Climate Action Plans for County Carlow and County Laois, and to facilitate their role as a driver in the mitigation of greenhouse gas emissions and climate change adaptation in Carlow-Graiguecullen, and the translation of national climate policy to local and community levels in the joint urban area. **CA. O2:** Support and facilitate the role of the Carlow Town Decarbonisation Zone in the delivery of effective climate action at a local level, through interventions, projects, and actions aimed at reducing greenhouse gas emissions and increasing energy efficiency and conservation.

Sources and/or pathways for adverse effects[2]	Respective Plan Development Objectives / Mitigation Measure(s)
	LU. P1: Secure climate resilience and a reduction of greenhouse gas emissions in Carlow-Graiguecullen by actively implementing policies which support integrated land use planning and sustainable travel, and maximise such opportunities through development location, form, layout, and design. **UR. P1:** Secure climate resilience and a reduction of greenhouse gas emissions in Carlow-Graiguecullen through encouragement and support for urban regeneration projects and interventions, including those set out in Project Carlow 2040 – A Vision for Regeneration. **UR. P2:** Support the effective and efficient use of land in Carlow-Graiguecullen, prioritising compact growth in preference to greenfield land consumption, through the development and regeneration of vacant and underutilised brownfield/infill land and buildings within the existing built-up footprint of the joint urban area. **UR. O1:** Leverage all available funding streams which will support and deliver urban regeneration outcomes in Carlow-Graiguecullen which seek to secure climate resilience and a reduction of greenhouse gas emissions in the joint urban area. **EE. P1:** Encourage and promote the consideration of energy efficient and low-carbon design solutions and modern construction methods when carrying out pre-planning discussions for major residential, commercial, and industrial development in Carlow-Graiguecullen. **EE. P2:** Encourage development proposals that are low carbon, well adapted to the impacts of climate change, include mitigation measures, and maximise energy efficiency through renewable energy sources, water conservation, SuDS, siting, layout and design. **EE. P5:** Support and facilitate the installation of district heating systems as a decarbonising technology in new developments, subject to compliance with proper planning and environmental considerations. **EE. O1:** Support the implementation of national energy efficiency standards in Carlow-Graiguecullen, including energy efficiency and conservation measures through: Improved building design; Promoting smarter travel; and, Raising awareness/benefits of energy conservation. **EE. O3:** Retrofit all non-LED local authority public lighting in Carlow-Graiguecullen to high efficiency LED lanterns to contribute to meeting statutory energy efficiency targets, and to significantly reduce emissions and achieve cost savings with energy and maintenance efficiencies.
Renewable Energy	**RE. P1**: Encourage and support a transition to renewable energy sources in Carlow-Graiguecullen, subject to compliance with proper planning and environmental considerations. **EE. P3:** Promote the use of efficient energy storage systems and infrastructure that support energy efficiency and reusable energy system optimisation, subject to compliance with proper planning and environmental considerations. **EE. P4:** Support the use of blue roofs, green roofs, green walls, photovoltaic and/or solar thermal collector panels and heat pumps on new residential, commercial, industrial, and public buildings **EE. P6:** Promote the use of efficient energy storage systems and infrastructure in Carlow-Graiguecullen that support energy efficiency and reusable energy system optimisation, subject to compliance with proper planning and environmental considerations. **EE. O2:** Reduce dependency on fossil fuels for domestic and commercial heating in Carlow-Graiguecullen by encouraging the use of renewable heat solutions through the development management process.
Green / Blue Infrastructure	**GI. P1:** Protect and enhance the biodiversity and ecological function of the green infrastructure network in Carlow-Graiguecullen. **GI. P2:** Identify, protect, maintain, and enhance existing and planned green infrastructure assets in Carlow-Graiguecullen, and recognise the wide range of environmental, social, and economic benefits of green spaces and nature-based solutions by ensuring the integration of green infrastructure planning and development in the planning process. **GI. P3:** Protect and preserve landscape features which significantly contribute to green infrastructure in Carlow-Graiguecullen, including trees, hedgerows, woodlands, wetlands, watercourses, and other habitats. **GI. P4:** Require the protection and integration of new and existing green infrastructure as an essential component of all new developments in Carlow-Graiguecullen, and to ensure future development does not fragment, damage, or prejudice the integrity of the green infrastructure network in the joint urban area. **GI. P6:** Require development proposals to include an outline of measures to protect the retained green infrastructure of a site during the period of construction. **GI. P7:** Require large scale development proposals in the joint urban area such as residential schemes, industrial development, or retail schemes, to submit a green infrastructure plan as an integral part of a planning application. **GI. P8:** Promote a network of pedestrian and cycle paths to enhance accessibility to the green infrastructure network in Carlow-Graiguecullen, while ensuring that the layout, design, and operation of the routes responds to the ecological protection needs of each site. **GI. P9:** Incorporate elements of green infrastructure into existing areas of hard infrastructure in the joint urban area, where possible, thereby integrating these areas of the existing urban environment into the overall green infrastructure network. **NB. P1:** Actively promote and encourage nature-based approaches and green infrastructure solutions in Carlow-Graiguecullen as viable mitigation and adaptation measures to reduce greenhouse gas emissions, increase the adaptive capacity of ecosystems and optimise the multifaceted benefits through: Conservation, promotion, and restoration of the natural environment; Integrating an ecosystem services approach and promote healthy living environments through enhanced connection with nature and recreation/amenity; Enhancing biodiversity in the joint urban area; Assist with water and flood risk management; and, Carbon storage or sequestration.
Waste Management	**WM. P1:** Promote and support sustainable forms of waste management by households, communities, and businesses, including waste prevention, minimisation, reuse, recycling, and recovery. **WM. P2:** Safeguard the environment of the joint urban area by seeking to ensure that residual waste is disposed of appropriately. **WM. P3:** Ensure that Carlow-Graiguecullen is served by adequately sized public recycling facilities, bring bank recycling facilities, and to adequately maintain existing recycling facilities in the joint urban area. **WM. P4:** Require the incorporation of sustainable waste management measures within developments, including the provision of adequately sized facilities for the storage, separation, and collection of waste and recyclable materials. **WM. O2:** Promote and facilitate communities becoming involved in environmental awareness activities and community-based recycling initiatives or environmental management initiatives in support of local sustainable waste management practices. **WM. O3:** Eliminate unauthorised fly tipping in the joint urban area and to regulate and control the disposal of builder's spoil and rubble.

Section 3 Consideration of Alternatives

This section summarises the alternatives considered for the Plan during the preparation process. These alternatives have been incorporated into the Plan having regard to both:

1. The environmental effects (including those related to ecology and European sites) which are identified by the SEA (informed by the AA) and are summarised below; and
2. Planning - including social and economic - effects that also were considered by the Councils.

3.1 Limitations in Available Alternatives

The Plan is required to be prepared by the existing, already in force, Carlow and Laois County Development Plans and the Planning and Development Act 2000 (as amended), which specifies various types of objectives that must be provided for by the Plan. The alternatives available for the Plan are significantly limited by the provisions of higher-level planning objectives, including those of the National Planning Framework, the Regional Spatial and Economic Strategy for the Eastern and Midland Region, the Regional Spatial and Economic Strategy for the Southern Region and the County Development Plans. These documents set out various requirements for the content of the Plan including on topics such as land use zoning and the sustainable development of towns, including Carlow-Graiguecullen.

3.2 Alternatives Already Considered

The preparation of the Carlow and Laois County Development Plans and associated SEA process already considered various different types of alternatives, including those relating to land use zoning and densities. The selected alternatives for the County Development Plans set requirements for lower tier planning in the County and have been integrated into the Local Area Plan as appropriate.

3.3 Compact Development Alternatives

Carlow County Council and Laois County Council in preparing a Draft Joint Urban Local Area Plan (JULAP) for public display for Carlow-Graiguecullen developed the following alternatives for compact development (there are various alternative components under each alternative):

Compact Development Alternative A: "More Consolidated, More Compact Development"

- Carlow-Graiguecullen to reach population allocation, resulting in balanced orderly development and implementation of the Core Strategies of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027.
- This alternative involves preparing the JULAP using a Serviced/Serviceable Land and Infrastructure Assessment approach. Methodologies for this approach are set out in higher level documents, including the National Planning Framework and the 2013 Local Area Plan Guidelines for Planning Authorities.
- The infrastructure required to be in place to achieve the growth targets is already in place or planned.
- Residential Development to take place on New Residential and Existing/Infill Residential lands over the lifetime of the JULAP, with 30% expected on Town Centre lands.
- Development proposals would be developed in a planned and coordinated manner focused within the town centre.
- Intervention areas, including strategic and regeneration sites are identified with clear design and proposed uses provided.

Under this Compact Development Alternative, the Town would reach its population allocation under the core strategies as contained in the Carlow and Laois County Development Plans.

The approach under this alternative would allow for water supply, waste water, compact growth, public transport and co-ordinated development considerations to be integrated into the Plan to the highest degree.

The infrastructure required to be in place to achieve the growth targets is already in place or planned under this alternative.

Under this alternative there would be:

- More optimum use of land and resources, with positive role for addressing climate change, such as potential for reduced carbon heavy travel patterns.
- Greater potential for modal shift to sustainable travel such as walking, cycling and public transport, with knock on benefits for climate resilience in the joint urban area.
- Use of already serviced lands in more central and built-up urban area could lead to potential reduced costs for delivery of new supporting infrastructure.
- Creation of more liveable built environments, with greater accessibility to services and amenities for local communities.

Compact Development Alternative B "Less Consolidated, Less Compact Development"

- Carlow-Graiguecullen to reach population allocation, resulting in balanced orderly development and implementation of the core strategies of the Carlow County Development Plan 2022-2028 and the Laois County Development Plan 2021-2027.
- This alternative involves preparing the JULAP while not using the Serviced Land and Infrastructure Assessment approach.
- Additional infrastructure would be required to accommodate sporadic development, more than would be required for Alternative A "More Consolidated, More Compact Development" and some development may have to be serviced by private waste water treatment systems which would have to be properly maintained.
- Residential Development to take place on New Residential, Existing/Infill Residential and certain peripheral, outer fringe lands (beyond the existing development envelope) over the lifetime of the Plan, with 30% less likely to be achieved on Town Centre lands (in comparison with Alternative A "More Consolidated, More Compact Development").
- Town centre development would be sporadic and uncoordinated around the Town centre zonings.
- Industry would occur at locations including those close to residential development.
- Strategic and regeneration sites are identified but no clear guidance on the design parameters or uses provided.

Under this Compact Development Alternative, the Town would reach its population allocation under the core strategies as contained in the Carlow and Laois County Development Plans.

The approach under this alternative would not allow for water supply, waste water, compact growth, public transport and co-ordinated development considerations to be integrated into the Plan to the highest degree.

Additional infrastructure would be required to accommodate sporadic development, more than would be required for Alternative A 'More Consolidated, More Compact Development' and some development may have to be serviced by private waste water treatment systems which would have to be properly maintained.

Under this alternative there would be:

- An increase in car dependency and associated carbon heavy travel patterns, which would undermine efforts aimed at securing climate resilience.
- Increased suburban pattern of residential development with potential for self-contained and disconnected built environments.
- Reduced potential for modal shift to sustainable travel options such as walking, cycling and public transport.
- Potential for increased costs associated with the delivery on new supporting infrastructure (roads, footpaths etc.) in more peripheral and outer suburban areas.

- Increased costs for the delivery of necessary supporting infrastructure for urban fringe, outer suburban areas and greenfield sites.

Selected Compact Development Alternative for the Plan: A "More Consolidated, More Compact Development".

3.4 Ecosystem Services Approach Alternatives

The importance of fulfilling natural capital[3] and ecosystem[4] service obligations has increasingly emerged in recent years. An Ecosystems Services Approach would provide a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. An Ecosystems Services Approach would include the integration of ecological considerations at a local level across the JULAP area.

Ecosystem Services Approach Alternative A: A JULAP that follows an Ecosystems Services Approach to a greater degree. This alternative would, to the greatest extent:

- Underpin the requirement for nature-based solutions (and green infrastructure) to be incorporated into development proposals at the detailed design stage, with corresponding recognition of the role natural environment in moderating and adapting to the effects of climate change.
- Contribute to flood prevention and storage capacity measures for development proposals in the joint urban area.
- In the formulation of the layout and design of development proposals, contribute to a focus on the conservation, protection and restoration of the natural environment in the joint urban area.
- Encourage the use of SuDS for development proposals in the joint urban area, offering a more sustainable approach to the management of urban storm water runoff than impermeable surfaces, and conventional underground pipe and storage-based solution. This would contribute to offsetting the impacts of climate change and increase climate resilience.
- Provide more benefits for recreation, amenity, and biodiversity.
- Promote more healthy living environments for local communities.
- Contribute to a reduction in greenhouse gas emissions.
- Improve health and wellbeing.

Ecosystem Services Approach Alternative B: A JULAP that does not follow, or follows to a lesser degree, an Ecosystems Services Approach. This alternative would result in:

- Greater potential for focus and reliance on conventional less sustainable surface water drainage methods in the joint urban area, such as single function piped drainage and attenuation/storage measures.
- Reduced climate resilience in the built environment.
- Reduced scope for introduction of nature-based flood alleviation measures in development proposals.
- Greater potential for increased costs in the delivery of conventional surface water drainage infrastructure.
- Greater potential for biodiversity and habitat fragmentation.
- Reduced potential for urban greening measures in the built environment.

Selected Ecosystem Services Approach Alternative for the Plan: A "A JULAP follows an Ecosystems Services Approach to a greater degree".

[3] Renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals).
[4] Ecosystems are multifunctional communities of living organisms interacting with each other and their environment. Ecosystems provide a series of services for human well-being (ecosystem services) either directly or indirectly contributing towards human wellbeing.

3.5 Area Based Transport Assessment Alternatives

In line with the County Development Plans, the creation of a compact and connected Carlow-Graiguecullen joint urban area could be achieved by integrating land use and transportation policy, thus promoting compact climate resilient growth and ensuring that people can easily access their homes, employment, education and the services they require by walking cycling or use of public transport. An Area Based Transport Assessment would seek to maximise opportunities for the integration of land use and transport planning, with an emphasis on cycling, walking and public transport and delivering on the "10-minute neighbourhood" concept.

Area Based Transport Assessment Alternative A: Inform the JULAP with an Area Based Transport Assessment, which focuses on delivering travel solutions that support moving people from the private car to more sustainable modes. This alternative would:

- Support greater alignment between and integration of land use planning and transport planning.
- Ensure the assessment of transport demand and its associated impact informs the scale of development proposals, including location, density, required transport infrastructure etc.
- Facilitate a greater shift towards a more sustainable, healthy, and low carbon-built environment.
- Prioritise of active travel measures and considerations in the formulation of development proposals, including the consideration of suitable land for development.
- Promote and encourage a modal shift from the private car to walking and cycling, particularly for short to medium distance trips.
- Prioritise walking, cycling and public transport accessibility.
- Result in improvements in the built environment for the safety and security of those walking and cycling.
- Provide greater focus on compliance with the principles, approaches and standards in the Design Manual for Urban Roads and Streets (DMURS 2013-2019).
- Facilitate the implementation of the 10-Minute town concept.
- Potentially reduce traffic congestion at peak traffic times, improving road network reliability.

Area Based Transport Assessment Alternative B: Do not inform the JULAP with an Area Based Transport Assessment, which focuses on delivering travel solutions that support moving people from the private car to more sustainable modes, relying solely on existing provisions, including those of the County Development Plans. This alternative would:

- Increase the potential for land use planning and developments aspects of the JULAP to be considered in isolation of transport planning considerations.
- Mean that the assessment of existing traffic, transport, and movement conditions within the JULAP area would not be taken into account in the formulation of policies and objectives.
- Undermine ability to plan for efficient movement of people and services within the JULAP area.
- Limit the ability and scope to plan for required transport interventions in the JULAP area.
- Not inform site specific transport assessment for development proposals with an ABTA.
- Reduce support for modal shift from private car travel to active travel, including walking and cycling.

Selected Area Based Transport Assessment Alternative for the Plan: Alternative A.

3.6 Built Heritage Alternatives

Built heritage in the Carlow-Graiguecullen joint urban area includes both architectural and archaeological heritage. These alternatives consider the degree to which built heritage and conservation are provided for at a local level in Carlow-Graiguecullen.

Built Heritage Alternative A: A JULAP that adds detailed, local-level provisions to the existing planning framework relating to the conservation of built heritage. Built Heritage Alternative A would:

- Provide a focus for heritage-led regeneration in the existing built environment including conservation, restoration and reuse of built heritage assets.
- Support the implementation of a Heritage Initiative Plan for Carlow Town.
- Ensure that the conservation of built heritage, including architectural heritage (protected structures) and archaeology is a key consideration, in the formulation of development proposals, as appropriate.
- Promote and support the conservation of the special character and setting of designated Architectural Conservation Areas in the joint urban area.
- Promote the protection, retention, and public awareness of vernacular architecture in the joint urban area not listed as protected structures or located in ACAs.
- Promote and support the importance of climate-proofing built heritage assets and by reference to Department of Culture Heritage and the Gaeltacht 'Built and Archaeological Heritage, Climate Change Sectoral Adaptation Plan' (2019).

Built Heritage Alternative B: A JULAP that does not add detailed, local-level provisions to the existing planning framework relating to the conservation of built heritage, relying solely on existing provisions, including those included as part of the County Development Plans. Built Heritage Alternative B would:

- Not provide for sufficient consideration of the built heritage in the joint urban area at detailed design stage for development proposals.
- Increase the potential for loss of and/or negative impacts on the character and setting of historic built fabric in the joint urban area, including protected structures and vernacular architecture.
- Increase the potential to undermine the special character and setting of the designated ACAs in the joint urban area.
- Not support the implementation of a Heritage Initiative Plan for Carlow Town.

Selected Built Heritage Alternative for the Plan: Alternative A.

Appendix I: AA Determinations from Carlow and Laois County Councils

COMHAIRLE CONTAE
CHEATHARLACH

CARLOW COUNTY COUNCIL

Oifigí an Chontae,
Bóthar Átha Í,
Ceatharlach, R93E7R7

County Buildings,
Athy Road,
Carlow, R93E7R7

T: 059 9170300
E: See carlow.ie/contact-us
W: carlow.ie

Appropriate Assessment Determination

under
Section 177V of the Planning and Development Act 2000, as amended,
for the

Carlow-Graiguecullen Joint Urban Draft Local Area Plan 2024-2030

In order to comply with the requirements of Section 177V of the Planning and Development Act 2000, as amended, and pursuant to Article 6(3) of the Habitats Directive as to whether or not a plan or project would affect the integrity of any European site(s), this Appropriate Assessment determination is being made by Carlow and Laois County Councils relating to the potential for the Carlow-Graiguecullen Joint Urban Draft Local Area Plan 2024-2030 that is being adopted[1] to have effects on the integrity of European sites.

In carrying out this Appropriate Assessment (AA), the Councils are taking into account the matters specified under Part XAB of the Planning and Development Act 2000 (as amended), including the following[2]:

- The Natura Impact Report prepared for the Draft Plan;
- The Screening for AA Report prepared for the Proposed Material Alterations;
- Written submissions made during the Plan preparation process; and
- Ongoing advice on AA from the Councils' agents.

As part of the AA, it was identified that the Plan may, if unmitigated, have significant effects on 1 (no.) European site. Plan elements that could present sources with pathways for potential significant effects to European sites are:

- The Plan's provisions, including those relating to housing, economic development, retail and tourism, urban design, town centre and regeneration, sustainable travel and transportation, infrastructure and environmental services, sustainable communities, built heritage, natural heritage, green infrastructure and landscape, climate action and land use zoning and implementation, which introduce sources for potential effects through construction phase such as habitat loss, light pollution, disturbance effects and hydrological interactions through surface hydrological connectivity and/or shared groundwater sources;
- Loading pressures from the operational phase of developments – these sources could result in habitat loss/fragmentation, light pollution, disturbance effects and interactions with water quality (surface and/or groundwater); and
- Increases in visitor numbers to ecologically sensitive areas during the operational phase of developments which have potential to introduce sources for significant effects, such as recreational and tourism developments.

The undersigned, having carefully considered the information referred to above agrees with and adopts the reasoning and conclusions presented and determines that:

- Implementation of the Plan would have had the potential to result in effects to the integrity of European sites, if unmitigated.
- The risks to the safeguarding and integrity of the Qualifying Interests and Conservation Objectives of the European sites identified have been addressed by the inclusion of mitigation measures into the

[1] Incorporating: the Draft Plan; all and any alterations; and all and any further modifications considered by the AA process.
[2] A consolidated Natura Impact Report has also been made available, integrating relevant elements of these matters into one document.

COMHAIRLE CONTAE
CHEATHARLACH

CARLOW COUNTY COUNCIL

Oifigí an Chontae,
Bóthar Átha Í,
Ceatharlach, R93E7R7

County Buildings,
Athy Road,
Carlow, R93E7R7

T: 059 9170300
E: See carlow.ie/contact-us
W: carlow.ie

Draft Plan that will prioritise the avoidance of effects in the first place and mitigate against the identified potential significant effects where these cannot be avoided. In addition, all lower-level plans and projects arising through the implementation of the Plan will themselves be subject to AA/screening for AA when further details of design and location are known.

- In-combination effects from interactions with other plans and projects are considered and the mitigation measures incorporated into the Plan are seen to be robust to ensure that there will be no effect on the integrity of any European site as a result of the implementation of the Plan either alone or in-combination with other plans/projects.
- Having incorporated mitigation measures[3] into the Plan, it has been demonstrated that the Plan to be adopted is not foreseen to give rise to any effect on the integrity of any designated European site, alone or in combination with other plans or projects[4]. This demonstration has been made in view of the conservation objectives of the habitats and/or species, for which these sites have been designated.

Signed: _____

Name: Michael Rainey

Date: 30th July 2024

Signatory: _____

Date: 30th July 2024

[3] As identified by the following reference numbers in the consolidated Natura Impact Report: Chapter 12, Section 12.0, SO. 7, TD. P5, TD. P17, SR. P10, NH. P3, NH. P4, NH. P5, NH. P6, NH. P7, NH. P8, NH. P9, H. P10, GI. P10, GI. P11, GI. P14, GI. P15, GI. O1, GI. O2, PW. P6, FR. O2, SR. O1, NH. P2, GI. P12, LC. P6, PW. P1, PW. P2, WW. P1, WW. P2, WW. O2, SG. P1, SG. P2, SG. P3, SG. O1, SG. O2, SW. P1, TD. P1, TD.P4, TD. P11, TD. P12, TD. O1, CC. P1, UVD. P1, URD. P7, URD. P11, W. O1, FR. P1, FR. P2, FR. P3, FR. P4, FR. P6, FR. O1, FR. P5, NH. P11, SO. 4, SO. 6, CS. O6, RT. O6, URD. P5, LT. P1, AT. P1, PT. P1, PW. P5, CA. P1, CA. P2, CA. P3, CA. P4, CA. O1, CA. O2, LU. P1, UR. P1, UR. P2, UR. O1, EE. P1, EE. P2, EE. P5, EE. O1, EE. O3, RE. P1, EE. P3, EE. P4, EE. P6, EE. O2, GI. P1, GI. P2, GI. P3, GI. P4, GI. P6, GI. P7, GI. P8, GI. P9, NB. P1, WM. P1, WM. P2, WM. P3, WM. P4, WM. O2 and WM. O3

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

COMHAIRLE CHONTAE LAOISE
LAOIS COUNTY COUNCIL

Áras an Chontae
Portlaoise,
Co Laois
R32 EHP9

Appropriate Assessment Determination

under
Section 177V of the Planning and Development Act 2000, as amended,
for the

Carlow-Graiguecullen Joint Urban Draft Local Area Plan 2024-2030

In order to comply with the requirements of Section 177V of the Planning and Development Act 2000, as amended, and pursuant to Article 6(3) of the Habitats Directive as to whether or not a plan or project would affect the integrity of any European site(s), this Appropriate Assessment determination is being made by Carlow and Laois County Councils relating to the potential for the Carlow-Graiguecullen Joint Urban Draft Local Area Plan 2024-2030 that is being adopted[1] to have effects on the integrity of European sites.

In carrying out this Appropriate Assessment (AA), the Councils are taking into account the matters specified under Part XAB of the Planning and Development Act 2000 (as amended), including the following[2]:

- The Natura Impact Report prepared for the Draft Plan;
- The Screening for AA Report prepared for the Proposed Material Alterations;
- Written submissions made during the Plan preparation process; and
- Ongoing advice on AA from the Councils' agents.

As part of the AA, it was identified that the Plan may, if unmitigated, have significant effects on 1 (no.) European site. Plan elements that could present sources with pathways for potential significant effects to European sites are:

- The Plan's provisions, including those relating to housing, economic development, retail and tourism, urban design, town centre and regeneration, sustainable travel and transportation, infrastructure and environmental services, sustainable communities, built heritage, natural heritage, green infrastructure and landscape, climate action and land use zoning and implementation, which introduce sources for potential effects through construction phase such as habitat loss, light pollution, disturbance effects and hydrological interactions through surface hydrological connectivity and/or shared groundwater sources;
- Loading pressures from the operational phase of developments – these sources could result in habitat loss/fragmentation, light pollution, disturbance effects and interactions with water quality (surface and/or groundwater); and
- Increases in visitor numbers to ecologically sensitive areas during the operational phase of developments which have potential to introduce sources for significant effects, such as recreational and tourism developments.

The undersigned, having carefully considered the information referred to above agrees with and adopts the reasoning and conclusions presented and determines that:

- Implementation of the Plan would have had the potential to result in effects to the integrity of European sites, if unmitigated.
- The risks to the safeguarding and integrity of the Qualifying Interests and Conservation Objectives of the European sites identified have been addressed by the inclusion of mitigation measures into the Draft Plan that will prioritise the avoidance of effects in the first

[1] Incorporating: the Draft Plan; all and any alterations; and all and any further modifications considered by the AA process.
[2] A consolidated Natura Impact Report has also been made available, integrating relevant elements of these matters into one document.

COMHAIRLE CHONTAE LAOISE
LAOIS COUNTY COUNCIL

Áras an Chontae
Portlaoise,
Co Laois
R32 EHP9

place and mitigate against the identified potential significant effects where these cannot be avoided. In addition, all lower-level plans and projects arising through the implementation of the Plan will themselves be subject to AA/screening for AA when further details of design and location are known.

- In-combination effects from interactions with other plans and projects are considered and the mitigation measures incorporated into the Plan are seen to be robust to ensure that there will be no effect on the integrity of any European site as a result of the implementation of the Plan either alone or in-combination with other plans/projects.
- Having incorporated mitigation measures[3] into the Plan, it has been demonstrated that the Plan to be adopted is not foreseen to give rise to any effect on the integrity of any designated European site, alone or in combination with other plans or projects[4]. This demonstration has been made in view of the conservation objectives of the habitats and/or species, for which these sites have been designated.

Signed: _____

Name: ANGELA MCEVOY

Date: 29th JULY 2024

Signatory: _____

Date: 29th JULY 2024

[3] As identified by the following reference numbers in the consolidated Natura Impact Report: Chapter 12, Section 12.0, SO. 7, TD. P5, TD. P17, SR. P10, NH. P3, NH. P4, NH. P5, NH. P6, NH. P7, NH. P8, NH. P9, H. P10, GI. P10, GI. P11, GI. P14, GI. P15, GI. O1, GI. O2, PW. P6, FR. O2, SR. O1, NH. P2, GI. P12, LC. P6, PW. P1, PW. P2, WW. P1, WW. P2, WW. O2, SG. P1, SG. P2, SG. P3, SG. O1, SG. O2, SW. P1, TD. P1, TD.P4, TD. P11, TD. P12, TD. O1, CC. P1, UVD. P1, URD. P7, URD. P11, W. O1, FR. P1, FR. P2, FR. P3, FR. P4, FR. P6, FR. O1, FR. P5, NH. P11, SO. 4, SO. 6, CS. O6, RT. O6, URD. P5, LT. P1, AT. P1, PT. P1, PW. P5, CA. P1, CA. P2, CA. P3, CA. P4, CA. O1, CA. O2, LU. P1, UR. P1, UR. P2, UR. O1, EE. P1, EE. P2, EE. P5, EE. O1, EE. O3, RE. P1, EE. P3, EE. P4, EE. P6, EE. O2, GI. P1, GI. P2, GI. P3, GI. P4, GI. P6, GI. P7, GI. P8, GI. P9, NB. P1, WM. P1, WM. P2, WM. P3, WM. P4, WM. O2 and WM. O3

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

Appendix III
Strategic Flood Risk Assessment

Carlow Graiguecullen Joint Urban Local Area Plan Strategic Flood Risk Assessment

Technical Report

August 24

CARLOW COUNTY COUNCIL

COMHAIRLE CHONTAE CHEATHARLOCHA

Laois County Council

Áras an Chontae, Portlaoise, Co. Laois

JBA Project Manager

Ross Bryant BSc MSc CEnv MCIWEM C.WEM
24 Grove Island
Corbally
Limerick
Ireland

Revision History

Revision Ref / Date Issued	Amendments	Issued to
S3-P01 December 2023	Initial issue	Carlow County Council
S3-P02 December 2023	Amended issue	Carlow County Council
S3-P03 March 2024	Material Amendments	Carlow County Council
S3-P04 May 2024	Material Amendments for display	Carlow County Council
S3-P05 July 2024	CE Report updates	Carlow/Laois County Council

Contract

This report describes work commissioned by Carlow County Council. Ross Bryant and Fiona Byrne of JBA Consulting carried out this work.

Prepared by ..... Fiona Byrne BSc MSc
Analyst

Reviewed by ..... Ross Bryant BSc MSc CEnv MCIWEM C.WEM
Associate Director

Purpose

This document has been prepared as an SFRA for Carlow County Council. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

JBA Consulting has no liability regarding the use of this report except to Carlow County Council.

Copyright

Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 122g if 100% post-consumer recycled paper is used and if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex.

JBA is aiming to reduce its per capita carbon emissions.

Contents

List of Figures

List of Tables

Abbreviations

1D ..... One Dimensional (modelling)
2D ..... Two Dimensional (modelling)
AEP ..... Annual Exceedance Probability
CFRAM ..... Catchment Flood Risk Assessment and Management
DoEHLG ..... Department of the Environment, Heritage and Local Government
FARL ..... FEH index of flood attenuation due to reservoirs and lakes
FB ..... Freeboard
FFL ..... Finish Floor Levels
FRA ..... Flood Risk Assessment
FSR ..... Flood Studies Report
FSU ..... Flood Studies Update
GSI ..... Geological Survey of Ireland
LHB ..... Left Hand Bank
OPW ..... Office of Public Works
PFRA ..... Preliminary Flood Risk Assessment
RFI ..... Request for Further Information
RHB ..... Right Hand Bank
RR ..... Rainfall-Runoff
SAAR ..... Standard Average Annual Rainfall (mm)
SFRA ..... Strategic Flood Risk Assessment
URBEXT ..... FEH index of fractional urban extent
WL ..... Water Level

1 Introduction

JBA Consulting was appointed to carry out the Strategic Flood Risk Assessment for the Carlow Graiguecullen Joint Urban Area Plan 2024-2030.

This report details the SFRA for this area and has been prepared in accordance with the requirements of the DoEHLG and OPW Planning Guidelines, The Planning System and Flood Risk Management1; these guidelines were issued under the Planning and Development Act 2000 and recognise the significance of proper planning to manage flood risk.

1.1 Terms of Reference and Scope

Under the "Planning System and Flood Risk Management" guidelines, the purpose for the FRA is detailed as being *"to provide a broad (wide area) assessment of all types of flood risk to inform strategic land-use planning decisions. SFRAs enable the LA to undertake the sequential approach, including the Justification Test, allocate appropriate sites for development and identify how flood risk can be reduced as part of the development plan process".*

The Carlow Graiguecullen Joint Urban Local Area Plan 2024-2030 (JULAP) will be the key document for setting out a vision for the development of the Carlow Graiguecullen during the plan period.

It is important that the JULAP fulfils the requirements of the document “The Planning System and Flood Risk Management Guidelines for Planning Authorities” (OPW/DoEHLG, 2009) which states that flood risk management should be integrated into spatial planning policies at all levels to enhance certainty and clarity in the overall planning process.

In order to ensure that flood risk is integrated into the JULAP, the main requirements of the SFRA are to:

- Produce Flood Zone Mapping for the 2024-2030 plan.
- Prepare a Stage 2 - Flood Risk Assessment for the JULAP in particular in relation to location and type of zoning and land-use proposals, with a focus on new or changed zoning compared with the current plan.
- Review and update the policy guidance within the SFRA in compliance with OPW/DoEHLG – “The Planning System and Flood Risk Management –Guidelines for Planning Authorities (OPW/DoEHLG, 2009)”.
- Take cognizance of the Carlow Climate Adaptation Strategy 2019-2024, the National Climate Adaptation Framework and the various environmental and visual designations applicable to Carlow.
- Advise on zonings/land use-proposals and appropriate mitigation measures, assess and report on any submissions received as part of both the preparation and the public consultation stage of the plan, as they relate to flood risk.

1.2 Report Structure

This study considers the development strategy that will form part of the Development Plan for Carlow Graiguecullen. The context of flood risk in Carlow and Graiguecullen is considered with specific reference to a range of flood sources, including fluvial, pluvial, groundwater, sewer and artificial reservoirs and canals.

A two-stage assessment of flood risk was undertaken, as recommended in 'The Planning System and Flood Risk Management' guidelines, for the area that lies within the development boundary of the Development Plan. The first stage is to review historical flooding and flood extents and make updates based on new datasets and updated land use zoning.

Historical records and recent events demonstrate that Carlow has a history of flooding and confirms that a proportion of zoned lands are at flood risk. The SFRA must protect lands for any

1 DoHELG and OPW (2009) The Planning System and Flood Risk Management: Guidelines for Planning Authorities

potential future flood risk management infrastructure and ensure that development within Flood Zones A/B is sustainably managed.

The second stage and the main purpose of this SFRA report is to appraise the adequacy of existing information, to prepare a Flood Zone map, based on available data, and to highlight potential development areas that require application of the Justification Test and/or more detailed assessment on a site specific level. The SFRA also provides guidelines for development within areas at potential risk of flooding, and specifically looks at flood risk and the potential for development within a number of key sites in Carlow.

Section 2 of this report provides an introduction to the study area and Section discusses the concepts of flooding, Flood Zones and flood risk as they are incorporated into the Planning System and Flood Risk Management.

In Section 4 the available data related to flooding is summarised and appraised and outlines the sources of flooding to be considered, based on the review of available data. This section also considers the flood management assets that are in place. Section 5 summarises the key sources of flooding.

Following this, Section 6 outlines the flood risk management policy and Section 7 provides guidance and suggested approaches to managing flood risk to development; the contents of this section will be of particular use in informing the policies and objectives within the Development Plan.

Section 8 contains the review of land use zoning objectives across the settlement it also summarises the application of the Justification Test to which specific responses are included in the Appendix.

2 Carlow Town Study Area

2.1 Introduction

The plan area comprises the full extent of Carlow Town. Carlow Town is situated on the River Barrow. The town is subject to an existing flood relief scheme. There are also two proposed flood relief schemes under consideration on the River Burrin and the Knocknagee stream. Carlow is designated as a key town within the region and as a regional and inter--regional economic growth driver and is targeted for growth under the National Planning Framework and Regional Spatial and Economic Strategy (RSES).

2.2 Watercourses

The primary watercourse in the Carlow Town area is the River Barrow which is 192km long and drains a catchment of approximately 3000km^2, making it the second longest river in Ireland. The largest tributary of the Barrow is the Burrin River which flows 39km through the county before meeting the Barrow at Carlow Town. The Barrow flows in a southerly direction through Carlow town, under Graiguecullen Bridge and over the Carlow Weir. The River Burrin flows in a north easterly direction to its confluence with the Barrow immediately downstream of Carlow Weir. The Derrymoyle stream, a tributary of the Barrow, flows c. 4km in a southerly direction where it meets the Barrow.

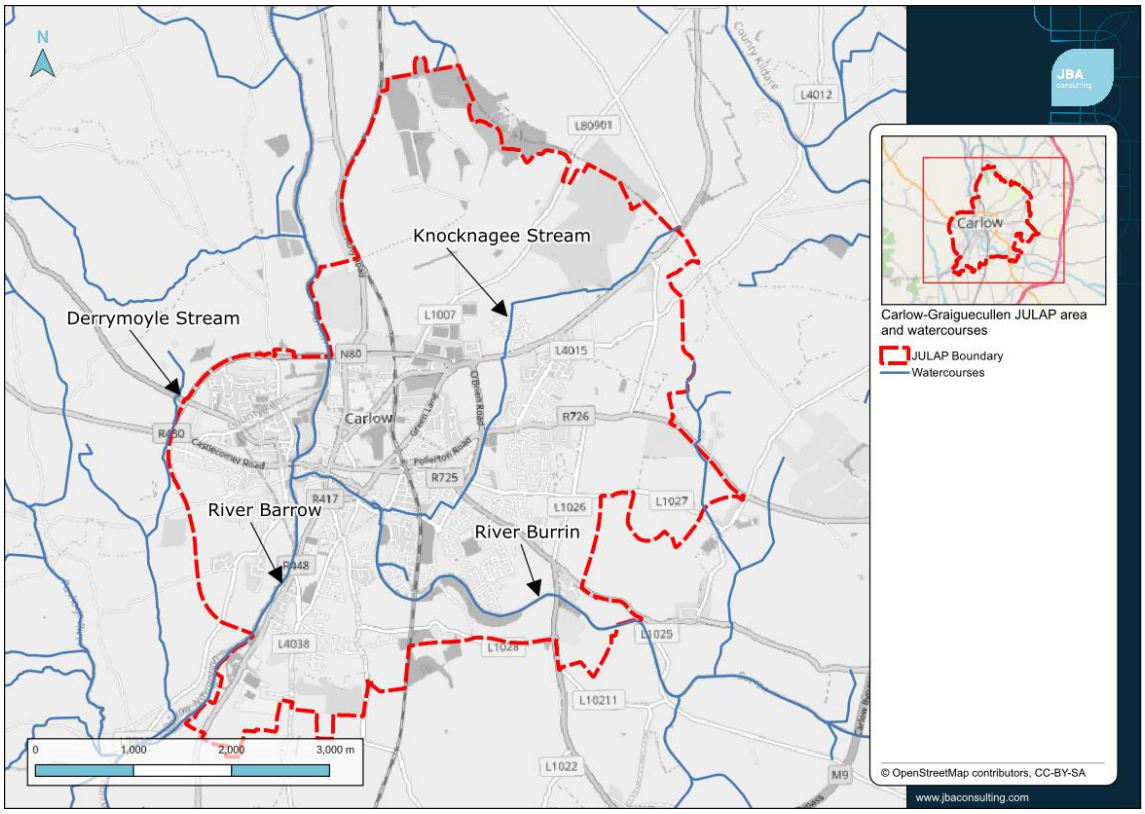


Figure 2-1 JULAP area and watercourses

2.3 Current Planning Policy

2.3.1 Ireland 2040 - National Planning Framework

A Strategic Flood Risk Assessment of the National Policy Objectives (NPO) within the Ireland 2040 – National Planning Framework was undertaken with the aim of ensuring that flood risk is a key consideration in delivering the proposed strategic sustainable land-use planning decisions. It sets out how all levels of the planning process, from national level strategic assessments to individual planning applications, should follow the sequential approach set out in the 2009 Guidelines on Planning and Flood Risk Management.

The NPF recognises that it is not always possible to avoid developing in flood risk areas due to spatial, economic, environmental and physical constraints. Development should be encouraged to continue, and in flood risk areas should follow the sequential approach and application of Justification Test set out in the Department's Guidelines on the Planning System and Flood Risk Management. These guidelines will facilitate the integration of flood risk and land risk planning in the Southern region, at all tiers of the planning hierarchy from national level through regional, city/county and local plans, masterplans and individual planning applications.

2.3.2 Regional Spatial and Economic Strategy (Southern Regional Assembly & Eastern and Midlands Region Assembly)

Carlow-Graiguecullen includes the functional area of two local authorities and two regional assemblies. The area of the town around Graiguecullen in County Laois is in the functional area of the Eastern and Midlands Region (EMRA), while the greater area of Carlow Town within County Carlow is located with the Southern Region.

The RSES' set out how Development Plans should include Strategic Flood Risk Assessments and all future zoning of land for development in areas at risk of flooding should follow the sequential approach set out in the 2009 Guidelines on Planning and Flood Risk Management (DoEHLG). The inclusion of policies and actions to support Sustainable Urban Drainage Systems is recommended in future developments as a major component of flood management and prevention.

The combined urban area of Carlow-Graiguecullen functions as a key regional centre for economic activity, education, healthcare, public services, retailing, arts, culture, and recreation. The core of the urban area in Carlow-Graiguecullen (i.e., Carlow Town) is located to the east of the River Barrow and within County Carlow. A part of the urban area comprising Graiguecullen is located to the west of the river and is partly located within County Laois. Being strategically located c.90km from Dublin and Waterford city, the joint urban area benefits from strong ties with the Greater Dublin Area, the Midlands, as well the Southern Region.

The Regional Spatial and Economic Strategies (RSES') for the Southern Region and the Eastern and Midlands Region (EMRA) seek to implement the NPF at a regional level. The designation of Carlow-Graiguecullen as a Key Town is a strategic issue for both regional policy documents and is recognition of the population, and the economic and employment scale of the town. These factors contribute to the town's role as a self-sustaining regional driver and its inter-regional role due to its strategic location in both regions. At the regional level settlement hierarchy, it is a function of Key Towns like Carlow-Graiguecullen to ensure a consolidated spread of growth beyond the five cities.

The settlement hierarchy selected by the RSES takes account of the fact that while Carlow-Graiguecullen, is vulnerable to fluvial flooding, wider, effective management of flood risk coupled with wider environmental, sustainability and economic considerations mean that it is possible to facilitate the continued consolidation of the development of the existing urban structure of the region. In line with the sequential and justification criteria set out in the Department's Guidelines on the Planning System and Flood Risk Management it is considered that these locations should be encouraged to continue to consolidate and to grow in order to bring about a more compact and sustainable urban development form while at the same time managing flood risk appropriately. These guidelines outline measures through which both the flood risk and the continued development of Carlow-Graiguecullen,

The RSES' included a number of development plan implications:

- An integrated approach to river catchment management is essential to manage and avoid increasing flood risk. Local authorities should fully support the completion of CFRAM studies and jointly implement any actions identified.
- Development Plans shall include Strategic Flood Risk Assessments and all future zoning of land for development in areas at risk of flooding should follow the sequential approach and Justification Test set out in the 2009 Department Guidelines on Planning and Flood Risk Management.
- Development Plans should include policies on the requirement for Sustainable Drainage Systems (SuDS) in future developments as a major component of flood management and prevention.

- Development and Local Area Plans in the region should take account of and incorporate the recommendations of the Flood Risk Management Plans, including planned investment measures for managing and reducing flood risk. Natural Water Retention Measures (NWRMS) should be incorporated where appropriate.

2.3.3 Carlow County Development Plan 2022-2028

As part of the Carlow County Development Plan 2022-2028 a Strategic Flood Risk Assessment was undertaken. The purpose of the SFRA is to provide a broad assessment of all types of flood risk to inform strategic land use planning decisions. Parts of County Carlow are vulnerable to flooding and are mapped as part of the Carlow County Development Plan 2015-2021

The flood management policies of Carlow County Council, as laid out in the development plan include:

- Carry out flood risk assessment for the purpose of regulating, restricting and controlling development in areas at risk of flooding and to minimise the level of flood risk to people, business, infrastructure and the environment through the identification and management of existing and potential future flood risk;
- Lower tier plans shall undertake Strategic Flood Risk Assessment in accordance with the requirements of the Planning System and Flood Risk Management-Guidelines for Planning Authorities (DEHLG and OPW, 2009);
- Apply the sequential approach which is based on the principles of avoidance, reduction and mitigation of flood risks when preparing town development plans and local area plans and when assessing planning applications for development proposals;
- Require the use of Sustainable Urban Drainage Systems (SuDS) to minimise the extent of hard surfacing and paving and require the use of sustainable drainage for new development or extensions to existing developments;
- Ensure that all development proposals comply with the requirements of the Planning System and Flood Risk Management-Guidelines for Planning Authorities' (DEHLG and OPW 2009) and to ensure that the Justification Test for Development Management is applied to required development proposals and in accordance with methodology set out in the guidelines;
- Preserve appropriately sized riparian strips alongside river channels free of development and of adequate width to permit access for river maintenance;
- Integrate as appropriate the recommendations of any relevant CFRAM Studies, Flood Risk Management Plans, future flood hazard maps or flood risk maps;
- Ensure that where flood protection or alleviation works take place that the natural and cultural heritage and rivers, streams and watercourses are protected and enhanced. Such works will be subject to Appropriate Assessment as required under Article 6 of the EU Habitats Directive;
- Ensure that development proposals in areas at moderate (Flood Zone B) or high (Flood Zone A) risk of flooding which are considered acceptable in principle demonstrate that appropriate mitigation measures can be put in place and that residual risks can be managed to acceptable levels;
- Site-specific Flood Risk Assessment (FRA) is required for all planning applications in areas at risk of flooding, even for developments appropriate to the particular Flood Zone. The detail of these site-specific FRAs will depend on the level of risk and scale of development. A detailed site-specific FRA should quantify the risks, the effects of selected mitigation and the management of any residual risks. The Council shall have regard to the results of any CFRAM Study in the assessment of planning applications;
- Support, in co-operation with the OPW, the implementation of the EU Flood Risk Directive (2007/60/EC), the Flood Risk Regulations (SI No. 122 of 2010) and the DEHLG/OPW publication The Planning System and Flood Risk Management Guidelines (2009) (and any updated/superseding legislation or policy guidance). Carlow County Council will also take account of the South Eastern Catchment Flood Risk Assessment and Management Study;
- Protect water bodies and watercourses within the County from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands

and natural floodplains. This will include protection buffers in riverine and wetland areas as appropriate. For larger river channels (over 10m), the recommended width of the core riparian core (CZR) is 35-60m (18-30m on each side of the river) and may be larger where flood plains adjoin the riparian zone. For smaller channels (under 10m), a core riparian zone (CZR) of 20m or greater (minimum 10m on each side of the river) is recommended.

- In addition, the Specific Objective for Flood Risk Management requires a detailed site-specific FRA for identified potential flood risk areas, taking into consideration findings of the CFRAM Study when completed.

2.3.4 Laois County Development Plan 2021 - 2027

As part of the Laois County Development Plan 2017-2023 a Strategic Flood Risk Assessment was undertaken. The purpose of the SFRA is to provide a broad assessment of all types of flood risk to inform strategic land use planning decisions. Parts of County Laois are vulnerable to flooding and are mapped as part of the Laois County Development Plan 2017-2023.

The Laois County Development Plan 2017-2023 considered flood risk with specific reference to people, business, infrastructure and the environment at risk of flooding. The LCDP proposed to minimise the risk of flooding through the identification and management of existing, and particularly potential future, flood risks.

The flood management policies of Laois County Council, as laid out in the development plan include:

- Ensure that flood risk management is incorporated into the preparation of all local area plans through the preparation in accordance with the requirements of the Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG 2009).
- Ensure that all development proposals comply with the requirements of the Planning System and Flood Risk Management-Guidelines for Planning Authorities' (DEHLG 2009) and to ensure that the Justification Test for Development Management is applied to required development proposals and in accordance with methodology set out in the guidelines and new development does not increase flood risk elsewhere, including that which may arise from surface water runoff.
- Support the implementation of recommendations in the CFRAM Programme to ensure that flood risk management policies and infrastructure are progressively implemented.
- Support the implementation of recommendations in the Flood Risk Management Plans (FRMP's), including planned investment measures for managing and reducing flood risk. 221 Flood Risk Management Policy Objectives
- Consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels where required, to facilitate maintenance access thereto.
- Assist the OPW in developing catchment-based Flood Risk Management Plans for rivers in County Laois and have regard to their provisions/recommendations.
- Protect and enhance the County's floodplains and wetlands as 'green infrastructure' which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defences in the future, subject to normal planning and environmental criteria.
- Protect the integrity of any formal (OPW or Laois County Council) flood risk management infrastructure, thereby ensuring that any new development does not negatively impact any existing defence infrastructure or compromise any proposed new infrastructure.
- Ensure that where flood risk management works take place that the natural and cultural heritage, rivers, streams and watercourses are protected and enhanced.
- Ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management applicable at the time.
- Consult, where necessary, with Inland Fisheries Ireland, the National Parks and Wildlife Service and other relevant agencies in the provision of flood alleviation measures in the County.

- Prioritise plans for flood defence works in the towns as indicated in the Strategic Flood Risk Assessment in order to mitigate against potential flood risk.
- Ensure new development does not increase flood risk elsewhere, including that which may arise from surface water runoff.
- Protect water sinks because of their flood management function, as well as their biodiversity and amenity value and encourage the restoration or creation of water sinks as flood defence mechanisms, where appropriate.

3 The Planning System and Flood Risk Management

3.1 Introduction

Prior to discussing the management of flood risk, it is helpful to understand what is meant by the term. It is also important to define the components of flood risk in order to apply the principles of the Planning System and Flood Risk Management in a consistent manner.

The Planning System and Flood Risk Management: Guidelines for Planning Authorities, published in November 2009, describe flooding as a natural process that can occur at any time and in a wide variety of locations. Flooding can often be beneficial, and many habitats rely on periodic inundation. However, when flooding interacts with human development, it can threaten people, their property and the environment.

This Section will firstly outline the definitions of flood risk and the Flood Zones used as a planning tool; a discussion of the principles of the planning guidelines and the management of flood risk in the planning system will follow.

3.2 Definition of Flood Risk

Flood risk is generally accepted to be a combination of the likelihood (or probability) of flooding and the potential consequences arising. Flood risk can be expressed in terms of the following relationship:

Flood Risk = Probability of Flooding x Consequences of Flooding

The assessment of flood risk requires an understanding of the sources, the flow path of floodwater and the people and property that can be affected. The source - pathway - receptor model, shown below in Figure 3-1, illustrates this and is a widely used environmental model to assess and inform the management of risk.

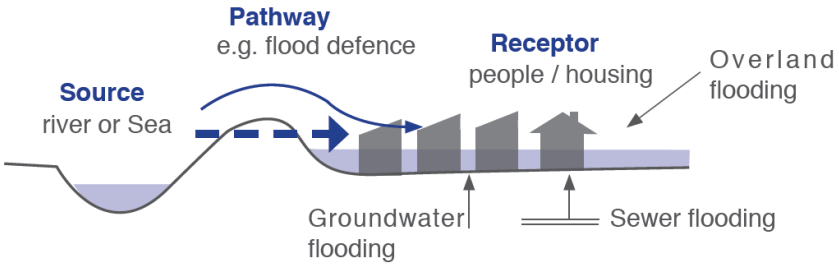


Figure 3-1: Source Pathway Receptor Model

Source: Figure A1 The Planning System and Flood Risk Management Guidelines Technical Appendices

Principal sources of flooding are rainfall or higher than normal sea levels while the most common pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. Receptors can include people, their property and the environment. All three elements must be present for flood risk to arise. Mitigation measures, such as defences or flood resilient construction, have little or no effect on sources of flooding but they can block or impede pathways or remove receptors.

The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk.

3.3 Likelihood of Flooding

Likelihood or probability of flooding of a particular flood event is classified by its annual exceedance probability (AEP) or return period (in years). A 1% AEP flood indicates the flood event that will occur or be exceeded on average once every 100 years and has a 1 in 100 chance of occurring in any given year.

Return period is often misunderstood to be the period between large flood events rather than an average recurrence interval. Annual exceedance probability is the inverse of return period as shown in Table 3-1.

Table 3-1: Probability of Flooding

Return Period (Years)	Annual Exceedance Probability (%)
2	50
100	1
200	0.5
1000	0.1

Considered over the lifetime of development, an apparently low-frequency or rare flood has a significant probability of occurring. For example:

A 1% flood has a 22% (1 in 5) chance of occurring at least once in a 25-year period - the period of a typical residential mortgage;

And a 53% (1 in 2) chance of occurring in a 75-year period - a typical human lifetime.

3.4 Consequences of Flooding

Consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, e.g. age-structure, of the population, presence and reliability of mitigation measures etc).

The Planning System and Flood Risk Management guidelines provide three vulnerability categories, based on the type of development, which are detailed in Table 3.1 of the Guidelines, and are summarised as:

Highly vulnerable, including residential properties, essential infrastructure and emergency service facilities;

Less vulnerable, such as retail and commercial and local transport infrastructure;

Water compatible, including open space, outdoor recreation and associated essential infrastructure, such as changing rooms.

3.5 Definition of Flood Zones

In the Planning System and Flood Risk Management guidelines, Flood Zones are used to indicate the likelihood of a flood occurring. These Zones indicate a high, moderate or low probability of flooding from fluvial or tidal sources and are defined below in Table 3-2.

It is important to note that the definition of the Flood Zones is based on an undefended scenario and does not take into account the presence of flood protection structures such as flood walls or embankments. This is to allow for the fact that there is a residual risk of flooding behind the defences due to overtopping or breach and that there may be no guarantee that the defences will be maintained in perpetuity.

It is also important to note that the Flood Zones indicate flooding from fluvial and tidal sources and do not take other sources, such as groundwater or pluvial, into account, so an assessment of risk arising from such sources should also be made.

Table 3-2: Definition of Flood Zones

Zone	Description
Zone A High probability of flooding.	This zone defines areas with the highest risk of flooding from rivers (i.e. more than 1% probability or more than 1 in 100) and the coast (i.e. more than 0.5% probability or more than 1 in 200).
Zone B Moderate probability of flooding.	This zone defines areas with a moderate risk of flooding from rivers (i.e. 0.1% to 1% probability or between 1 in 100 and 1 in 1000) and the coast (i.e. 0.1% to 0.5% probability or between 1 in 200 and 1 in 1000).
Zone C Low probability of flooding.	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1000).

3.6 Objectives and Principles of the Planning Guidelines

The Planning System and Flood Risk Management Guidelines describe good flood risk practice in planning and development management. Planning authorities are directed to have regard to the guidelines in the preparation of Development Plans and Local Area Plans, and for development control purposes.

The objective of the Planning System and Flood Risk Management Guidelines is to integrate flood risk management into the planning process, thereby assisting in the delivery of sustainable development. For this to be achieved, flood risk must be assessed as early as possible in the planning process. Paragraph 1.6 of the Guidelines states that the core objectives are to:

"Avoid inappropriate development in areas at risk of flooding;

Avoid new developments increasing flood risk elsewhere, including that which may arise from surface run-off;

Ensure effective management of residual risks for development permitted in floodplains;

Avoid unnecessary restriction of national, regional or local economic and social growth;

Improve the understanding of flood risk among relevant stakeholders; and

Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management".

The guidelines aim to facilitate 'the transparent consideration of flood risk at all levels of the planning process, ensuring a consistency of approach throughout the country.' SFRAs therefore become a key evidence base in meeting these objectives.

The 'Planning System and Flood Risk Management' works on a number of key principles, including:

Adopting a staged and hierarchical approach to the assessment of flood risk;

Adopting a sequential approach to the management of flood risk, based on the frequency of flooding (identified through Flood Zones) and the vulnerability of the proposed land use.

3.7 The Sequential Approach & Justification Test

Each stage of the Flood Risk Assessment (FRA) process aims to adopt a sequential approach to management of flood risk in the planning process.

Where possible, development in areas identified as being at flood risk should be avoided; this may necessitate de-zoning lands within the development plan. If de-zoning is not possible, then rezoning from a higher vulnerability land use, such as residential, to a less vulnerable use, such as open space may be required.

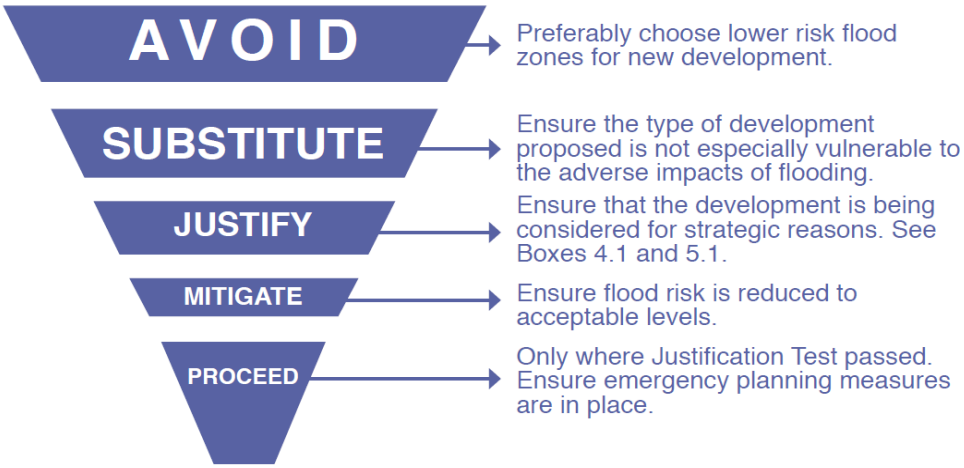


Figure 3-2: Sequential Approach Principles in Flood Risk Management

Source: The Planning System and Flood Risk Management (Figure 3.1)

Where rezoning is not possible, exceptions to the development restrictions are provided for through the application of the Justification Test. Many towns have central areas that are affected by flood risk and have been targeted for growth. To allow the sustainable and compact development of these urban centres, development in areas of flood risk may be considered necessary. For development in such areas to be allowed, the Justification Test must be passed.

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of such developments. The test is comprised of two processes; the Plan-making Justification Test, and the Development Management Justification Test. The latter is used at the planning application stage where it is intended to develop land that is at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be considered inappropriate for that land.

Table 3-3 shows which types of development, based on vulnerability to flood risk, are appropriate land uses for each of the Flood Zones. The aim of the SFRA is to guide development zonings to those which are 'appropriate' and thereby avoid the need to apply the Justification Test.

Table 3-3: Matrix of Vulnerability versus Flood Zone

	Flood Zone A High Probability	**Flood Zone B Moderate Probability**	**Flood Zone C Low Probability**
Highly Vulnerable Development (Including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water-Compatible Development	Appropriate	Appropriate	Appropriate

3.8 Scales and Stages of Flood Risk Assessment

Within the hierarchy of regional, strategic and site-specific flood-risk assessments, a tiered approach ensures that the level of information is appropriate to the scale and nature of the flood-risk issues and the location and type of development proposed, avoiding expensive flood modelling and development of mitigation measures where it is not necessary. The stages and scales of flood risk assessment comprise of:

Regional Flood Risk Assessment (RFRA) – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment and to identify where flood risk management measures may be required at a regional level to support the proposed growth. This should be based on readily derivable information and undertaken to inform the Regional Planning Guidelines.

Strategic Flood Risk Assessment (SFRA) – an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. This SFRA will revisit and develop the flood risk identification undertaken in the RFRA and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones, will also be carried out for those areas zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a site-specific FRA will be recommended, which will necessitate a detailed flood risk assessment.

Site Specific Flood Risk Assessment (FRA) – site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk to and from the site to an acceptable level. If the previous tiers of study have been undertaken to appropriate levels of detail, it is highly likely that the site-specific FRA will require detailed channel and site survey, and hydraulic modelling.

4 Data Collection and Review

This section reviews the data collection and the flood history for the settlements so that any additional information on flooding can be included within this SFRA. It will confirm the extent of extreme flooding (through the Flood Zone mapping) and key sources of flood risk.

Table 4-1: Available Flood Data for Flood Zone Development

Description	Coverage	Robustness	Comment on usefulness
South Eastern CFRAM Flood Mapping	Covers the river Barrow and its tributaries	High AFA status	Detailed 1D/2D CFRAM HPW model and is useful. Site verified by walkover and consultation with local authority. In general, CFRAM provides all information needed to apply the Justification Test (JT) for Plan Making under the SFRA. Area is listed for update under the OPW map review programme and this will be updated in the County Flood Zones when available.
National Indicative Fluvial Mapping (OPW)	Watercourses to the west of Carlow Town	Low	This data is broadscale and based on remotely sensed ground models. There is no modelled water level or depth associated with this dataset. Has been screened out at this stage due to a concern with the quality of data following a meeting with OPW. These flood extents are not suitable for use to assess flood risk and have not been used to define the Flood Zones.
Historical Flood Event Outlines	Coverage of most of LAP area from previous flood event	Moderate	Used indirectly to validate flood zones. Useful background information for flooding in specific areas of the settlement.

Table 4-2 Other Available Data

Description	Coverage	Robustness	Comment on usefulness
GSi Groundwater and Surface Water flood information	Full Study Area	Moderate	Provides both historic and predictive flood extents for groundwater and historic surface water flooding.
Alluvial Soils Maps	Full Study Area	Low	Used to provide indication of risk in areas with no other mapping available.
Groundwater vulnerability maps	Broadscale, County wide	Moderate	Initial assessment of groundwater vulnerability. Provides a screening tool for use in FRA.
Site Walkover	Specific areas of interest	Moderate	Helpful for assessing flood risk in areas where mapping is unavailable. Used to verify existing mapping and
Historic Flood Records including photos, aerial photos and reports.	Coverage of most of LAP area from 2009 flood	Various	Highly useful oversight of historic flooding issues provided by Local Authority.

	event and spot coverage for other events		
LiDAR height model	Carlow area	High	Aerial survey is used to appraise the topography and identify low spots, floodplain and areas potentially susceptible to flooding.

As set out in the RSES Regional Flood Risk Appraisal Report, and under the Planning Guidelines, the Flood Zone mapping for Carlow is principally derived from the CFRAM where possible.

All sources of available flood mapping were reviewed, and the best available dataset is used.

Specific guidance is provided for each area Carlow Town based on the data review and the site visit is used to confirm the most appropriate dataset and flood extents to define the Flood Zones. During the site visit (attended by Local Authority Engineers and Planners) the flood mapping was appraised on site by an experienced flood risk manager and professional opinion and judgement has been used to develop the recommendations within the Settlement Review of Section 8.

- The review of the suite of flood risk data has been developed as a spatial planning tool to guide CCC in making land-use zoning and development management decisions. The data sets have been deemed appropriate for the planning decisions being made at this stage of the plan making process and where flood risk is identified the following approach has been undertaken;
- Application of the Justification Test and/or;
- Further detailed analysis, or;
- Rezoning to a less vulnerable use, or;
- Further assessment at Development Management stage in limited circumstances where it has been determined that development should be possible in principle, taking into account a site specific opinion.

Where CFRAM modelling has been carried out, flood levels are available at selected node points along the watercourse. Once an appropriate level of validation has been undertaken as part of the site-specific FRA, these flood levels may be used to form the basis of the development design.

4.1 Historic Flooding

A number of areas in the Carlow and Graiguecullen area have been affected by flooding historically. Several sources were consulted to identify previous flood events including the OPW floodinfo.ie website, newspaper articles and previous flood studies. Floodinfo.ie provides information on historical flood events across the country and formed the basis of the Regional Flood Risk Assessment. Information is provided in the form of reports and newspaper articles which generally relate to rare and extreme events. A map of affected areas is shown in Figure 4-1

Location	Start Date	Description
Carlow	March 1947	Flooding in the town centre from River Barrow.
Carlow Town	February and June 1990	Flooding due to high rainfall and overtopping of Barrow
Barrlow and Burrin, Carlow	Jan/Feb 1995	Flooding due to high rainfall and overtopping of Rivers Barrow and Burrin.
Barrow, Carlow Town	18/08/2008	Several areas of the town centre flooded due to overtopping of the Barrow after heavy rainfall.
Carlow Town	27/11/2009	Severe flooding was recorded between the 19th and 27th of November 2009 after the Barrow burst its banks following prolonged period of heavy rain. A maximum flood depth of 1.5m was recorded during this time and 33 residential and 16 commercial properties were affected by the flooding
Carlow town	Recurring	Carlow town is subject to recurring flooding. Locations vulnerable to flooding include: Carlow Town Centre, • Paupish Lane (Alleviation works have increased the level of protection to Paupish Lane), • Dr Cullen Road (Lack of capacity of surface water drainage system. Will be alleviated following Carlow Main Drainage Scheme), • Green Lane (Road lowered beneath railway bridge. Deficiencies in surface water drainage.), • Askagh Drive Pollerton (Lack of capacity of surface water drainage system. To be alleviated following Carlow Main Drainage Scheme), • Green Road Ballycarney (Lack of capacity of surface water drainage system) • Ballynakillbeg, • Pollerton Big (Lack of capacity of surface water drainage), • Ford Bridge, • Ballinacarrig (Alleviation works have reduced severity of flooding), • Oak Park Entrance.

-2 Historic Flooding (floodinfo.ie)

4.1.1 Carlow Flood Relief Scheme

The Carlow Flood Relief Scheme was initiated in 1996 following severe flooding in 1995 and was constructed from 2010 to 2013. The Scheme, which comprises flood defence walls and embankments along the River Barrow and Burrin Stream with a pumping station at their confluence which provides protection against fluvial flooding to the 1% AEP for 185 properties. The flood relief scheme also includes some weir alterations and channel improvement works.

Further works on the Burrin River in the Mill Race/Springfield area and on the Knocknagee Stream in the Castle Oaks area were recommended by the CFRAM and have been included as part of the first 50 FRSs to be investigated further under the 10-year government spending plan announced in May 2018.

4.2 Site Walkover

As part of the SFRA process a site walkover and consultation was undertaken in Carlow Town by an experience Flood Risk Manager alongside the Local Authority Engineer. The site walkover aimed to assess risks presented by potentially unmapped watercourses and to verify CFRAM mapping.

The walkover took place at specific locations throughout Carlow Town based on CFRAM and OSi mapping. The CFRAM mapping was also found to be in agreement with observations made during the walkover.

4.3 GSI Groundwater Flood

The winter of 2015/2016 saw the most extensive groundwater flooding ever witnessed in Ireland. The lack of data on groundwater flooding and fit-for-purpose flood hazard maps were identified as serious impediments to managing groundwater flood risk in vulnerable communities. Geological Survey Ireland - in collaboration with Trinity College Dublin and Institute of Technology Carlow - initiated the groundwater flood project GWFlood to address these deficits. Data available as a result of the project include national-scale flood maps for both historic and predictive groundwater flooding.

The historic groundwater flood map is primarily based on the winter 2015/2016 flood event, which in most areas represented the largest groundwater flood event on record. The map was produced based on the SAR imagery of the 2015/2016 event as well as any available supplementary evidence.

The predictive groundwater flood map presents the probabilistic flood extents for locations of recurrent karst groundwater flooding. It consists of a series of stacked polygons at each site representing the flood extent for specific AEP's mapping floods that are expected to occur every 10, 100 and 1000 years (AEP of 0.1, 0.01, and 0.001 respectively). The map is focussed primarily (but not entirely) on flooding at seasonally inundated wetlands known as turloughs. Sites were chosen for inclusion in the predictive map based on existing turlough databases as well as manual interpretation of SAR imagery.

The mapping process tied together the observed and SAR-derived hydrograph data, hydrological modelling, stochastic weather generation and extreme value analysis to generate predictive groundwater flood maps for over 400 qualifying sites. It should be noted that not all turloughs are included in the predictive map as some sites could not be successfully monitored with SAR and/or modelled.

The maximum historic groundwater flood mapping is displayed over page in Figure 4-3 which shows a small area of historic flooding in the north of the area and in the south. The Predictive mapping however, shows no predicted groundwater flooding within or close to the LAP boundary.

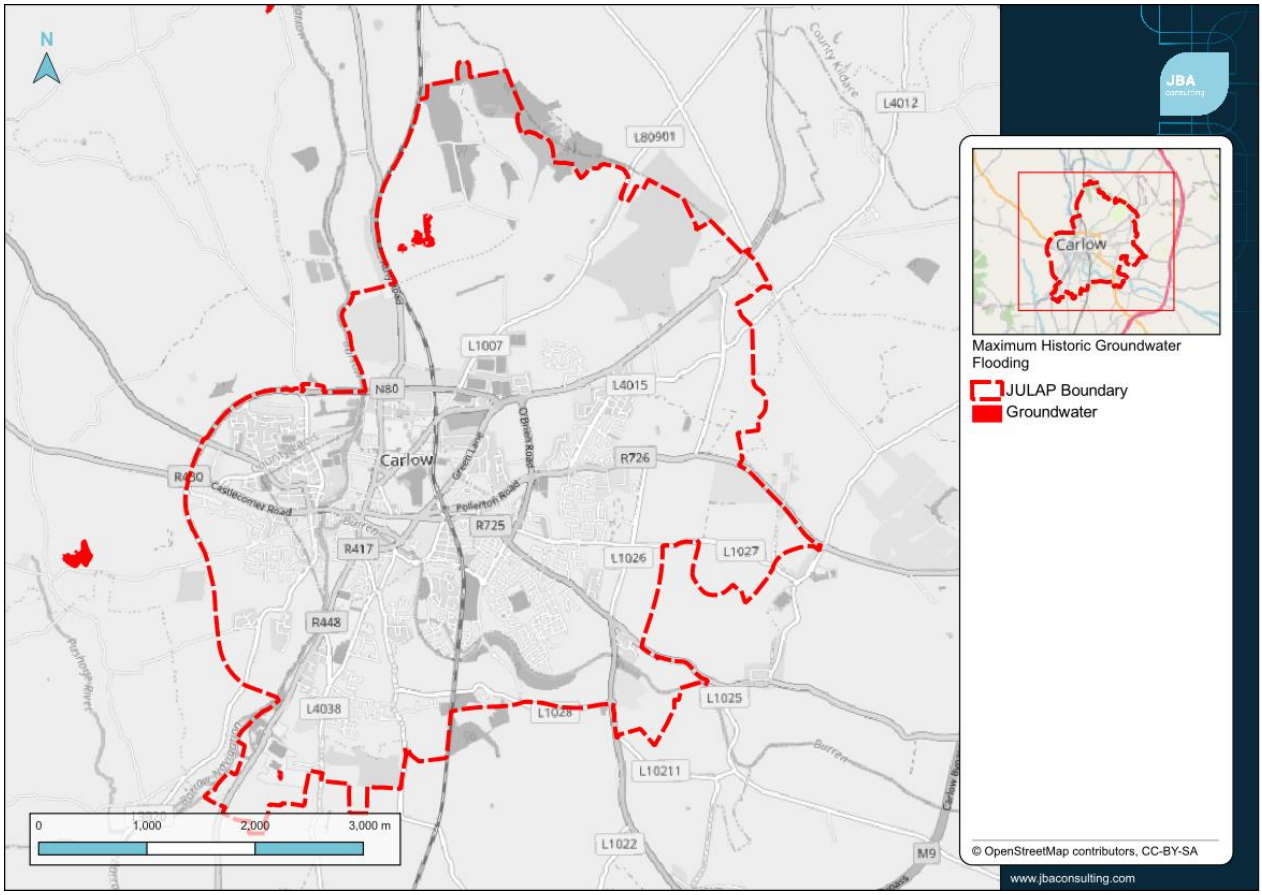


Figure 4-3 Maximum Historic Groundwater Flooding

4.4 GSI Surface Water Flooding

Geological Survey Ireland - in collaboration with Trinity College Dublin and Institute of Technology Carlow - initiated the groundwater flood project GWFlood to address deficits in groundwater flooding and fit-for-purpose flood hazard maps.

In addition to the historic groundwater flood map, the flood mapping methodology was also adapted to produce a surface water flood map of the 2015/2016 flood event. This flood map encompasses fluvial and pluvial flooding in non-urban areas and has been developed as a separate product. The historic surface water flood map is displayed within Figure 4-4 and was reviewed on site during the walkover.

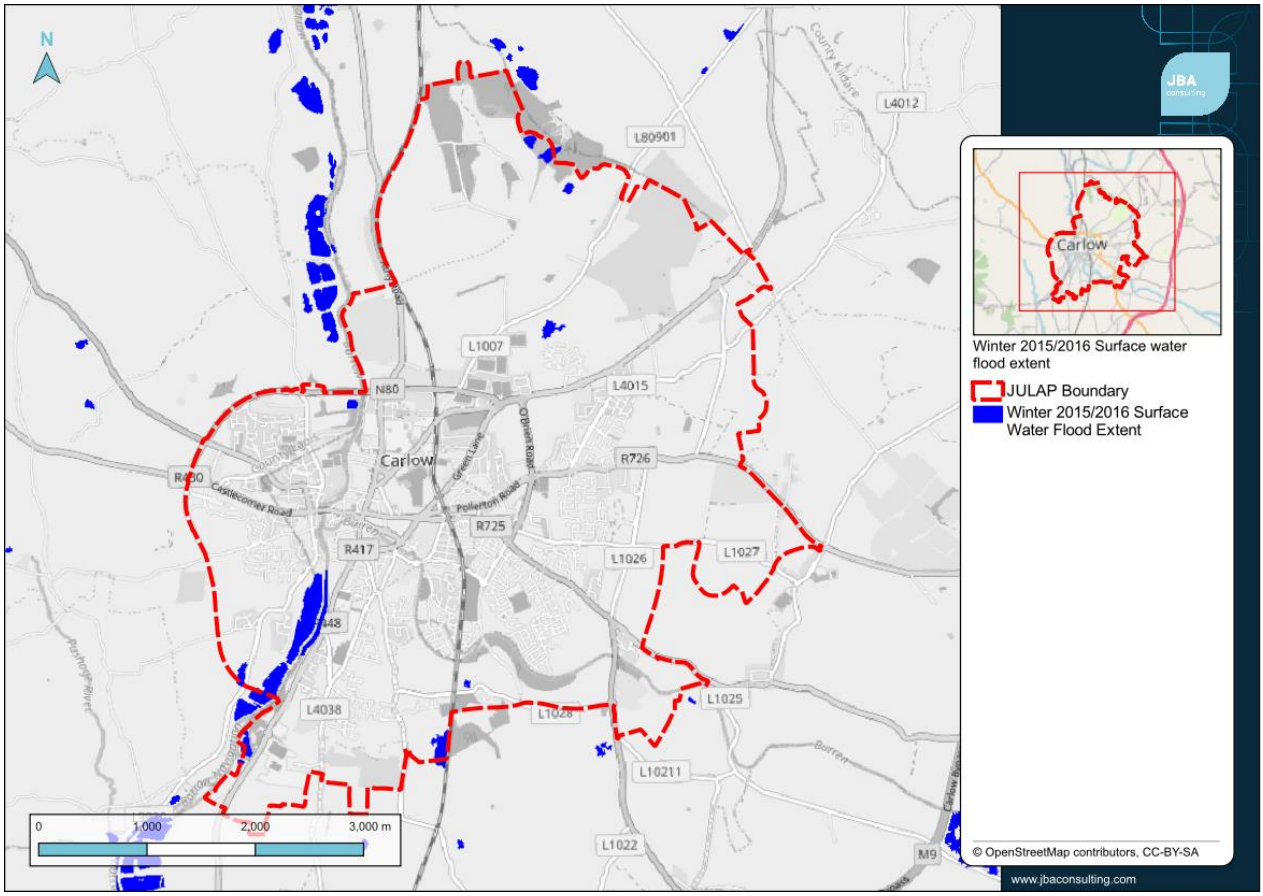


Figure 4-4 Winter 2015/2016 Surface water flood extent (GSI)

4.5 CFRAM

In 2011 the OPW commenced appointment of consultants to carry out a more detailed flood risk assessment on key flood risk areas. This work was undertaken under the CFRAM programme across seven river basin districts in Ireland. The South Eastern RBD includes the entire catchment of the River Barrow, covering some 13,000km^2 and 20% of the country. The RBD covers parts of 7 counties: Carlow, Kildare, Kilkenny, Laois, Tipperary, Waterford and Wexford.

The initial Flood Risk Review (FRR) stage of the of the South Eastern CFRAM included a site-based review of the PFRA flood outlines at a number of settlements. Several communities were identified through this process as being at potentially significant flood risk in the South Eastern River Basin, which included Carlow Town. Following this review, any sites recommended as an Area for Further Assessment (AFA) were included in the subsequent detailed assessment stage of each CFRAM study.

A set of flood maps, indicating the areas prone to flooding, has been developed and published for the Joint Urban Area Plan. The Plan builds on and supplements the national programme of flood protection works completed previously, that are under design and construction at this time or that have been set out through other projects or plans, and the ongoing maintenance of existing drainage and flood relief schemes.

Climate change is likely to have a considerable impact on flood risk in Ireland, such as through rising mean sea levels, increased wave action and the potential increases in winter rainfall and intense rainfall events. Land use change, for example, through new housing and other developments, can also increase potential future flood risk. In order to assess this risk, the South East CFRAM study also included detailed assessments of flooding and impacts for potential future climate change scenarios.

The 1% AEP and 1% AEP + climate change outlines are displayed over page in Figure 4-5 Results confirm a generally high impact of climate change across the settlement with the HEFS mapping aligning with the 0.1% current flood extent.

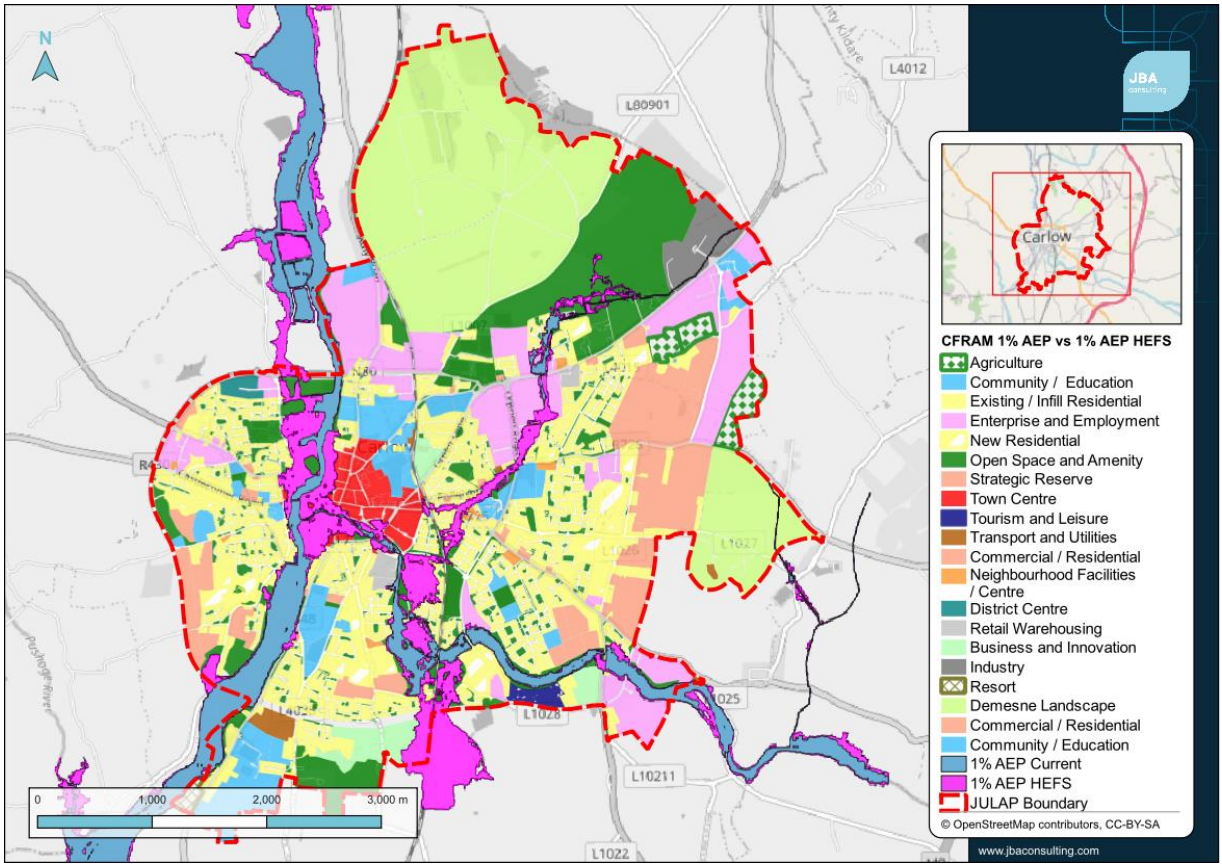


Figure 4-5 CFRAM 1% AEP vs 1% AEP HEFS

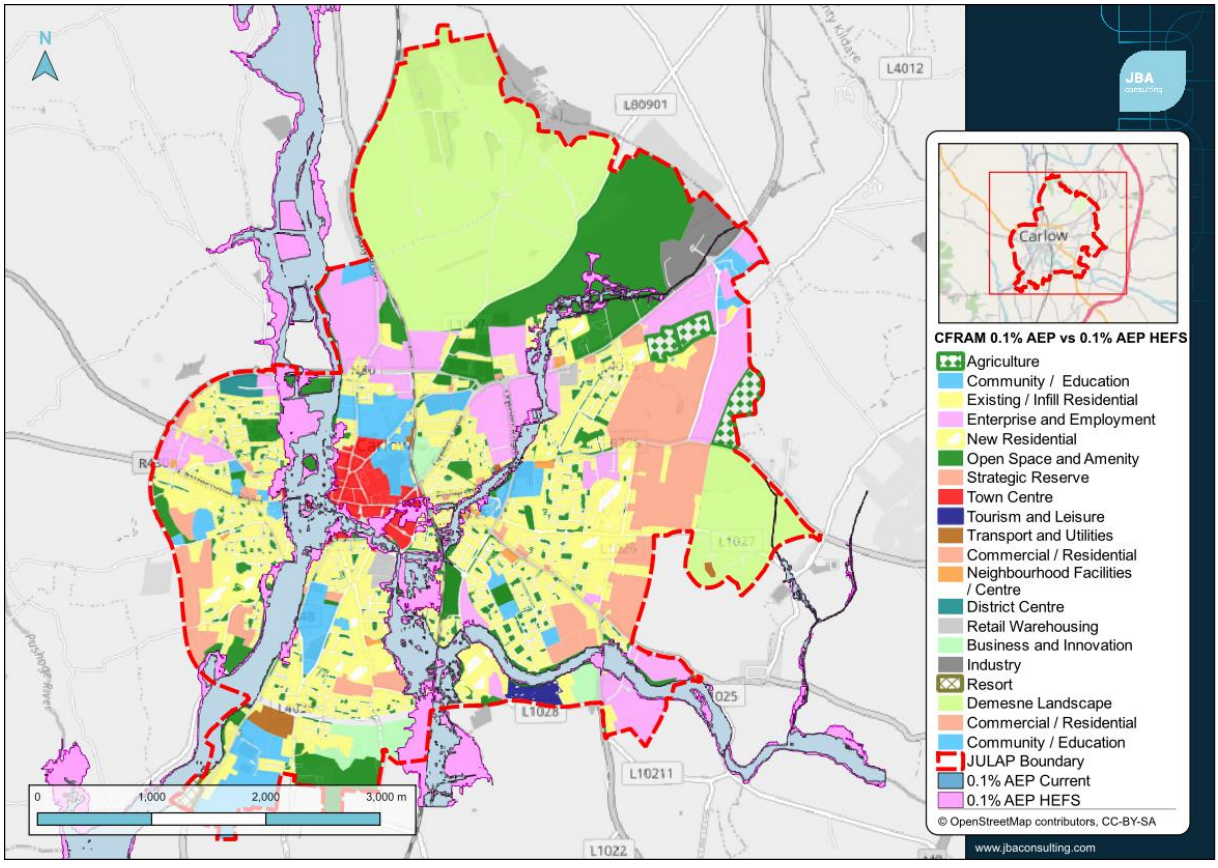


Figure 4-6 CFRAM 1% AEP vs 0.1% AEP HEFS

5 Sources of Flooding

This SFRA has reviewed flood risk from fluvial, pluvial and groundwater sources. Flooding events have become more pronounced in Ireland, and Carlow, A review of the historical event data and predictive flood information has highlighted a number of sources of potential flood risk to the town. These are discussed in the following sections.

5.1.1 Fluvial Flooding

Flooding from rivers and streams is associated with the exceedance of channel capacity during higher flows. The process of flooding from watercourses depends on numerous characteristics associated with the catchment including; geographical location and variation in rainfall, steepness of the channel and surrounding floodplain and infiltration and rate of runoff associated with urban and rural catchments. Generally, there are two main types of catchments; large and relatively flat or small and steep, both giving two very different responses during large rainfall events.

In a large, relatively flat catchment, flood levels will rise slowly, and natural floodplains may remain flooded for several days or even weeks, acting as the natural regulator of the flow. In small, steep catchments local intense rainfall can result in the rapid onset of deep and fast-flowing flooding with little warning. Such “flash” flooding, which may only last a few hours, can cause considerable damage and possible risk to life.

5.1.2 Flooding from Defence Overtopping or Breach

There is a flood relief scheme in Carlow Town which was completed in 2013. There are also plans to progress the development of Flood Relief Schemes in Carlow to augment the existing Scheme.

In addition to the defences in place as part of this scheme there will also be a number of walls and other structures which, whilst not designed to act as flood defences, provide a level of protection against flood water.

Existing development clearly benefits from the construction of defences, and new defences will be considered as one means of facilitating the redevelopment of the settlements. However, it is against sustainability objectives, and the general approach of the OPW, to construct defences with the intention of releasing green field land for development. It is also not appropriate to consider the benefits of schemes which have not been constructed or which may only be at pre-feasibility or design stage.

Residual risk is the risk that remains after measures to control flood risk have been carried out. Residual risk can arise from overtopping of flood defences and / or from the breach from structural failure of the defences.

The concept of residual risk is explained in ‘The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' as follows:

"Although flood defences may reduce the risk of flooding, they cannot eliminate it. A flood defence may be overtopped by a flood that is higher than that for which it was designed or be breached and allow flood water to rapidly inundate the area behind the defence. In addition, no guarantee can be given that flood defence will be maintained in perpetuity. As well as the actual risk, which may be reduced as a result of the flood defence, there will remain a residual risk that must be considered in determining the appropriateness of particular land uses and development. For these reasons, flooding will still remain a consideration behind flood defences, and the flood zones deliberately ignore the presence of flood defences."

Overtopping of flood defences will occur during flood events greater than the design level of the defences. Overtopping is likely to cause lower levels of inundation of the floodplain than if defences had not been built, but the impact will depend on the duration, severity and volume of floodwater. However, and more critically, overtopping can destabilise a flood defence, cause erosion and make it more susceptible to breach or fail. Recovery time and drainage of overtopping quantities should also be considered. Overtopping may become more likely in future years due to the impacts of climate change and it is important that any assessment of defences includes an appraisal of climate change risks.

Breach or structural failure of flood defences is hard to predict and is largely related to the structural condition and type of flood defence. 'Hard' flood defences such as solid concrete walls are less likely to breach than 'soft' defence such as earth embankments. Breach will usually result

in sudden flooding with little or no warning and presents a significant hazard and danger to life. There is likely to be deeper flooding in the event of a breach than due to overtopping.

Whilst it is important that residual risks are recognised and appropriate management measures put in place, it is also important to acknowledge the benefits that a flood relief scheme provides to those living and working behind it. In this regard, although 'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' requires flood zones to be undefended, consideration should be given to the benefit provided by flood defences, but only once the Justification Test has been applied and passed.

5.1.3 Pluvial Flooding

Flooding of land from surface water runoff is usually caused by intense rainfall that may only last a few hours. The resulting water follows along natural valley lines, creating flow paths along roads and through and around developments and ponding in low spots, which often coincide with fluvial floodplains. Any areas at risk from fluvial flooding will almost certainly be at risk from surface water flooding.

The PFRA study considered pluvial flood risk and produced a national set of pluvial flood maps. This dataset was reviewed and used to identify development areas at particular risk of surface water and pluvial flooding. However, the level of detail contained in the PFRA map, and the widespread distribution of areas at risk did not allow a commentary relating to pluvial flood risk to be developed, or for particularly high-risk areas to be identified. Instead, an overall strategy for the management of pluvial risk is presented and should be implemented across all development proposals. This, and recommendations for the assessment of surface water risks, are provided in the Flood Risk Management Policy section.

5.1.4 Flooding from Drainage Systems

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its discharge capacity, it becomes blocked, or it cannot discharge due to a high-water level in the receiving watercourse.

Flooding in urban areas can also be attributed to sewers. Sewers have a finite capacity which, during certain load conditions, will be exceeded. In addition, design standards vary and changes within the catchment areas draining to the system, in particular planned growth and urban creep, will reduce the level of service provided by the asset. Sewer flooding problems will often be associated with regularly occurring storm events during which sewers and associated infrastructure can become blocked or fail. This problem is exacerbated in areas with under-capacity systems. In the larger events that are less frequent but have a higher consequence, surface water will exceed the sewer system and flow across the surface of the land, often following the same flow paths and ponding in the same areas as overland flow.

Foul sewers and surface water drainage systems are spread extensively across the urban areas with various interconnected systems discharging to treatment works and into local watercourses.

5.1.5 Drainage Districts

Another form of fluvial regime is seen within the JULAP area is related to rivers that have been subject to works as part of a drainage programme. Drainage Districts were carried out by the Commissioners of Public Works under a number of drainage and navigation acts from 1842 to the 1930s to improve land for agriculture and to mitigate flooding. Channels and lakes were deepened and widened, weirs removed, embankments constructed, bridges replaced or modified and various other work was carried out.

The purpose of the schemes was to improve land for agriculture, by lowering water levels during the growing season to reduce waterlogging on the land beside watercourses known as callows.

Drainage Districts cover approximately 10% of the country, typically the flattest areas.

Local authorities are charged with responsibility to maintain Drainage Districts. The Arterial Drainage Act, 1945 contains a number of provisions for the management of Drainage Districts in Part III and Part VIII of the act. The Act was amended on a number of occasions, e.g. to transpose EU Regulations and Directives such as the EIA, SEA, and Habitats Directives and the Aarhus Convention.

Through the implementation of these schemes the hydraulic conveyance efficiency of a catchment is increased, thereby leading to a reduction in overland flood storage. Although it has been found that these schemes generally achieve their main objectives, this increase in discharge-carrying capacity leads to an acceleration of the response to rainfall with flood peaks of increased intensity and more rapid recessions.

The Barrow, Quinagh and Burren Drainage Districts are located within the JLAP (see Figure 5-1 below) and typically ensure that flood waters (of varying magnitude but typically the 3-year flood) are retained in bank by lowering water levels during the growing season thus reducing waterlogging on the adjacent land during wetter periods.

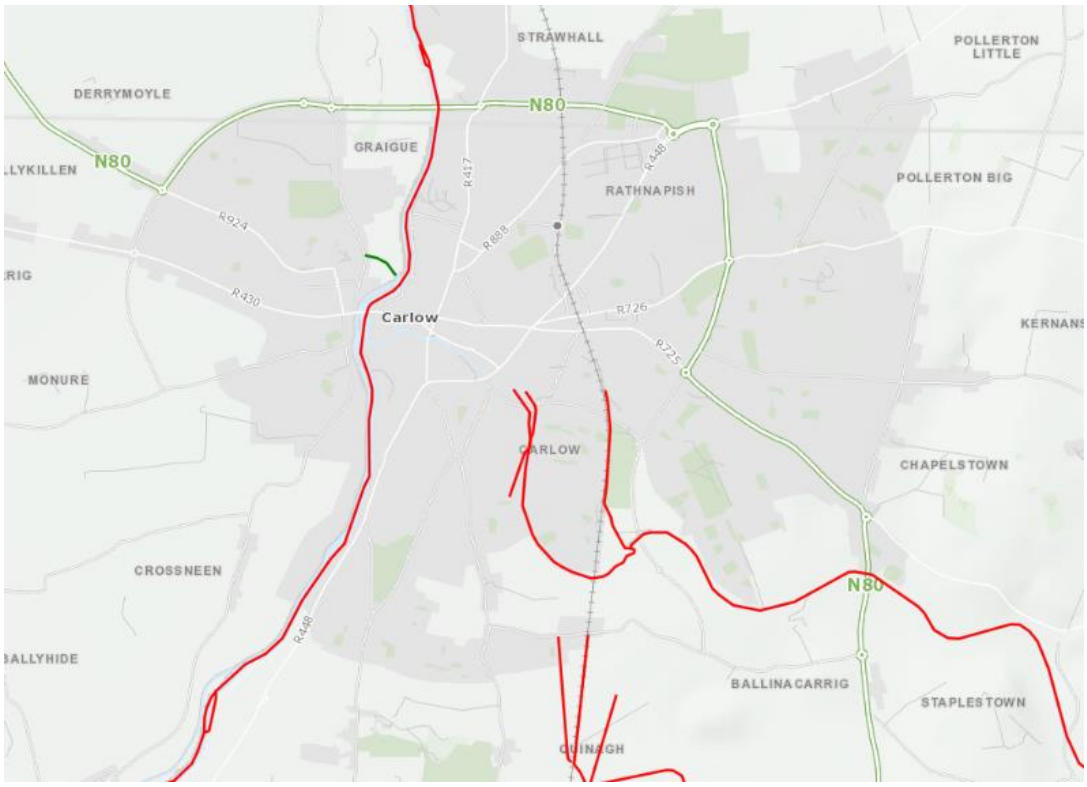


Figure 5-1 Local Drainage Districts

5.1.6 Groundwater Flooding

Groundwater flooding is caused by the emergence of water originating from underground and is particularly common in karst landscapes. This can emerge from either point or diffuse locations. The occurrence of groundwater flooding is usually very local and unlike flooding from rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, groundwater flooding can cause significant damage to property, especially in urban areas and pose further risks to the environment and ground stability. Flood risk relating to groundwater has been screened under Section 4.3 and confirmed that Carlow is not at risk from predicted groundwater flooding.

6 Flood Risk Management Policy

The Planning Guidelines recommend a sequential approach to spatial planning, promoting avoidance rather than justification and subsequent mitigation of risk. The implementation of the Planning Guidelines on a settlement basis is achieved through the application of the policies and objectives contained within Chapter 6 of the CCDP 2022-2028.

The use and application of the policies and guidelines constitutes the formal plan for flood risk management in County Carlow. This approach has been achieved in the development plan making process in the settlements contained within the plan and covered in this SFRA.

The specific management of risk is discussed for each settlement in Section 8.

6.1 Surface Water

Section 6.5 of the CDP outlines the approach to surface water management. CCC will require compliance with best practice guidance for the collection, reuse, treatment and disposal of surface waters for all future development proposals.

CCC seeks to ensure the sustainable management of surface water discharges through the use of Sustainable Urban Drainage Systems (SuDS). SuDS manage the water as close as possible to its origin replicating the natural characteristics of rainfall runoff from any site, ensuring water is infiltrated or conveyed more slowly to the drainage system and ultimately to water courses via permeable paving, swales, green roofs, rainwater harvesting, detention basins, ponds and wetlands. SuDS provides an integrated approach which addresses water quantity thereby reducing potential for flood risk, water quality, amenity and habitat.

CCC policy and objectives are outlined in the tables below.

Table 6-1 Surface Water & Groundwater (Incl. Sustainable Urban Drainage Systems) – Policies

Policy	Description
SG P1	Maintain and enhance the existing surface water drainage systems in Carlow-Graiguecullen and to protect surface and ground water quality in accordance with the Water Framework Directive.
SG P2	Require the use of Sustainable Urban Drainage Systems (SuDS) within development proposals and infrastructure projects, in accordance with the DHLGH Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document, 2022' (and any subsequent amendments or revisions to the document), Carlow County Council's SuDS Policy, and Laois County Council's Storm Water Management Policy as appropriate, in order to reduce flood risk, improve water quality and enhance biodiversity and amenity in the joint urban area.
SW P3	Ensure that all development proposals maintain surface water discharge at greenfield run-off rate, including an allowance for climate change.

Table 6-2 Surface Water Objectives

Objective	Description
SG O1	Maintain, improve, and enhance the environmental and ecological quality of surface waters and groundwater in Carlow-Graiguecullen in conjunction with the Environmental Protection Agency (EPA) and in accordance with the River Basin Management Plan for Ireland 2018-2021 and any subsequent amendments or revisions to the Plan
SG 02	Require applicants, where necessary, to demonstrate that development proposals will not negatively impact on any surface water or groundwater body and be compliant with the requirements of the Water Framework Directive and measures to protect and improve our water bodies set down in the River Basin Management Plan for Ireland 2018 – 2021 and any subsequent amendments or revisions to the Plan.

6.2 Flood Risk Management

Section 6.10 of the CDP outlines the policy for the management of flooding. It highlights the context to the policy through an introduction to the EU Directive and national policy driven by the OPW's response to the Directive and the Planning Guidelines. CCC policy is outlined in the table below.

Table 6-3 Flood Management Policy

Policy	Description
FR P1	Ensure that all development proposals in Carlow- Graiguecullen comply with the requirements of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (and any future revisions or updates to these Guidelines), in particular through the application of the sequential approach and the Development Management Justification Test.
FR P2	Have regard to the findings and recommendations of the Strategic Flood Risk Assessment (SFRA) carried out for this Joint Urban Local Area Plan.
FR P3	Carry out flood risk assessment for the purpose of regulating, restricting, and controlling development in areas at risk of flooding in Carlow-Graiguecullen and to minimise the level of flood risk to people, business, infrastructure and the environment through the identification and management of existing and potential future flood risk.
FR P4	Require the submission of a Site-Specific Flood Risk Assessment (FRA) in areas at risk of flooding in Carlow-Graiguecullen. The assessment shall be carried out by a suitably qualified and indemnified professional, shall be appropriate to the scale and nature of the risk to the proposed development and shall consider all sources of flooding. The FRA shall be prepared in accordance with the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (and any future revisions or updates to these Guidelines), and shall address climate change, residual risk, avoidance of contamination of water sources and any proposed site-specific flood management measures.
FR P5	Minimise flood risk arising from pluvial (surface water) flooding in Carlow-Graiguecullen by promoting the use of natural flood risk management measures including the use of Sustainable Urban Drainage Systems (SuDS) and nature-based solutions.
FR P6	Maintain a riparian (buffer) zone of not less than 10 metres between all watercourses and any development proposals to mitigate against flood risk, with the full extent of the buffer zone to be determined on a case-by-case basis by the Planning Authority, based on site specific characteristics and sensitivities and consultation with Inland Fisheries Ireland.

Table 6-4 Flood Risk Management Objectives

Policy	Description
FR O1	Manage flood risk in Carlow-Graiguecullen in conjunction with the Office of Public Works (OPW) and in accordance with the requirements of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (2009), Circular PL02/2014, and any future revisions or updates to these Guidelines.
FR O2	Seek to ensure that where flood risk management works take place that the natural and cultural heritage of the River Barrow and Burren River is protected and improved where possible.

6.3 CFRAM Recommendations

Following the publication of the final Flood Risk Management Plans for the CFRAM Study in May 2018 a 10 year €1billion programme of works (for 118 schemes) was announced by the OPW.

The OPW's South Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study identified Carlow Town as an AFA. For Carlow the measure suggested was to maintain and upgrade the existing Carlow Flood Relief scheme.

The proposed management policy will maintain and upgrade several key flood protection benefits; reducing risk to numerous residential properties, an NIAH protected structure, 2 utilities, several social infrastructure assets and transport links for the current and future climate change scenarios. The Mill Race/Springfield area and the Knocknagee Stream in the Castle Oaks area were recommended by the CFRAM for new measures to combat currently undefended areas.

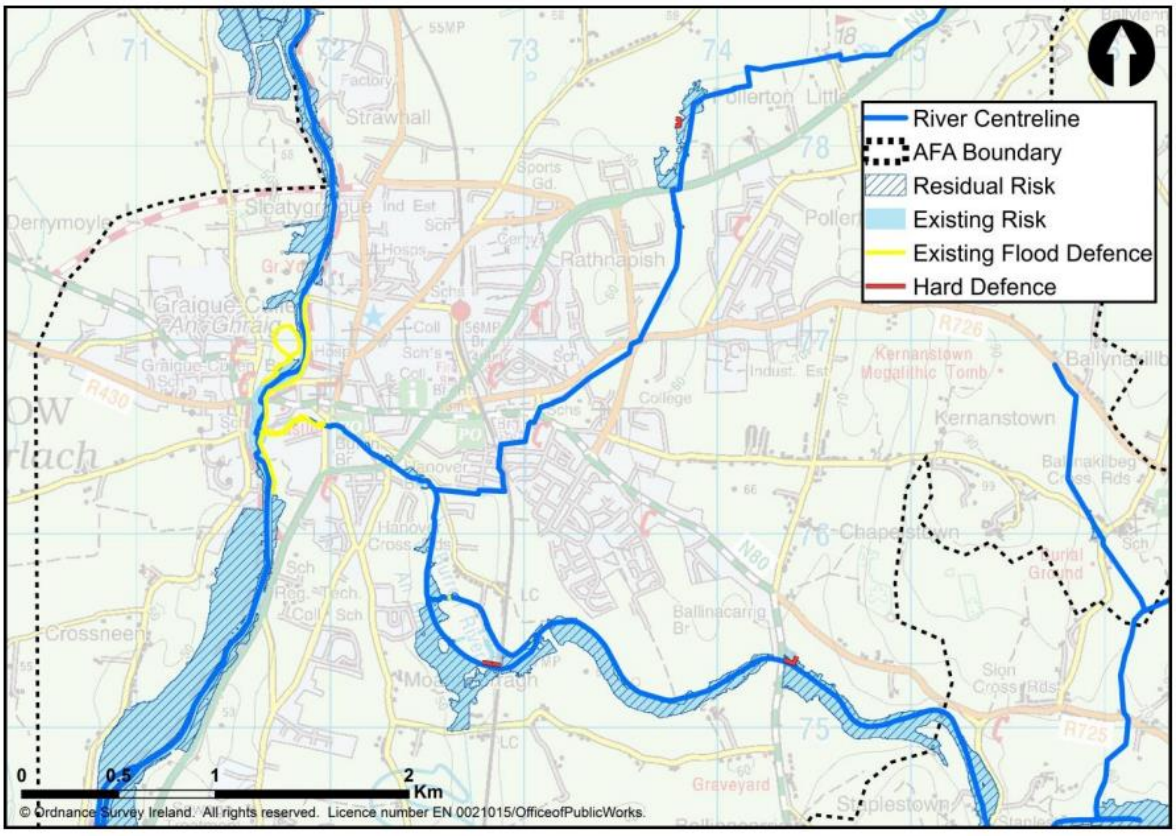


Figure 6-1 Carlow AFA CFRAM recommendation

7 Development Management and Flood Risk

In order to guide both applicants and relevant council staff through the process of planning for and mitigating flood risk, the key features of a range of development scenarios have been identified (relating the flood zone, development vulnerability and presence or absence of defences). For each scenario, a number of considerations relating to the suitability of the development are summarised below.

It should be noted that this section of the SFRA begins from the point that all land zoned for development has passed the Justification Test for Development Plans, and therefore passes Part 1 of the Justification Test for Development Management – which states that the land has in the first instance been zoned accordingly in a development plan (that underwent an SFRA). In addition to the general recommendations in the following sections, Section 8 should be reviewed for specific recommendations for individual settlements, including details of the application of the Justification Test. In areas where there are no formal land use zoning objectives, the Justification Test cannot pass for any sites within Flood Zone A/B. It would be down to a site-specific FRA to confirm (in appropriate detail) the extent of Flood Zone A/B.

In order to determine the appropriate design standards for a development it may be necessary to undertake a site-specific flood risk assessment. This may be a qualitative appraisal of risks, including drainage design. Alternatively, the findings of the CFRAM, or other detailed study, may be drawn upon to inform finished floor levels. In other circumstances a detailed modelling study and flood risk assessment may need to be undertaken. Further details of each of these scenarios, including considerations for the flood risk assessment are provided in the following sections.

7.1 Requirements for a Flood Risk Assessment

Assessment of flood risk is required in support of any planning application where flood risk may be an issue, and this may include sites in Flood Zone C (low probability of flooding) where a watercourse or field drain exists nearby. The level of detail will vary depending on the risks identified and the proposed land use. As a minimum, all proposed development, including that in Flood Zone C, must consider the impact of surface water flood risks on drainage design. In addition, flood risk from sources other than fluvial should be reviewed.

For sites within Flood Zone A or B (high/moderate probability of flooding), a site specific "Stage 2 - Initial FRA" will be required and may need to be developed into a "Stage 3 - Detailed FRA". The extents of Flood Zone A and B are delineated through this SFRA. However, future studies may refine the extents (either to reduce or enlarge them) so a comprehensive review of available data should be undertaken once an FRA has been triggered.

Within the FRA the impacts of climate change and residual risk (including culvert/structure blockage) should be considered and remodelled where necessary, using an appropriate level of detail, in the design of finished floor levels. Further information on the required content of the FRA is provided in the Planning System and Flood Risk Management Guidelines.

Any proposal that is considered acceptable in principle shall demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal will demonstrate that appropriate mitigation and management measures are put in place.

7.2 Drainage Design

All proposed development, whether in Flood Zone A, B or C, must consider the impact of surface water flood risks on drainage design as specified by the surface water management policies in the Greater Dublin Strategic Drainage Study (GDSDS) and this will be considered in the planning process. This may be in the form of a section within the flood risk assessment (for sites in Flood Zone A or B) or part of a surface water management plan.

Areas vulnerable to ponding are indicated on the OPW's PFRA mapping. Particular attention should be given to development in low-lying areas which may act as natural ponds for collection of run-off.

The drainage design should ensure no increase in flood risk to the site, or the downstream catchment. Where possible, and particularly in areas of new development, floor levels should at a minimum be 300mm above adjacent roads and hard standing areas to reduce the consequences

of any localised flooding. Where this is not possible, an alternative design appropriate to the location may be prepared.

In addition, for larger sites (i.e. multiple dwellings or commercial units) master planning should ensure that existing flow routes are maintained, through the use of green infrastructure.

7.3 Development in Flood Zones A or B

7.3.1 Minor Developments

Section 5.28 of the Planning Guidelines on Flood Risk Management identifies certain types of development as being 'minor works'. In such cases, the sequential approach cannot be used to locate such development in lower-risk areas and the Justification Test will not apply.

Generally, the approach to deal with flood protection would involve raising the ground floor levels above extreme flood levels. However, in some parts of the plan area, which are already developed, ground floor levels for flood protection could lead to floor levels being much higher than adjacent streets, thus creating a hostile streetscape for pedestrians. This would cause problems for infill development sites if floor levels were required to be significantly higher than those of neighbouring properties. In this regard, for the key sites in the plan area it has been recognised that ground floor levels below predicted flood levels could be allowed, in limited circumstances, on a site by site basis, for commercial and business developments. However, if this is the case, then these would be required to be flood resistant construction using water resistant materials and electrical fittings places at higher levels. For high risk areas it would also be necessary to impose planning restrictions in these areas. Residential Uses would not be permitted at ground flood levels in high risk zones.

It should be noted that for residential buildings within Flood Zone A or B, bedroom accommodation shall not be permitted at basement or ground floor.

For commercial operations, business continuity must be considered, and steps taken to ensure operability during and recovery after a flood event for both residential and commercial developments. Emergency access must be considered as in many cases flood resilience will not be easily achieved in the existing build environment.

The requirement for providing compensatory storage for minor developments has been reviewed and can generally be relaxed, even where finished floor levels have been raised, and particularly where flood risk is primarily tidal or the development is behind defences. This is because the development concerns land which has previously been developed and would already have limited capacity to mitigate flooding and would particularly be the case in tidal risk areas. However, a commentary to this effect must be substantiated in the FRA and should be discussed with Carlow County Council prior to submission of a planning application.

7.3.2 Highly vulnerable development in Flood Zone A or B

Development which is highly vulnerable to flooding, as defined in The Planning System and Flood Risk Management, includes (but is not limited to) dwelling houses, hospitals, emergency services and caravan parks.

New development

It is not appropriate for new, highly vulnerable, development to be located in Flood Zones A or B outside the core of a settlement. Such proposals do not pass the Justification Test for Development Plans. Instead, a less vulnerable or water compatible use should be considered.

In some cases, land use objectives which include for highly vulnerable uses have been justified in the Development Plan. This includes zonings focused around an urban core which allow for a mix of residential, commercial and other uses. In such cases, a sequential approach to land use within the site must be taken and will consider the presence or absence of defences, land raising and provision of compensatory storage, safe access and egress in a flood and the impact on the wider development area.

Existing developed areas

The Planning Circular (PL02/2014) states that "*notwithstanding the need for future development to avoid areas at risk of flooding, it is recognised that the existing urban structure of the country contains many well established cities and urban centres which will continue to be at risk of flooding. In addition, development plans have identified various strategically important urban centres … whose continued consolidation, growth, development or generation, including for residential use, is being encouraged to bring about compact and sustainable growth*.

In cases where specific development proposals have passed the Justification Test for Development Plans, the outline requirements for a flood risk assessment and flood management measures are detailed in this SFRA in the following sections and the site specific assessments in Section 8, which also detail where such development has been justified. Of prime importance is the requirement to manage risk to the development site and not to increase flood risk elsewhere. It should also be noted that for residential buildings within Flood Zone A or B, bedroom accommodation shall not be permitted at basement or ground floor.

7.3.3 Less vulnerable development in Flood Zone A or B

This section applies to less vulnerable development in Flood Zone A which has passed the Justification Test for development plans, and less vulnerable development in Flood Zone B, where this form of development is appropriate, and the Justification Test is not required. Development which is less vulnerable to flooding, as defined in The Planning Guidelines, includes (but is not limited to) retail, leisure and warehousing and buildings used for agriculture and forestry (see Table 3-3 for further information). This category includes less vulnerable development in all forms, including refurbishment or infill development, and new development both in defended and undefended situations.

The design and assessment of less vulnerable development should begin with 1% AEP fluvial or 0.5% tidal events (depending on dominant flood source) as standard, with climate change and a suitable freeboard included in the setting of finished floor levels. The presence or absence of flood defences informs the level of flood mitigation recommended for less vulnerable developments in areas at risk of flooding. In contrast with highly vulnerable development, there is greater scope for the developer of less vulnerable uses to accept flood risks and build to a lower standard of protection, which is still high enough to manage risks for the development in question. However, any deviation from the design standard of 1%/0.5% AEP, plus climate change, plus freeboard, needs to be fully justified within the FRA and show an appropriate response to the flood risk present and to be agreed with Carlow County Council engineers and planners. However, in County Carlow there are limited locations where formal (non-agricultural) flood defences are present.

7.4 Development in Flood Zone C

Where a site is within Flood Zone C but adjoining or in close proximity of a watercourse, there could be a risk of flooding associated with factors such as future scenarios (climate change), blocking of a bridge or culvert or other residual risk. Risk from sources other than fluvial and coastal must also be addressed for all development in Flood Zone C, including groundwater flooding and/or flooding associated with stormwater deficiencies, restrictions or blockages. As a minimum in such a scenario, an assessment of flood risk should be undertaken which will screen out possible sources of flood risk and where they cannot be screened out it should present mitigation measures. The most likely mitigation measure will involve setting finished floor levels to a height that is above the 1% AEP fluvial event level, with an allowance for climate change and freeboard, or to ensure a step up from road level to prevent surface water ingress. Design elements such as channel maintenance or trash screens may also be required. Evacuation routes in the event of inundation of surrounding land should also be detailed.

Guidance for the assessment of surface water risk is provided in Section 7.6.

The impacts of climate change should be considered for all proposed developments. A development which is currently in Flood Zone C may be shown to be at risk when an allowance for climate change is applied. Details of the approach to incorporating climate change impacts into the assessment and design are provided in Section 7.8.

7.5 Water compatible uses in Flood Zone A or B

Water compatible uses can include the non-built environment, such as open space, agriculture and green corridors which are appropriate for Flood Zone A and B and are unlikely to require a flood risk assessment. However, there are numerous other uses which are classified as water compatible, but which involve some kind of built development, such as lifeguard stations, fish processing plants and other activities requiring a waterside location. In other situations, works to an area of open space may result in changes to the topography which could lead to loss in flood plain storage and/or impacts on flood conveyance. The Justification Tests are not required for such development, but an appropriately detailed flood risk assessment is required. This should consider mitigation measures such as development layout and finished floor levels, access, egress and emergency plans. In line with other highly vulnerable development, sleeping accommodation at basement or ground floor level will not be permitted. Climate change and other residual risks should also be considered within the SSFRA.

7.6 Drainage Impact Assessment

All proposed development, including that in Flood Zone C, must consider the impact of surface water flood risks on drainage design.

There are extensive networks of surface water runoff routes across the settlement, with areas vulnerable to ponding indicated on the Flood Zone Maps. Particular attention should be given to development in low-lying areas which may act as natural ponds for collection of runoff. The council are currently undertaking a review of the surface water systems and the results of this assessment should inform site drainage design as they are available.

The drainage design shall ensure no increase in flood risk to the site, or the downstream catchment. Reference should be made to the relevant policies in the Development Plan and any forthcoming Surface Water Strategy for details of the assessment process.

Master planning of development sites should ensure that existing flow routes are maintained, through the use of green infrastructure. Where possible, and particularly in areas of new development, floor levels should at a minimum be 300mm above adjacent roads and hard standing areas to reduce the consequences of any localised flooding. Where this is not possible, an alternative design appropriate to the location may be prepared.

7.7 Requirements for a Flood Risk Assessment

An appropriately detailed flood risk assessment will be required in support of all planning applications. The level of detail will vary depending on the risks identified and the proposed land use. As a minimum, all proposed development, including that in Flood Zone C, must consider the impact of surface water flood risks on drainage design. In addition, flood risk from sources other than fluvial and tidal should be reviewed.

For sites within Flood Zone A or B, a site specific "Stage 2 - Initial FRA" will be required and subject to the outcome may need to be developed into a "Stage 3 - Detailed FRA". The extents of Flood Zone A and B are delineated through this SFRA. However, future studies may refine the extents (either to reduce or enlarge them) and proposed variations to the Flood Zones should be discussed with Carlow County Council.

An assessment of the risks of flooding should accompany applications to demonstrate that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities, particularly for operation and maintenance activities by Carlow County Council and OPW. Where possible, the design of built elements in these applications should demonstrate principles of flood resilient design (See Section 4 - Designing for Residual Flood Risk of the Technical Appendices to the DoECLG Flooding Guidelines). Emergency access must be considered, as in many cases flood resistance (such as raised finished floor levels and flood barriers) and retrofitting flood resilience features may be challenging in an existing building. Within the FRA the impacts of climate change and residual risk (including culvert/structure blockage) should be considered and remodelled where necessary, using an appropriate level of detail, in the design of FFL. Further information on the required content of the FRA is provided in the Planning Guidelines.

Any proposal that is considered acceptable in principle shall demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test

for Development Management (where required), the proposal will demonstrate that appropriate mitigation and management measures are put in place.

7.7.1 Development in Defended Areas

Carlow is partially defended and in this case it should be noted that where a site or area is referred to as being defended for the purposes of determining flood mitigation it is assumed that the defences provide a minimum of the 1% AEP (fluvial) or 0.5% AEP (tidal) standard of protection, and have been through a formal detailed design process and approved by OPW or Carlow County Council. Informal defences, which may only be at an agricultural standard, or those developed under the minor works scheme which may provide a lesser standard of protection, are not considered to provide a robust enough standard of protection to allow a moderation in the flood risk mitigation required at a site. The understanding of risks of developing behind defences needs to be explored in the site specific FRA and this has been discussed in detail under the Justification tests presented in Appendix A.

7.7.2 Checklist for Applications for Development in Areas at Risk of Flooding

This section applies to both highly and less vulnerable development in Flood Zone A and highly vulnerable development in Flood Zone B that satisfy the following:

- Meet the definition of Minor Development; or
- Have passed the Justification Test for Development Plans and be able to pass the Justification Test for Development Management to the satisfaction of the Planning Authority.
- The following checklist is required for all development proposals:
- The SSFRA be carried out by an appropriately qualified Engineer with relevant FRA experience (as deemed acceptable by the Planning Authority), in accordance with the Carlow County Council SFRA and the Planning Guidelines.
- Demonstration that the specific objectives or requirements for managing flood risk set out in Section 8 of this SFRA have been complied with, including an assessment of residual risks.
- Preparation of access, egress and emergency plans which are appropriate to the source of flooding and lead time to issue a warning, vulnerability of the development and its occupiers, the intensity of use and the level of flood risk.
- An assessment of the potential impacts of climate change and the adaptive capacity of the development.
- Compliance with C753 CIRIA SUDS guide, GDSDS and inclusion of SuDS.

7.8 Climate Change

In all developments, climate change should be considered when assessing flood risk and in particular residual flood risk. Climate change may result in increased flood extents and therefore caution should be taken when zoning lands in transitional areas (i.e. on the edge of the floodplain). Consideration of climate change is particularly important where flood alleviation measures are proposed, as the design standard of the proposal may reduce significantly in future years due to increased rainfall and river flows (sea levels are not a pertinent consideration in Carlow).

The 'Planning System and Flood Risk Management' recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. A significant amount of research into climate change has been undertaken on both a national and international front, and updates are ongoing.

Advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW Climate Change Sectoral Adaptation Plan. Two climate change scenarios are considered; these are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "extreme" future scenario at the upper boundaries of future projections. Based on these two scenarios the OPW recommended allowances for climate change are given in the table below. These climate change allowances are particularly important at the development management

stage of planning and will ensure that proposed development is designed and constructed to take into account best current knowledge.

Table 7-1: Allowances for Future Scenarios (100-year Time Horizon)

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500mm	+1000mm
Land Movement	-0.5mm / year*	-0.5mm / year*
Urbanisation	No General Allowance - Review on Case by Case Basis	No General Allowance - Review on Case by Case Basis
Forestation	-1/6 Tp**	-1/3 Tp**+10% SPR***

Notes:

* Applicable to the southern part of the country only (Dublin - Galway and south of this)

** Reduce the time to peak (Tp) by a third; this allows for potential accelerated runoff that may arise as a result of drainage of afforested land.

*** Add 10% to the Standard Percentage Runoff (SPR) rate; this allows for increased runoff rates that may arise following felling of forestry

Through the CFRAM Study, both MRFS and HEFS model runs have been completed on all study watercourses, providing flood extent and depth maps. This information can be used to support flood risk assessments.

For watercourses that are not part of the CFRAM programme, fluvial flood extents can be qualitatively assessed by using the Flood Zone B outline as a surrogate for 'Flood Zone A with allowance for the possible impacts of climate change', as suggested in the 'Planning System and Flood Risk Management'. Quantitative assessment of risks may require an additional model run to fully understand risks.

For most development, including residential, nursing homes, shops and offices, the medium-range future scenario (20% increase in flows) is an appropriate consideration. This should be applied in all areas that are at risk of flooding (i.e. within Flood Zone A and B) and should be considered for sites which are in Flood Zone C but are adjacent to Flood Zone A or B. This is because land which is currently not at risk may become vulnerable to flooding when climate change is taken into account.

Where the risk associated with inundation of a development is low and the design life of the development is short (typically less than 30 years) the allowance provided for climate change may be less than the 20% / 0.5m level. However, the reasoning and impacts of such an approach should be provided in the site-specific FRA.

Conversely, there may be development which requires a higher-level response to climate change. This could include major facilities which are extremely difficult to relocate, such as hospitals, airports, Seveso sites or power stations, and those which represent a high-economic and long-term investment within the scale of development across the county. In such situations it would be reasonable to expect the high-end future scenario (30% increase in flow) to be investigated in the site-specific FRA and used as the design standard.

In general, climate change will be accounted for the setting of finished floor levels to a height which includes an allowance for climate change. However, climate change may also reveal additional flow paths which need to be protected or give rise to flows which exceed culvert capacity or overtop defences. These outcomes will need to be specifically investigated for each site, and an appropriate response provided.

Further consideration to the potential future impacts of climate change is given for each settlement in Section 8.

7.9 Flood Mitigation Measures at Site Design

For any development proposal in an area at moderate or high risk of flooding that is considered acceptable in principle (i.e. has passed the Plan Making Justification Test), the site-specific FRA must demonstrate that appropriate mitigation measures can be put in place and that residual risks can be managed to acceptable levels. This may include the use of flood-resistant construction measures that are aimed at preventing water from entering a building and that mitigate the damage floodwater causes to buildings. Alternatively, designs for flood resilient construction may be adopted where it can be demonstrated that entry of floodwater into buildings is preferable to limit damage caused by floodwater and allow relatively quick recovery.

Various mitigation measures are outlined below and further detail on flood resilience and flood resistance are included in the Technical Appendices of the Planning Guidelines, The Planning System and Flood Risk Management.

7.9.1 Site Layout and Design

To address flood risk in the design of new development, a risk-based approach should be adopted to locate more vulnerable land use to higher ground while water compatible development i.e. car parking (with appropriate flood management plan) and recreational space can be located in higher flood risk areas.

The site layout should identify and protect land required for current and future flood risk management. Waterside areas or areas along known flow routes can be used for recreation, amenity and environmental purposes to allow preservation of flow routes and flood storage, while at the same time providing valuable social and environmental benefits.

7.9.2 Ground Levels, Floor Levels and Building Use

Modifying ground levels to raise land above the design flood level is a very effective way of reducing flood risk to the site. However, in most areas of fluvial flood risk, conveyance or flood storage would be reduced locally and could increase flood risk off site. There are a number of criteria which must all be met before this is considered a valid approach:

- Development at the site must have been justified through this SFRA based on the existing (unmodified) ground levels.
- The FRA should establish the function provided by the floodplain. Where conveyance is a prime function then a hydraulic model will be required to show the impact of its alteration.
- The land being given over to storage must be land which does not flood in the 1% AEP fluvial event (i.e. Flood Zone B or C).
- Compensatory storage should be provided on a level for level basis to balance the total area that will be lost through infilling where the floodplain provides static storage.
- The provision of the compensatory storage should be in close proximity to the area that storage is being lost from (i.e. within the same flood cell).
- The land proposed to provide the compensatory storage area must be within the ownership / control of the developer.
- The compensatory storage area should be constructed before land is raised to facilitate development.
- Compensatory storage is generally not required for loss of floodplain in locations behind defences.

In some sites it is possible that ground levels can be re-landscaped to provide a sufficiently large development footprint. However, it is likely that in other potential development locations there is insufficient land available to fully compensate for the loss of floodplain. In such cases it will be necessary to reconsider the layout or reduce the scale of development or propose an alternative and less vulnerable type of development. In other cases, it is possible that the lack of availability of suitable areas of compensatory storage mean the target site cannot be developed and should remain open space.

Raising finished floor levels within a development is an effective way of avoiding damage to the interior of buildings (i.e. furniture and fittings) in times of flood. Alternatively, assigning a water compatible use (i.e. garage / car parking) or less vulnerable use to the ground floor level, along with suitable flood resilient construction, is an effective way of raising vulnerable living space

above design flood levels. It can however have an impact on the streetscape. Safe access and egress is a critical consideration in allocating ground floor uses.

Depending on the scale of residual risk, resilient and resistance measures may be an appropriate response, but this will mostly apply to less vulnerable development.

7.9.3 Raised Defences

Construction of raised defences (i.e. flood walls and embankments) has traditionally been the response to flood risk. However, this is not a preferred option on an ad-hoc basis where the defences to protect the development are not part of a strategically led flood relief scheme. Where a defence scheme is proposed as the means of providing flood defence, the impact of the scheme on flood risk up and downstream must be assessed and appropriate compensatory storage must be provided.

7.9.4 Emergency Flood Response Plan

In some instances, and only when all parts both the Plan Making and Development Management Justification Tests have been passed, it may be necessary for an emergency flood response plan to be prepared to support other flood management measures within the context of a less vulnerable or water compatible development. An emergency response plan may be required to trigger the operation of demountable flood defences to a less vulnerable development, evacuation of a car park or closure of a business or retail premises.

The emergency plan will need to detail triggers for activation, including receipt of a timely flood warning, a staged response and to set out the management and operational roles and responsibilities. The plan will also need to set out arrangements for access and egress, both for pedestrians, vehicles and emergency services. The details of the plan should be based on an appropriately detailed assessment of flood risk, including speed of onset of flooding, depths and duration of inundation.

However, just because it is possible to prepare an emergency plan does not mean this is advisable or appropriate for the nature and vulnerability of development.

7.9.5 Nature based solutions / Green Infrastructure / SUDS

Measures can be taken that aim to retain water on the landscape during periods of high rainfall and flood by mimicking the functioning of a natural landscape, thereby reducing the magnitude of flood events and providing complementary ecosystem services. In general, nature-based measures aim to:

- Reduce the rate of runoff during periods of high rainfall;
- Provide flood storage in upper catchment areas; and
- Use natural materials and “soft” engineering techniques to manage flooding in place of “hard” engineering in river corridors.

Nature-based measures to control flooding typically focus on the use of porous surfaces in developments (Sustainable Urban Drainage Systems or SUDS), planting of native vegetation communities/assemblages that are tolerant of both wet and dry conditions and reversing the impacts of over-engineered river corridors (river restoration) to reduce the peak of flood events by mimicking the function of a natural catchment landscape. In addition to providing flood relief benefits, nature-based solutions can provide an array of ecosystem services including silt and pollution control for runoff entering the river system, improved riparian and in-river habitats, localised temperature reduction during periods of extreme heat, reduced maintenance requirements in engineered systems, groundwater recharge, and carbon sequestration.

These measures can be implemented across an array of scales, for instance across a catchment as part of a wider flood relief scheme, or on a site-specific basis as part of a landscaping or green infrastructure plan. Nature-based solutions can provide flood mitigation benefits and ecosystem services across all scales if given adequate planning and should be considered during the site layout and design stages of a development. The Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document (2022) provides guidance in making appropriate planning and design decisions to incorporate nature based solutions and climate change adaptation to urban spatial planning.

The drainage design shall ensure no increase in flood risk to the site, or the downstream catchment. Reference should be made to the CCDP and Carlow Graiguecullen JULAP for further policy and objectives. Considerable detail on the process and design of SuDS is also provided in C753, the Dublin SuDS Manual and the Greater Dublin Strategic Drainage Study.

7.9.6 Green Corridor

It is recommended that, where possible, and particularly where there is greenfield land adjacent to the river, a 'green corridor', is retained on all rivers and streams. This will have a number of benefits, including:

- Retention of all, or some, of the natural floodplain;
- Potential opportunities for amenity, including riverside walks and public open spaces;
- Maintenance of the connectivity between the river and its floodplain, encouraging the development of a full range of habitats;
- Natural attenuation of flows will help ensure no increase in flood risk downstream;
- Allows access to the river for maintenance works;
- Retention of clearly demarcated areas where development is not appropriate on flood risk grounds, and in accordance with the Planning System and Flood Risk Management.

The width of this corridor should be determined by the available land, and topographically constraints, such as raised land and flood defences, but would ideally span the fully width of the floodplain (i.e. all of Flood Zone A).

8 Settlement Zoning Review

The purpose of land use zoning objectives is to indicate to property owners and members of the public the types of development the Planning Authority considers most appropriate in each land use category. Zoning is designed to reduce conflicting uses within areas, to protect resources and, in association with phasing, to ensure that land suitable for development is used to the best advantage of the community as a whole.

This section of the SFRA will:

- Outline the strategic approach to flood risk management.
- Consider the land use zoning objectives utilised within Carlow and assess their potential vulnerability to flooding.
- Based on the associated vulnerability of the particular use, a clarification on the requirement of the application of the Justification Test is provided.
- The consideration of the specific land use zoning objectives and flood risk will be presented for the settlements. Comment will be provided on the use of the sequential approach and justification test. Conclusions will be drawn on how flood risk is proposed to be managed in the settlement.

8.1 A Strategic Approach to Flood Risk Management

A strategic approach to the management of flood risk is important in Carlow as the risks are varied, with scales of risk and vulnerability varying across the settlement.

Following the Planning Guidelines, development should always be located in areas of lowest flood risk first, and only when it has been established that there are no suitable alternative options should development (of the lowest vulnerability) proceed. Consideration may then be given to factors which moderate risks, such as defences, and finally consideration of suitable flood risk mitigation and site management measures is necessary.

It is important to note that whilst it may be technically feasible to mitigate or manage flood risk at site level, strategically it may not be a sustainable approach.

A summary of flood risks associated with each of the zoning objectives has been provided in the following settlement reviews. The Flood Risk commentary indicates whether a certain land zoning, in Flood Zone A or B, will need to have the Plan Making Justification Test (JT) applied and passed.

When carrying out a site-specific FRA, or when planning applications are being considered, it is important to remember that not all uses will be appropriate on flood risk grounds, hence the need to work through the Justification Test for Development Management on a site by site. For example, a Town Centre zoning objective can include for an integrated mix of residential, commercial, community and social uses which have varying vulnerabilities and would not be equally permissible within Flood Zone A and B.

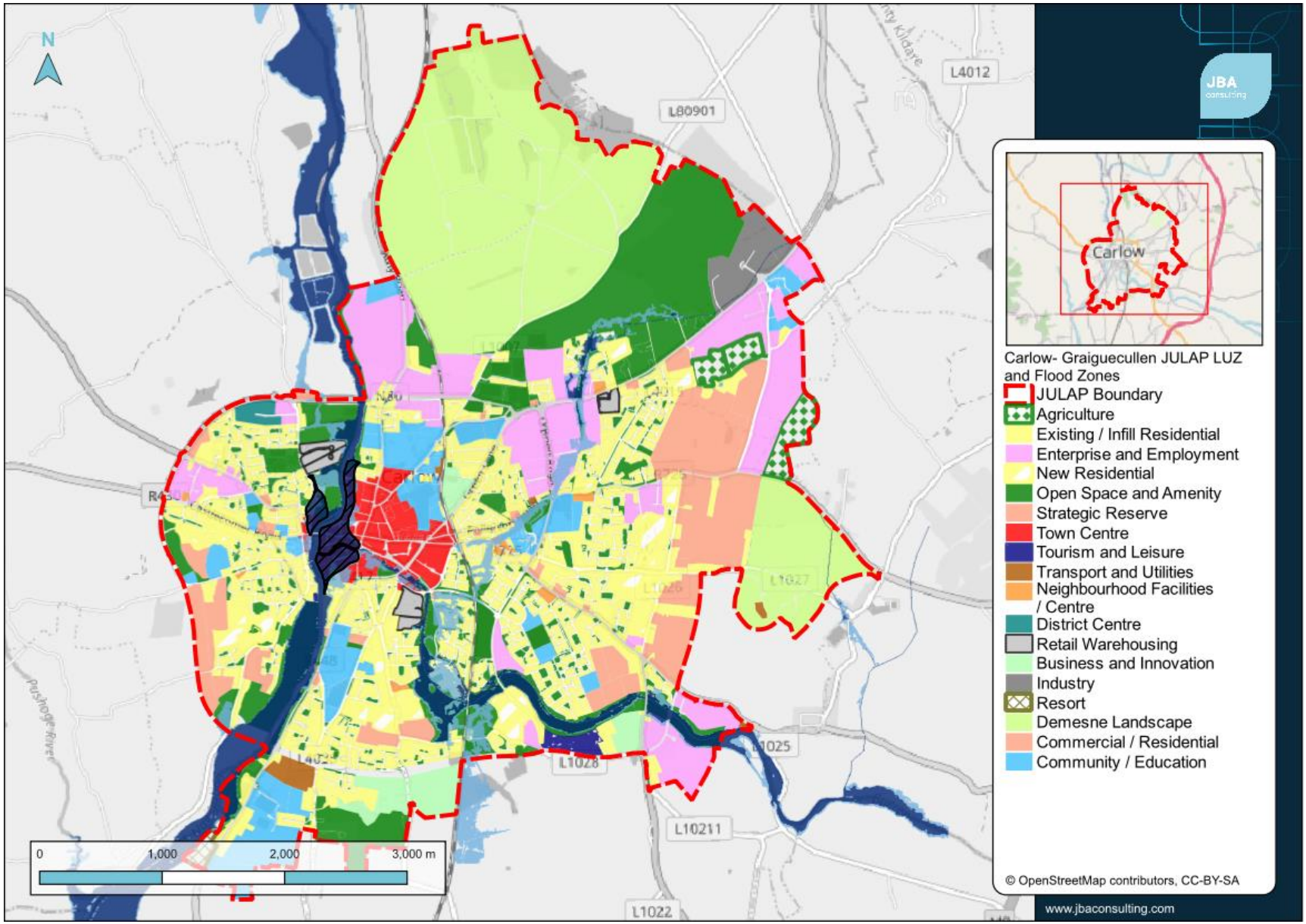
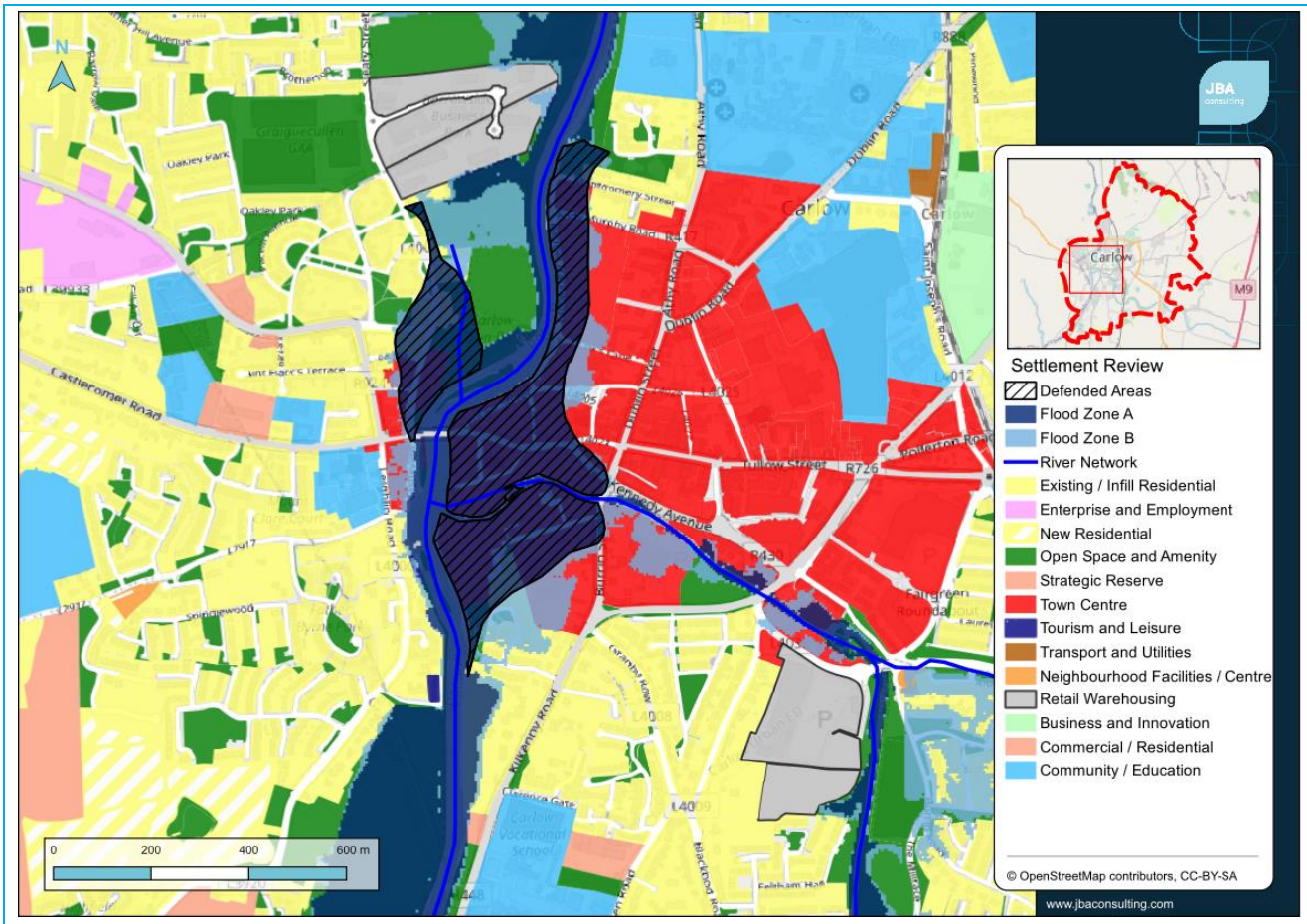


Figure 8-1 Carlow-Graiguecullen JULAP with flood zones

The following sections review the land use zoning objectives for each settlement area within the plan and provide a comprehensive summary of flood risk and justification where necessary.

8.2 Town Centre



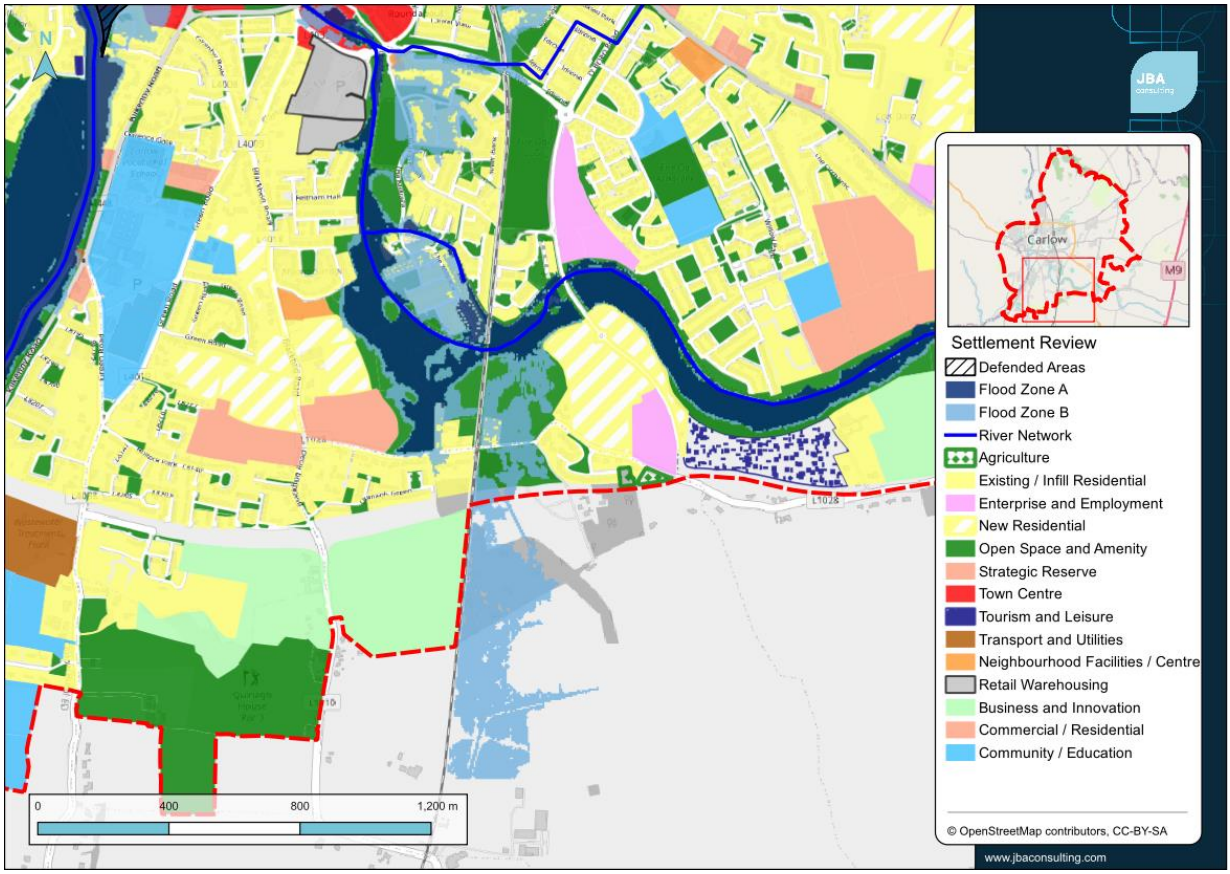
© OpenStreetMap contributors, CC-BY-SA,

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	Carlow is subject to an existing flood relief scheme which protects significant areas of Town Centre zoning from the River Barrow. Defences (retaining walls) were constructed along the River Barrow and Burrin River. This scheme defends Carlow town centre up to, and including, the 1% AEP event.
Historic Flooding	Several areas of Carlow Town have flooded in the past but a relief scheme now protects central areas of the town.
Comment	Defended Flood Zone A and areas of Flood Zone B impact Town Centre, Existing/Infill Residential, Residential, Retail Warehousing, and Open Space and Amenity.
Climate Change	Low sensitivity to climate change, little difference between 1 in 1000 year current and high end future scenario.
Conclusion	The town centre area is subject to regeneration plans which are formalised under the Carlow 2040 masterplan and allow consolidation of development, the Justification Test has been applied and passed. These areas include the former Celtic Linen Site and the Pembroke District. For both sites it is a suitable opportunity to apply nature based surface water management in line with SG P2 and the DHLGH Best Practice Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. Both sites are protected by the Carlow FRS and future development in these

	areas can develop within the defended Flood Zone A and Flood Zone B. Due to the presence of the defences ground levels can be raised appropriately to achieve the design FFL for the type of development proposed, without the need for compensatory storage. All development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and within Appendix A.1.1 and A.1.2, development must specifically address the following: • The Masterplan should be subject to an appropriately detailed FRA that finalises the design flood levels and mitigation approach; • The FRA should address climate change scenarios in relation to FFLs; • Basement levels are permitted, but no highly vulnerable development would be permitted on this level and the access point to the basement and any vents/opes should be above the design flood level including freeboard; • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. Other defended areas of the Town Centre are managed in a similar way and this is set out in Appendix A.1.3. Elsewhere in the Town Centre there are existing developed lands (principally residential), some of which do not benefit from the flood defences, where this is the case there are restrictions placed on new development in order to apply and pass the Justification Test. This is defined further under Appendix A.1.4, and is on the basis that within areas not benefitting from the FRS (undefended) development is; • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and the further measures outlined under Appendix A.1.5. Where there is also some undefended residential zoned land (Barrowville) a similar approach has been applied and this is detailed under Appendix A.1.5. The Retail Warehousing lands adjacent to the Burrin River are also at potential risk and are undefended but are a lower vulnerability class. Any future planning applications for extensions/refits/change of use should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and the guidance provided under Appendix A.1.6.

8.3 Mill Race/Springfield Area

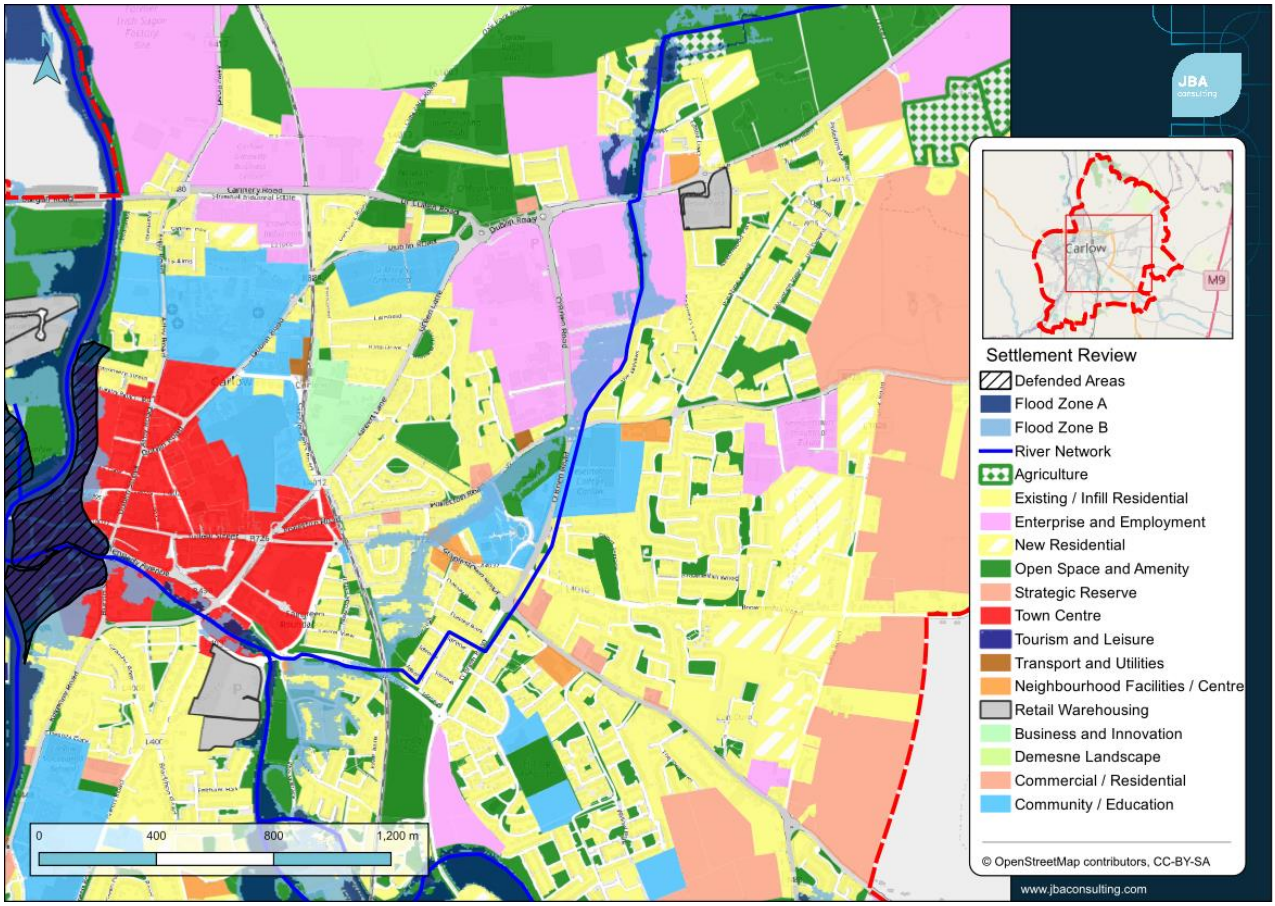


The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	None present in this area.
Historic Flooding	Burrin Paupish Lane has reported to flood in the past.
Comment	Much of the risk is limited to existing developments and open space. There is fluvial risk to Existing Residential/Infill, Neighbourhood Facilities/Centre, and Open Space. The Justification test has been applied and passed for those parts of Existing Residential/Infill adjacent to the core and Neighbourhood Facilities/Centre.
Climate Change	Moderate sensitivity to climate change in the south of the area. Care should be taken here in the area zoned for Business and Innovation.
Conclusion	The Justification Test for Existing Residential (see Appendix A.2.1) is passed on the basis that development is: • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • There are to be no bedrooms on the ground floor when extending existing residential property in Flood Zone A/B. Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the points detailed in Part 3 of the JT under Appendix A.2.1. The Justification Test was also applied for Neighbourhood Facilities/Centre Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning (see Appendix A.2.2):

	Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • The sequential approach should be applied and built development should preferably be located in Flood Zone C; • Flood Zone A would principally be suitable for playing pitches/water compatible use only; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy. Elsewhere in the area, risk can be managed in line with CCC approved policy and the guidance provided within Section 7 of this SFRA.

8.4 Knockane Stream downstream of Castle Oaks



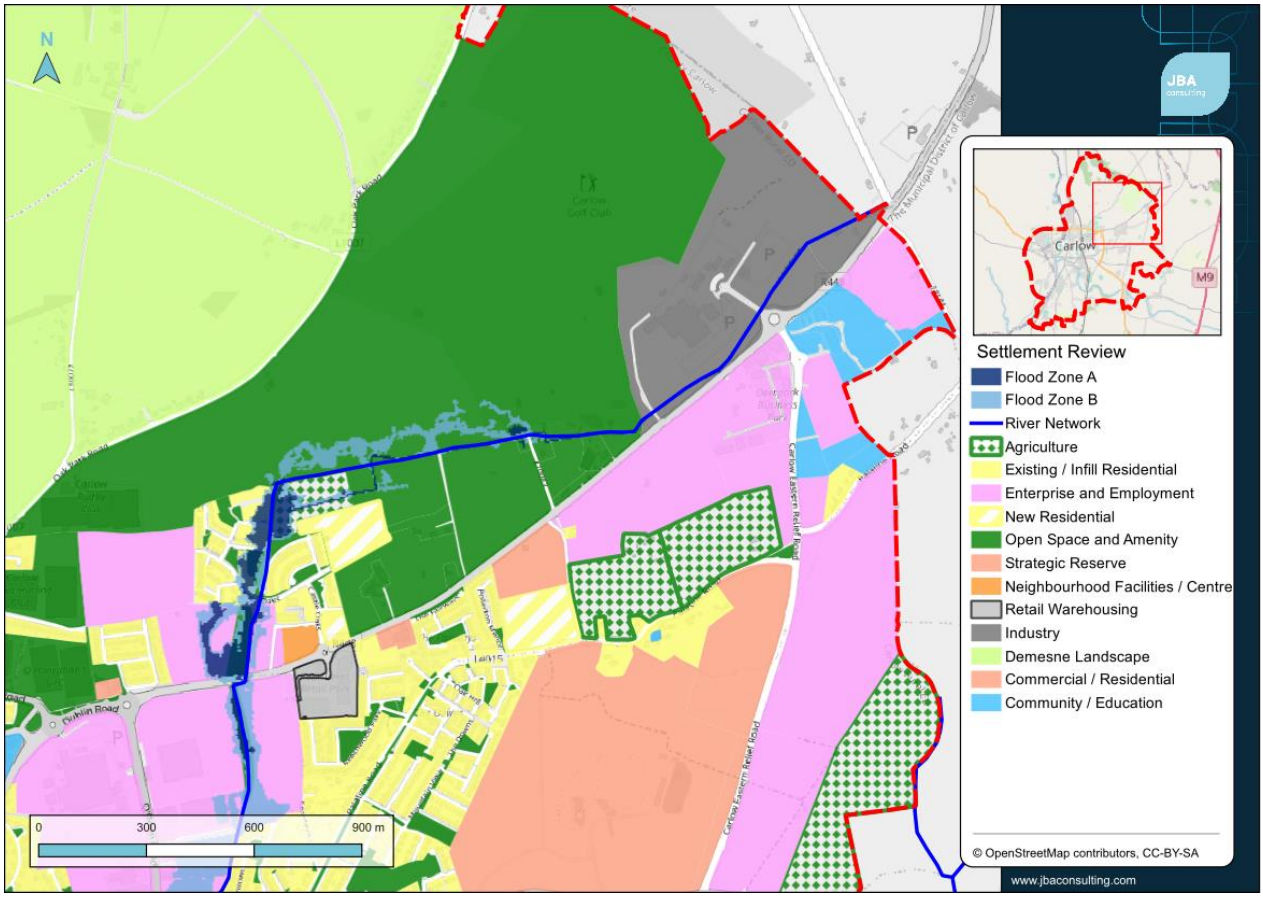
© OpenStreetMap contributors, CC-BY-SA,

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	No flood risk scheme present.
Historic Flooding	There has been reports of recurring flooding here at Askagh drive.
Comment	There is a risk of flooding along the Knocknagee Stream during a 1 in 1000 year event. Flooding is due to the Knocknagee Stream entering a culvert which surcharges at the 0.1% AEP. Risk is limited to Existing/Infill Residential, Community/Education, Neighbourhood Facilities/Centre, Commercial/Residential and Open Space and Amenity.
Climate Change	Low sensitivity to climate change, little difference between 1 in 1000 year current and high end future scenario.
Conclusion	Most of the risk is to existing developments and since the area is not within or adjacent to the core town centre the Justification Test cannot pass. On this basis flood risk must be managed in accordance with the sequential approach and Section 5.28 of the Planning Guidelines. As such the following is recommended: For Existing/Infill Residential development must be; • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • There are to be no bedrooms on the ground floor. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA.

	For Community/Education any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • The sequential approach should be applied and built development should preferably be located in Flood Zone C; • Flood Zone A would principally be suitable for water compatible use only; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy. For Commercial/Residential any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • Any development shall also be required to be built in accordance with CCC SuDS Policy. • The sequential approach should be applied and Highly vulnerable elements of the site should be located in Flood Zone C, or appropriately mitigated; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. For Neighbourhood Facilities/Centre, any future development of the site should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • A Change of use to residential/high vulnerability use would not be appropriate at this location. • FRA should consider flood resistance and resilience measures for any less vulnerable development; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy. Elsewhere in the area, risk can be managed in line with CCC approved policy and the guidance provided within Section 7 of this SFRA.

8.5 Knockane Stream Castle Oaks



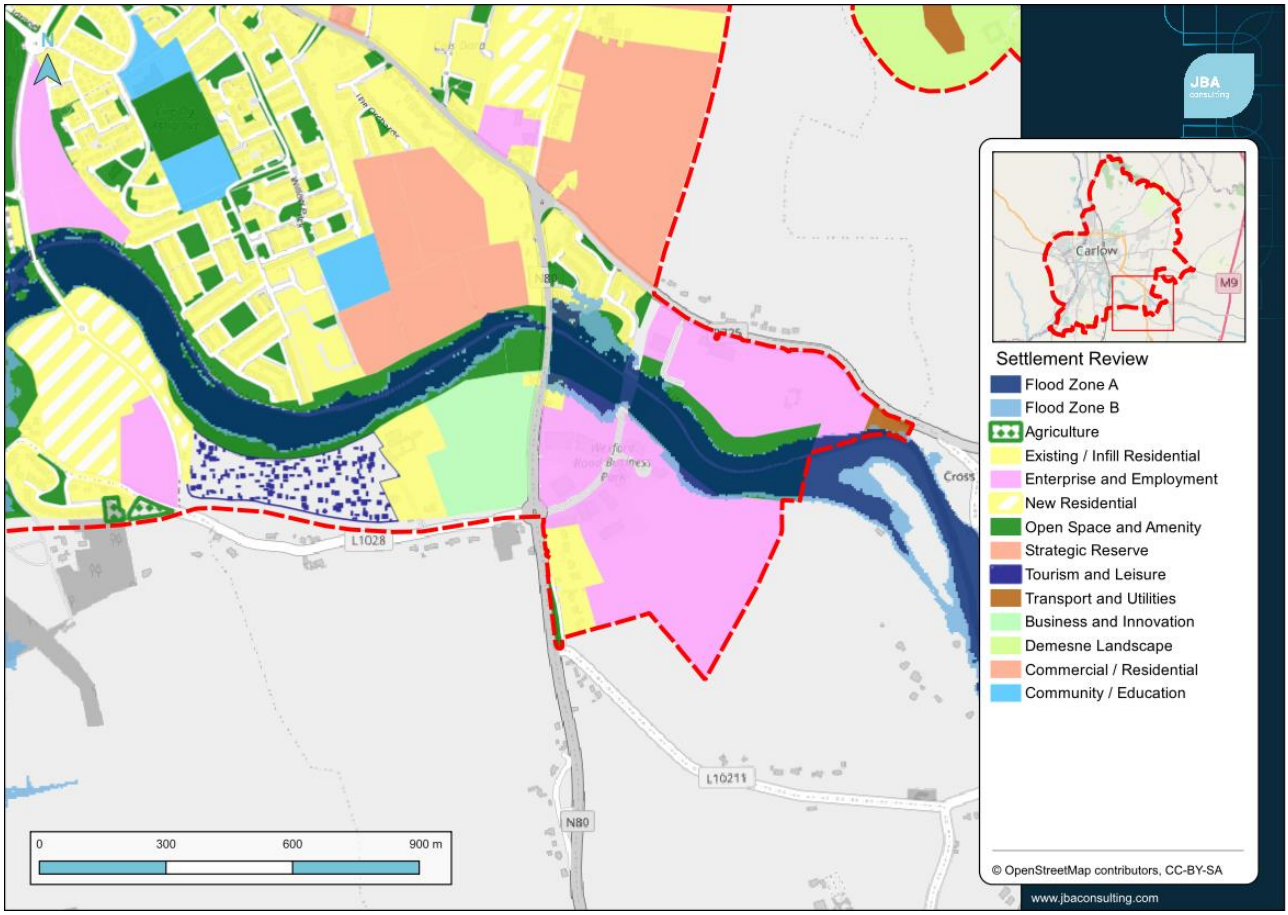
© OpenStreetMap contributors, CC-BY-SA,

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	None present in this area.
Historic Flooding	Area has historically flooded at Pollerton Big, Dr. Cullen Road, and areas along the Knockane Stream.
Comment	Risk of flooding is present in areas and along the banks of the Knockane stream. Risk is limited to Existing/Infill Residential, Enterprise and Employment, Agriculture and Open Space and Recreation.
Climate Change	Moderate sensitivity to climate change in area to the north of the Knockane stream.
Conclusion	Since the area is not within or adjacent to the core town centre the Justification Test cannot pass. On this basis flood risk must be managed in accordance with the sequential approach and Section 5.28 of the Planning Guidelines. As such the following is recommended: For the Enterprise and Employment lands any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • The sequential approach must be applied, and less vulnerable elements of the site should be located in Flood Zone B or preferably C; • Highly vulnerable development would only be suitable in Flood Zone C. • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Any development shall also be required to be built in accordance with

	CCC SuDS Policy. For Existing Residential development must be; • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • There are to be no bedrooms on the ground floor. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA. For Agriculture use then no less vulnerable development is appropriate within Flood Zone A. For other sites within the area risk must be managed in line with approved Policy and the guidance provided within Section 7 of this SFRA.

8.6 Burrin River south of Tullow Road



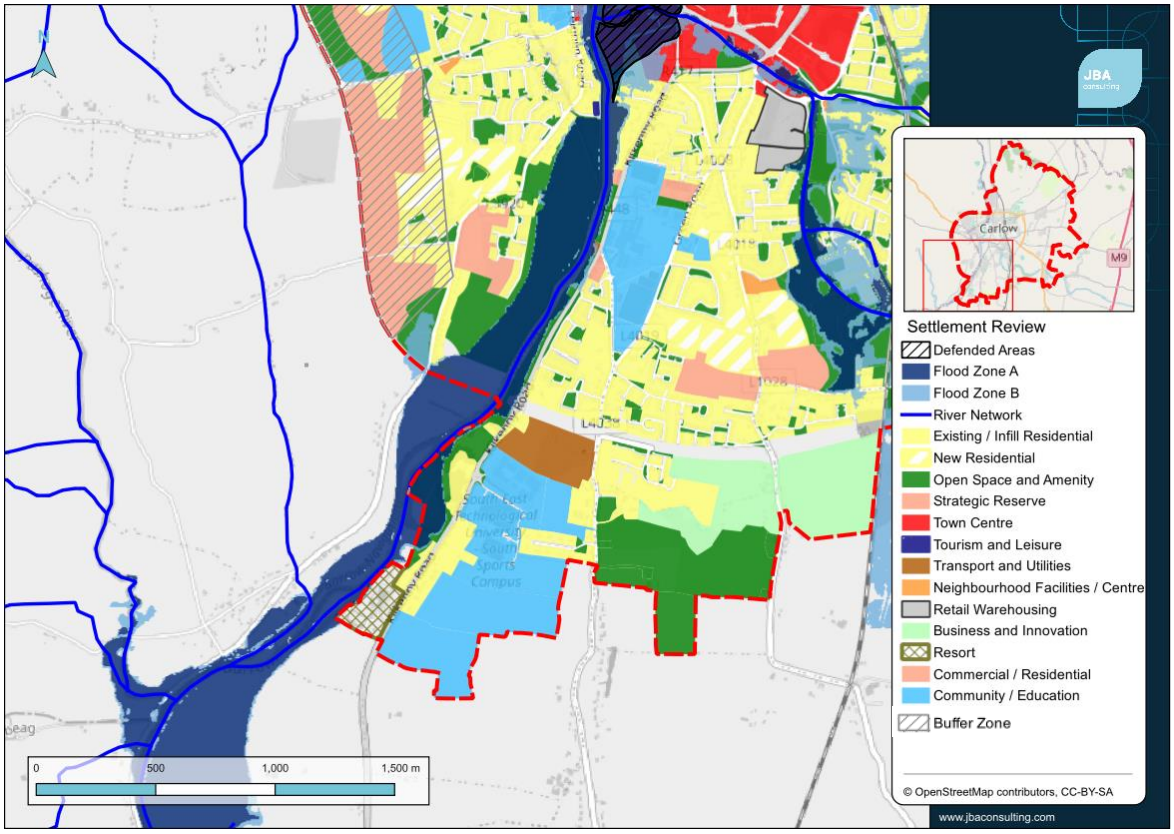
© OpenStreetMap contributors, CC-BY-SA,

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	No flood risk scheme present.
Historic Flooding	Flooding has occurred here at Ballinacarrig and on the N80.
Comment	Risk in this area is primarily present in water compatible areas. Risk is limited to Existing/Infill Residential, Open Space and Amenity, Strategic Reserve, Transport and Utilities and Enterprise and Employment.
Climate Change	Low sensitivity to climate change, little difference between 1 in 1000 year current and high end future scenario.
Conclusion	Most of the risk is limited to existing developments and since the area is not within or adjacent to the core town centre the Justification Test cannot pass. On this basis flood risk must be managed in accordance with the sequential approach and Section 5.28 of the Planning Guidelines. As such the following is recommended: For Existing Residential; • Development within Flood Zone A/B must be limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • There are to be no bedrooms on the ground floor. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA. Risk to existing Transport and Utilities lands comprising of a water treatment

	plant, can be managed on the basis that any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 7of the SFRA, and must specifically address the following: • The sequential approach should be applied and Highly vulnerable elements of the site should be located in Flood Zone C, or raised/bunded/protected; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy. For Enterprise & Employment any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • Existing flood data is indicative and does not provide flood levels. An appropriately detailed hydraulic model will be required to confirm flood levels and extents. • The sequential approach should be applied and Highly vulnerable elements of the site should be located in Flood Zone C, or appropriately mitigated; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with SG P2 and the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. For Strategic Reserve there should be no development within the lifetime of the plan within Flood Zone A/B. For other sites within the area manage risk in line with approved Policy and the guidance provided within Section 7 of this SFRA.

8.7 Barrow Kilkenny Road (east of River Barrow)



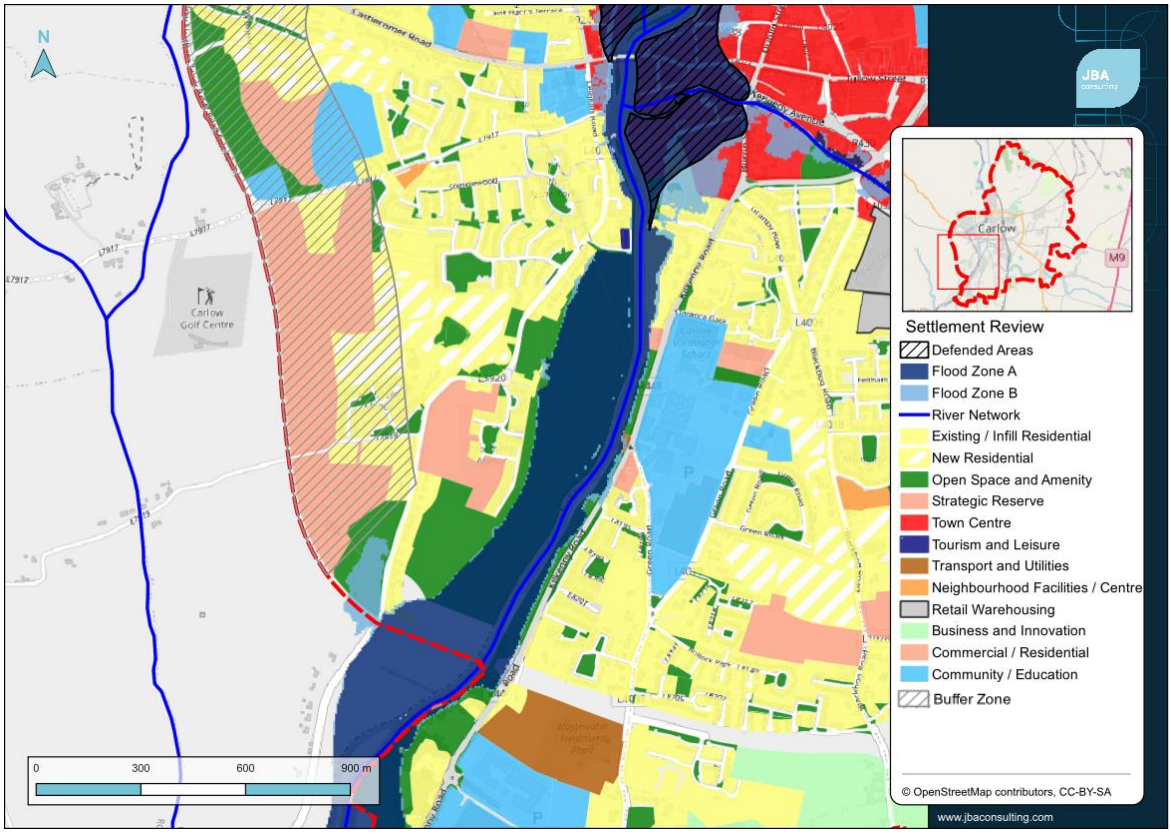
© OpenStreetMap contributors, CC-BY-SA,

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	No flood risk scheme present.
Historic Flooding	Reports of flooding along the Kilkenny Road due to Barrow overtopping.
Comment	Risk is moderate and located along the banks of the Barrow. Risk is limited to Existing/Infill Residential, Resort and Open Space and Amenity.
Climate Change	Low sensitivity to climate change, little difference between 1 in 1000 year current and high end future scenario.
Conclusion	Most of the risk is limited to existing developments and since the area is not within or adjacent to the core town centre the Justification Test cannot pass. On this basis flood risk must be managed in accordance with the sequential approach and Section 5.28 of the Planning Guidelines. As such the following is recommended: For Existing Residential development must be; • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • There are to be no bedrooms on the ground floor. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA. The risk to existing Resort can be managed by following the sequential approach and avoiding less or highly vulnerable development in Flood Zone A and B and according to recommendations contained in Section 7, include: • Flood Zone B would principally be suitable for water compatible use only; • There are to be no bedrooms on the ground floor.

	• FRA should address climate change scenarios in relation to operational levels and potential mitigation measures. For other sites within the area manage risk in line with approved Policy and the guidance provided within Section 7 of this SFRA.

8.8 Graiguecullen South (west of River Barrow)



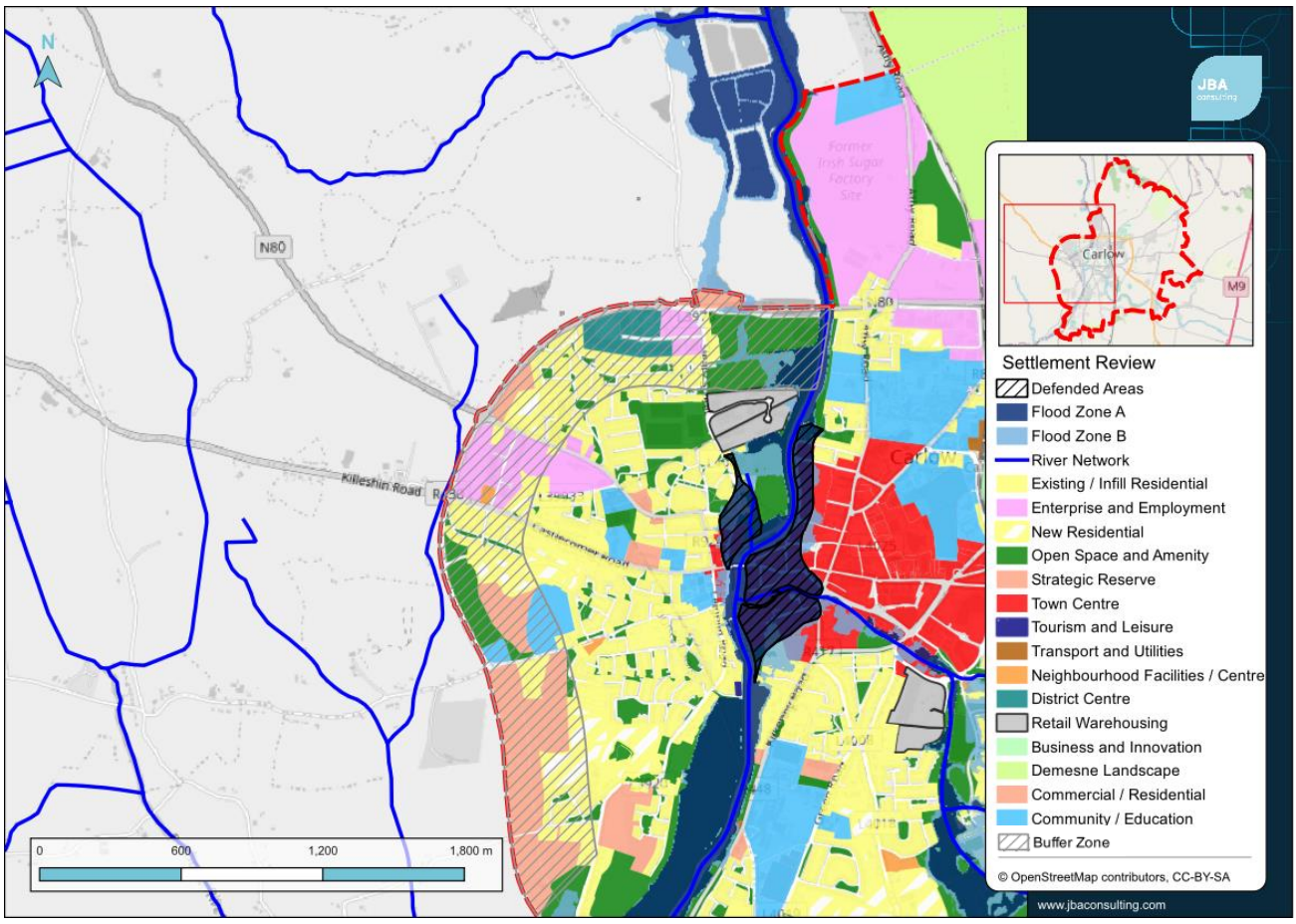
© OpenStreetMap contributors, CC-BY-SA,

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	No Flood Relief Scheme present.
Historic Flooding	Reports of flooding in Graiguecullen due to River Barrow overtopping.
Comment	Risk here is related to the Barrow. The risk to Existing/Infill Residential.
Climate Change	Low sensitivity to climate change, little difference between 1 in 1000 year current and high end future scenario.
Conclusion	The Derrymoyle Stream is currently an unmapped watercourse that runs outside the settlement boundary to the west. Due to this it is recommended that a Stage 3 Detailed FRA for any planning applications within 350m from the boundary is undertaken. The FRA must specifically model the impacts of the Derrymoyle Stream. Since the area of Graiguecullen South is not within or adjacent to the core town centre the Justification Test cannot pass. On this basis flood risk must be managed in accordance with the sequential approach and Section 5.28 of the Planning Guidelines. As such the following is recommended. For Existing Residential within the established Flood Zone A/B or for Strategic Reserve, New Residential, Existing Residential and Community Education within the buffer area then development is managed by the following measures; • For potential developments within the 350m buffer zone or in the current Flood Zone A/B, an appropriately detailed hydraulic model will be required to confirm flood levels/extents within the newly defined Flood Zone A/B: ○ Development should be limited to extensions, renovations and change of use.

	○ Bedrooms should be located in the upstairs of two-story buildings when extending existing property. ○ Infill residential development and demolition and reconstruction can only take place in Flood Zone C. ○ An appropriately detailed FRA will be required which should follow the general guidance provided in Section 7 of the SFRA. For other sites within the area manage risk in line with approved Policy and the guidance provided within Section 7 of this SFRA.

8.9 Graiguecullen North West



© OpenStreetMap contributors, CC-BY-SA,

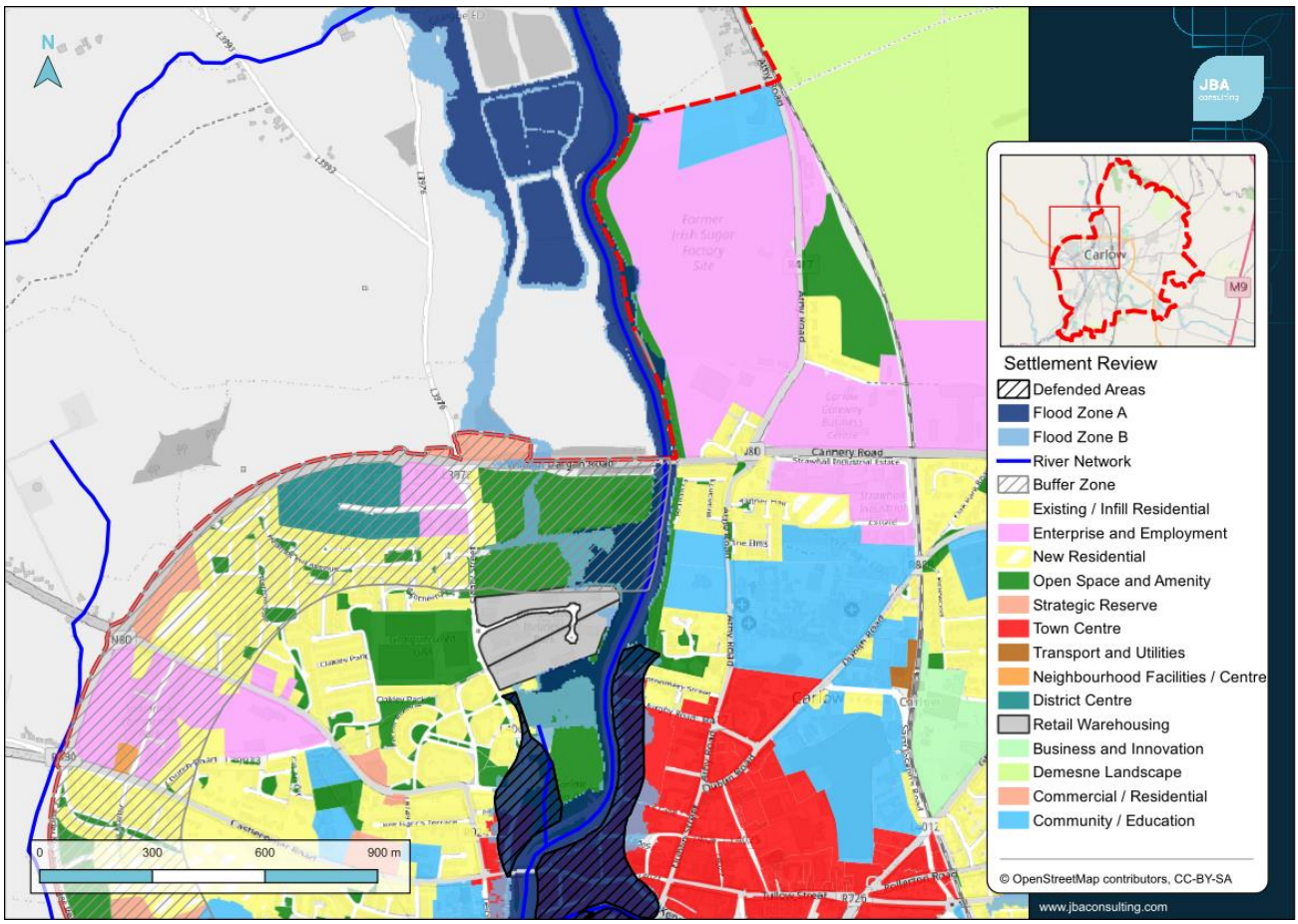
The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	No flood data.
Flood Relief Scheme	No Flood Relief Scheme present.
Historic Flooding	Reports of flooding in Graiguecullen due to River Barrow overtopping.
Comment	Potential risk here is related to the unmapped Derrymoyle stream and the Sleaty Stream flowing to the east, into the Barrow. There may be risk to adjacent lands, this is not likely to be significant but should be clarified at Development Management stage.
Climate Change	No Climate Change data
Conclusion	There are two unmapped watercourses in this area. The Derrymoyle Stream runs outside the settlement boundary to the west and the Sleaty stream flows in an easterly direction towards the Barrow to the north of the area. Due to the presence of these unmapped watercourses it is recommended that a Stage 3 Detailed FRA for any planning applications within 350m from the boundary is undertaken. The FRA must specifically model the impacts of the Derrymoyle Stream and any other local watercourses. Since the area of Graiguecullen West is not within or adjacent to the core town centre the Justification Test cannot pass. On this basis flood risk must be managed in accordance with the sequential approach and Section 5.28 of the Planning Guidelines. As such the following is recommended: For Existing Residential, development is managed by the following measures; • There is no existing flood data or levels. For potential developments

	within the 350m buffer zone or in the current Flood Zone A/B, an appropriately detailed hydraulic model will be required to confirm flood levels/extents within the newly defined Flood Zone A/B: o Development should be limited to extensions, renovations and change of use. o Bedrooms should be located in the upstairs of two-story buildings when extending existing property. o Infill residential development and demolition and reconstruction can only take place in Flood Zone C. o An appropriately detailed FRA will be required which should follow the general guidance provided in Section 7 of the SFRA. For the New Residential lands, since these are undeveloped it is a suitable opportunity to apply nature based surface water management in line with SG P2 and the DHLGH Best Practice Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. Development is managed by the following measures; • There is no existing flood data or levels. For potential developments within the 350m buffer zone or in the current Flood Zone A/B, an appropriately detailed hydraulic model will be required to confirm flood levels/extents within the newly defined Flood Zone A/B:: o Development should be limited to extensions, renovations and change of use. o Bedrooms should be located in the upstairs of two-story buildings when extending existing property. o Infill residential development and demolition and reconstruction can only take place in Flood Zone C. o An appropriately detailed FRA will be required which should follow the general guidance provided in Section 7 of the SFRA. For District Centre, any future development of the site should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • There is no existing flood data or levels. For potential developments within the 350m buffer zone or in the current Flood Zone A/B, an appropriately detailed hydraulic model will be required to confirm flood levels/extents within the newly defined Flood Zone A/B:: o A Change of use to residential/high vulnerability use would not be appropriate. o FRA should consider flood resistance and resilience measures for any less vulnerable development; o Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; o Any development shall also be required to be built in accordance with CCC SuDS Policy. For Retail Warehousing, any future development of the site should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • There is no existing flood data or levels. For potential developments within the 350m buffer zone or in the current Flood Zone A/B, an appropriately detailed hydraulic model will be required to confirm flood levels/extents within the newly defined Flood Zone A/B: • FRA should consider flood resistance and resilience measures for any less vulnerable development;

	• Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy. For Enterprise & Employment any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • There is no existing flood data or levels. For potential developments within the 350m buffer zone or in the current Flood Zone A/B, an appropriately detailed hydraulic model will be required to confirm flood levels/extents within the newly defined Flood Zone A/B:: o The sequential approach should be applied and Highly vulnerable elements of the site should be located in Flood Zone C, or appropriately mitigated; o FRA should consider flood resistance and resilience measures for any less vulnerable development; o Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; o Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. For Education and Community, any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • There is no existing flood data or levels. For potential developments within the 350m buffer zone or in the current Flood Zone A/B, an appropriately detailed hydraulic model will be required to confirm flood levels/extents within the newly defined Flood Zone A/B::: o The sequential approach should be applied and Highly vulnerable elements of the site should be located in Flood Zone C, or appropriately mitigated; o FRA should consider flood resistance and resilience measures for any less vulnerable development; o Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; o Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. For newly zoned Strategic Reserve Lands that are located to the north of the N80, these are in Flood Zone C but this to the east of the Sleaty Road are at potential risk of fluvial climate change. For future development then it would be most appropriate to consider water compatible uses, which is compatible with the uses permitted in principle for this zoning type. For other sites within the area manage risk in line with approved Policy and the guidance provided within Section 7 of this SFRA.

8.10 Graiguecullen North and Former Sugar Factory (east of River Barrow)



© OpenStreetMap contributors, CC-BY-SA,

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Flood Relief Scheme	No Flood Relief Scheme present.
Historic Flooding	No historical reports of flooding in this area.
Comment	Risk is related to the Barrow. There is limited overlap with Enterprise and Employment and Existing/Infill Residential. Much of the risk is within Open Space and Amenity.
Climate Change	Low sensitivity to climate change, little difference between 1 in 1000 year current and high end future scenario.
Conclusion	Since the area is not within or adjacent to the core town centre the Justification Test cannot pass. On this basis flood risk must be managed in accordance with the sequential approach and Section 5.28 of the Planning Guidelines. As such the following is recommended: For Existing Residential development risk is managed by the following measures within Flood Zone A/B; • Development limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • An appropriately detailed FRA will be required which should follow the general guidance provided in Section 7 of the SFRA.

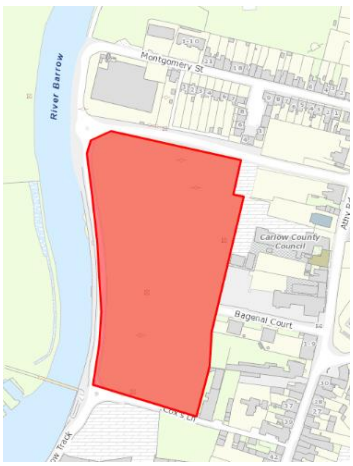
	For the Enterprise and Employment lands and Retail Warehousing any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • The sequential approach must be applied, and less vulnerable elements of the site should be located in Flood Zone B or preferably C; • Highly vulnerable development would only be suitable in Flood Zone C. • Any development shall also be required to be built in accordance with CCC SuDS Policy. • For the undeveloped Enterprise & Employment lands, it is a suitable opportunity to apply nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas. Elsewhere in the area, risk can be managed in line with CCC approved policy and the guidance provided within Section 7 of this SFRA.

Appendices

A Justification tests

A.1 Town Centre

A.1.1 Town Centre Redevelopment 1 including former Celtic Linen Site (lands immediately to north in flood zone but defended) - The Barrow Track



Site Description

The subject site is located in Carlow Town and includes a significant area for identified for regeneration. The western boundary of the site abuts the Barrow Track and River Barrow. To the north of the regeneration site is Andy Murphy Road, the former Celtic Linen plant, and existing housing fronting and accessed from Montgomery Street. To the east, are the offices of Carlow County Council and other commercial and retail development fronting Dublin Street and the Athy Road. Cox's Lane adjoins the southern boundary. The regeneration site was previously occupied by industrial and storage uses which have since been demolished and removed. The subject site presents a significant opportunity for new development at this location to strengthen the existing mixed uses in a town centre location in Carlow, increasing the service, residential and employment offering in the town.

1. The urban settlement is targeted for growth under the National Planning Framework, Regional Spatial and Economic Strategy (RSES), statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.

Regional Spatial and Economic Strategy: The Regional Spatial and Economic Strategy for the Southern Region 2020-2032 recognises the strategic role of Carlow Town which has been designated a Key Town within the region and as regional and inter-regional economic growth driver. Regional Policy Objective no 14 of the RSES specifically supports development of underused lands along the River Barrow as a strategic natural asset for the town. The growth strategy of the RSES supports the future development of Carlow Town and in particular the need for compact growth, regeneration, placemaking together with its role as an economic growth driver. Key provisions of the RSES which support development of Carlow Town include;

- Designation of Carlow Town as a Key Town to function as an economic self-sustaining regional driver and a focus of significant growth within the county. A population growth rate of more than 30% by 2040 relative to CSO 2016 baseline is targeted for Carlow Town. This entails also delivering important infrastructure and services, ensuring that it can grow as a successful regional employment centre and service hub. RPO 11 sets an objective for delivering population growth and infrastructure provision in Key Towns, as well as promoting sustainable transport, culture, placemaking, tourism development, education, sustainable development, and water infrastructure.
- Supporting town centre led regeneration in Carlow Town, and the development of underutilised lands with improvements to the public realm, investment in infrastructure together with sustainable transport solutions.

- Delivering new homes on urban infill and brownfield land within the town to support urban regeneration with at least 30% of all new homes targeted in settlements (other than the Cities and their suburbs) to be delivered within their existing built-up footprints. (RPO 35)
- Requirement for a coordinated planning framework (JULAP) for the Greater Carlow Urban area to strategically plan for the growth and development of the town, to identify and deliver strategic sites and regeneration areas for the future physical, economic and social development of Carlow Town in conjunction with Laois County Council.
- Supporting the strategic employment development potential of Carlow Town and facilitating economic integration between urban centres throughout the region including Tullow and Muine Bheag.
- Acknowledging the inter-regional role of Carlow town given its location to the north of the Southern Region and adjacent to the Eastern Midlands Regional Assembly region. Opportunities afforded to Carlow are noted as part of a network of regionally significant drivers of collaboration and growth located on the Waterford-Kilkenny-Carlow-Dublin M9/Rail Network/Axis.
- Identifying Carlow Town as an important regional centre of education and research, supporting the establishment of a Multi-Campus Technological University for the South East.

Carlow County Development Plan 2022-2028:

Carlow Town is designated as a Key Town (Tier 1 in the Settlement Hierarchy) in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, implementation of Project Carlow 2040, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level. The success of Carlow as a Key Town will be dependent on the delivery of targeted compact growth of a minimum of 30%, through regeneration and redevelopment of vacant, infill and/or brownfield sites. Carlow town is targeted to accommodate population growth of more than 30% by 2040 relative to CSO 2016 baseline. It is also an objective of the Plan to seek to build on existing economic attributes e.g. third level education provision, proximity to Dublin etc. and to secure continued investment in the town to support increased employment provision and expansion.

Project Carlow 2040, A Vision for Regeneration: Project Carlow 2040, A Vision for Regeneration, identifies the Barrow Track / Civic Spine as a key intervention area providing the opportunity to shape the town's future and deliver an exemplary model for sustainable compact growth in an urban environment. The vision for this area is to create a distinctive mixed-use quarter that brings the river back into the heart of the town centre as a key attribute. It acknowledges that Carlow's Riverfront will play a critical role in the future growth and expansion of the town, complementing other town centre uses, as well as providing connections to Carlow College, Carlow Railway Station, Carlow Castle and more.

Figure; Barrow Track / Civic Spine Regeneration Site

Layout Plan

2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:

i: Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;

The site is situated on land zoned 'Town Centre' in the Carlow Town Development Plan 2012-2018 (as extended) and as contained in the Joint Spatial Plan for the Greater Carlow Graiguecullen Urban Area 2012-2018. It is identified as an 'Opportunity Site' in Part 11, Section 3 of the Joint Spatial Plan as referred to above i.e. Opportunity Site 2: Barrow Track Site. It is the Policy of the Council to encourage the urban renewal and advancement of opportunity sites. The following policies, objectives and related provisions of the Plan are noted in this regard:

- It is a principle of the Carlow Town Development Plan Core Strategy to "Advance key opportunity sites by preparing development briefs or urban design frameworks". (Pg. 22)
- Objective CO3 seeks to "Present a schedule of landbanks within the Greater Urban Area which offer particular opportunities and are of strategic importance for the future development of the Greater Carlow Graiguecullen Urban Area, offering site briefs for each site".
- Carlow Town Objective CT04 seeks to "Promote the development of the River Quarter and Riverside Regeneration".
- Carlow Town Objective CT05 seeks to "Encourage specific urban renewal projects and advance opportunity sites".
- Policy CTP22 seeks to "Promote the development of opportunity sites with the River Quarter, subject to appropriate assessment, flood risk considerations as well as other general planning considerations".
- Policy CTP30 seeks to "Support the principle of redeveloping…Barrow Track Site (Opportunity Site 2)…".

The regeneration of this site is also supported in the Project Carlow 2040, A Vision for Regeneration as outlined above. It is a strategic objective of the Council (SO 3) as contained in the Carlow County Development Plan 2022-2028 *to support and promote the role of Carlow Town as a Regional and Inter-regional economic growth driver and to fulfil its role as a Key Town, focussed on regeneration, implementation of Project Carlow 2040, sustainable development, quality of life and economic investment.*

ii. **Comprises significant previously developed and/or under-utilised lands &;**
iii. Is within or adjoining the core of an established or designated urban settlement;

The site comprises a brownfield site and is a visually prominent tract of land with significant road frontage along the Barrow Track. Following significant clearance and groundworks, the site presents as a combination of old areas of hard standing / building floor slabs and overgrown stockpiles of soils. The site is located within the town centre and immediately adjoins the Core Retail Area of Carlow Town. It is highly accessible through existing established linkages e.g. Andy Murphy Road and Cox's Lane to Dublin Street and Tullow Street. The under-utilised brownfield site represents an appropriate expansion area for mixed use development facilitating compact development in a sequential manner.

iv. Will be essential in achieving compact and sustainable urban growth;

The subject site comprises a long-standing zoned town centre zoned site. It is considered that the development of this site is essential in realising the compact and sustainable growth of Carlow as it provides for a natural extension to the town centre on a previously developed site. It will enable the development of a new attractive neighbourhood to be developed with frontage to the River Barrow. The land presents the opportunity to expose the River and integrate it back into the public realm as part of a network of amenity areas within and surrounding the town. Opening up the river Barrow through the provision of enhanced walkways, new link streets and the potential for an additional pedestrian bridge will deliver significant benefits for an improved quality of life for residents of the town. Direct routes east and west across the River and through a proposed Civic Spine as well as south to the historic town centre and north to the Barrow way will enhance the quality of place and achieving compact and sustainable urban growth.

v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement;

The subject brownfield lands comprise a significant tract of town centre lands that could facilitate an integrated mixed use development within the town contributing to compact and sustainable urban growth. Alternative lands for the particular mixed-use development which is necessary to contribute to the regeneration of the town and sustainable compact growth are unavailable in areas at lower risk of flooding.

3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment.

The site is now protected to the 1% AEP standard by the Carlow Flood Relief Scheme. Protection is provided by the high level of the Barrow Track (road), rather than a discreet wall or embankment. Site levels adjacent to the road are lower than the road but increase in an easterly direction. A masterplan of the area has been provided under the Carlow 2040 document which has been used to guide the consideration of Part 3.

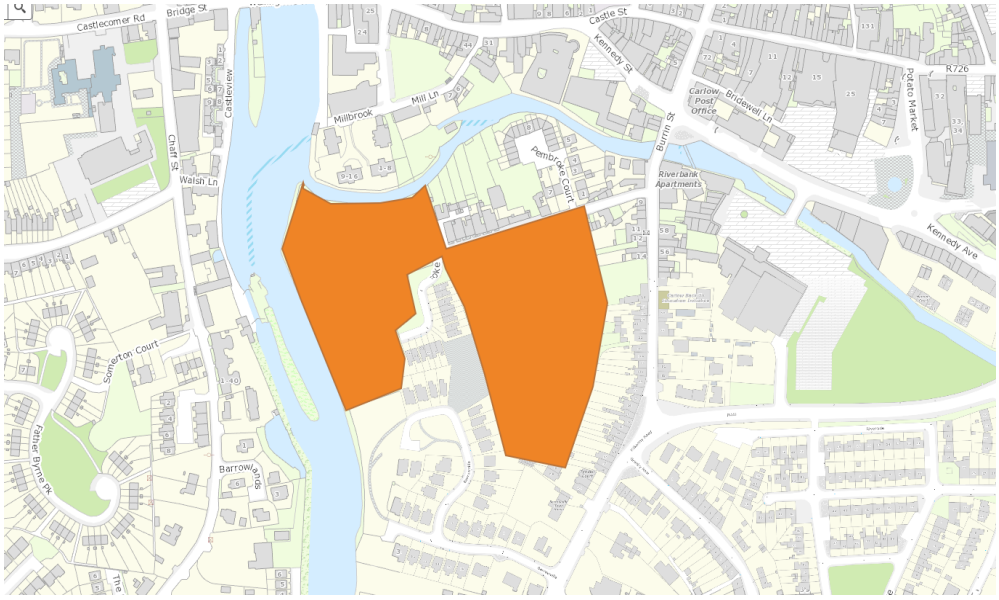
Parts 1 & 2 of the test found that it is considered appropriate to zone the lands as Town Centre.

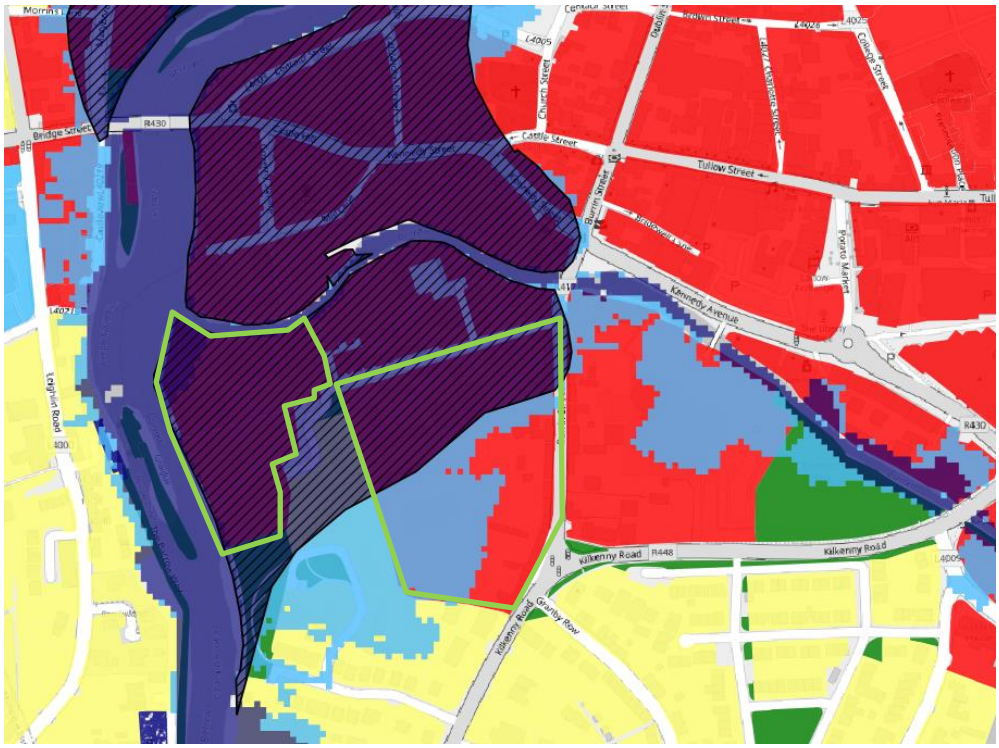
Future development in this area can develop within the defended Flood Zone A and Flood Zone B. Due to the presence of the defences ground levels can be raised appropriately to achieve the design FFL for the type of development proposed, without the need for compensatory storage. All development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following:

- The Masterplan should be subject to an appropriately detailed FRA that finalises the design flood levels and mitigation approach;
- The FRA should address climate change scenarios in relation to FFLs;
- Basement levels are permitted, but no highly vulnerable development would be permitted on this level and the access point to the basement and any vents/opes should be above the design flood level including freeboard;
- Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the

DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

A.1.2 Town Centre Redevelopment 2 - The Pembroke District





Site Description

The subject site is located in Carlow Town and has an area of c. 4ha. The site comprises of two under-utilised land parcels in the Pembroke District, the eastern parcel comprising former industrial land that includes a number of large semi-derelict sheds/warehouses and silos/tanks. The western boundary of the site abuts the River Barrow. To the north is the Burren River and existing housing along Pembroke Road. Located between the two land parcels are existing established residential areas of Barrowville and Pembroke. To the east, are mixed use properties which front Burrin Street. The subject site presents a significant opportunity for new development at this location to strengthen the residential uses in this town centre location in Carlow contributing to the vibrancy and vitality of the town centre.

1. The urban settlement is targeted for growth under the National Planning Framework, Regional Spatial and Economic Strategy (RSES), statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.

Regional Spatial and Economic Strategy: The Regional Spatial and Economic Strategy for the Southern Region 2020-2032 recognises the strategic role of Carlow Town which has been designated a Key Town within the region and as regional and inter-regional economic growth driver. Regional Policy Objective no 14 of the RSES specifically supports development of underused lands along the River Barrow as a strategic natural asset for the town. The growth strategy of the RSES supports the future development of Carlow Town and in particular the need for compact growth, regeneration, placemaking together with its role as an economic growth driver. Key provisions of the RSES which support development of Carlow Town include;

- Designation of Carlow Town as a Key Town to function as an economic self-sustaining regional driver and a focus of significant growth within the county. A population growth rate of more than 30% by 2040 relative to CSO 2016 baseline is targeted for Carlow Town. This entails also delivering important infrastructure and services, ensuring that it can grow as a successful regional employment centre and service hub. RPO 11 sets an objective for delivering population growth and infrastructure provision in Key Towns, as well as promoting sustainable transport, culture, placemaking, tourism development, education, sustainable development, and water infrastructure.
- Supporting town centre led regeneration in Carlow Town, and the development of underutilised lands with improvements to the public realm, investment in infrastructure together with sustainable transport solutions.
- Delivering new homes on urban infill and brownfield land within the town to support urban regeneration with at least 30% of all new homes targeted in settlements (other than the Cities and their suburbs) to be delivered within their existing built-up footprints. (RPO 35)
- Requirement for a coordinated planning framework (JULAP) for the Greater Carlow Urban area to strategically plan for the growth and development of the town, to identify and deliver strategic sites and regeneration areas for the future physical, economic and social development of Carlow Town in conjunction with Laois County Council.
- Supporting the strategic employment development potential of Carlow Town and facilitating economic integration between urban centres throughout the region including Tullow and Muine Bheag.
- Acknowledging the inter-regional role of Carlow town given its location to the north of the Southern Region and adjacent to the Eastern Midlands Regional Assembly region. Opportunities afforded to Carlow are noted as part of a network of regionally significant drivers of collaboration and growth located on the Waterford-Kilkenny-Carlow-Dublin M9/Rail Network/Axis.
- Identifying Carlow Town as an important regional centre of education and research, supporting the establishment of a Multi-Campus Technological University for the South East.

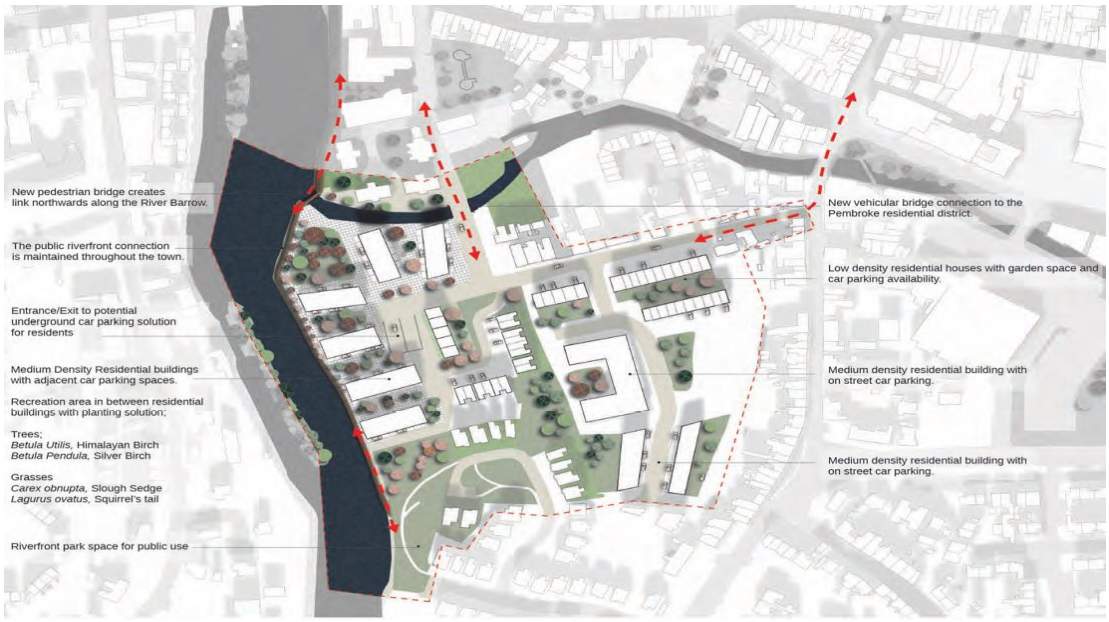
Carlow County Development Plan 2022-2028:

Carlow Town is designated as a Key Town (Tier 1 in the Settlement Hierarchy) in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, implementation of Project Carlow 2040, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level. The success of Carlow as a Key Town will be dependent on the delivery of targeted compact growth of a minimum of 30%, through regeneration and redevelopment of vacant, infill and/or brownfield sites. Carlow town is targeted to accommodate population growth of more than 30% by 2040 relative to CSO 2016 baseline. It is also an objective of the Plan to seek to build on existing economic attributes e.g. third level education provision, proximity to Dublin etc. and to secure continued investment in the town to support increased employment provision and expansion.

Project Carlow 2040, A Vision for Regeneration: Project Carlow 2040, A Vision for Regeneration identifies the Pembroke District as a key intervention area providing the opportunity to reimagine it as a new and vibrant residential quarter that benefits from its position on the banks of the River Barrow, new public spaces and enhanced connections with the Town Centre and key attractions in the immediate vicinity of the site. This intervention is central to the promotion and delivery of compact growth and town centre living as advocated by the National Planning Framework and the Regional Spatial and Economic Strategy. The redevelopment of the area will facilitate integration with the existing urban fabric, improving

the built environment and enhancing access to amenities. The reuse of these lands will also unlock the River Barrow as an amenity asset for both residents of and visitors to the area, including Carlow Castle to the north.

Figure; Pembroke District Regeneration Site



2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:

i: Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;

The site is situated on land zoned 'Town Centre' in the Carlow Town Development Plan 2012-2018 (as extended) and as contained in the Joint Spatial Plan for the Greater Carlow Graiguecullen Urban Area 2012-2018.

The site is identified as an 'Opportunity Site' in Part 4, Section 3 of the Joint Spatial Plan as referred to above i.e. Opportunity Site 6: Pembroke Road Sites. This overall opportunity site includes lands on the northern and southern sides of Pembroke Road.

It is the Policy of the Council to encourage the urban renewal and advancement of opportunity sites.

The following policies, objectives are related provisions of the Plan are noted in this regard:

- It is a principle of the Carlow Town Development Plan Core Strategy to "Advance key opportunity sites by preparing development briefs or urban design frameworks". (Pg. 22)
- Objective CO3 seeks to "Present a schedule of landbanks within the Greater Urban Area which offer particular opportunities and are of strategic importance for the future development of the Greater Carlow Graiguecullen Urban Area, offering site briefs for each site". (Pg. 24)
- Carlow Town Objective CT05 seeks to "Encourage specific urban renewal projects and advance opportunity sites". (Pg. 205)
- Policy CTP30 seeks to "Encourage the redevelopment of the listed sites having regard to the urban design frameworks…"
-
- (iii) Pembroke Road Sites (Opportunity Sites 6)

The regeneration of this site is also supported in the Project Carlow 2040, A Vision for Regeneration as outlined above. It is a strategic objective of the Council (SO 3) as contained in the Carlow County Development Plan 2022-2028 to support and promote the role of Carlow Town as a Regional and Inter-regional economic growth driver and to fulfil its role as a Key Town, focussed on regeneration, implementation of Project Carlow 2040, sustainable development, quality of life and economic investment. The delivery of the Pembroke District

intervention will support the overall strategy of regeneration in Carlow Town, promote town centre sustainable healthy living and an innovative, culturally rich and socially connected community activity.

ii. **Comprises significant previously developed and/or under-utilised lands &;**

iii. Is within or adjoining the core of an established or designated urban settlement;

The majority of the site comprises vacant and former industrial land including a number of large semi-derelict sheds/warehouses and silos/tanks, previously in use by Drummond Seeds and Pembroke Nursery. A portion of the overall area appears to be in use as a construction compound for the storage of building materials. To the north west of Pembroke Road is located a vehicle recovery business. These existing uses are on under-utilised lands located in a prime town centre location. The under-utilised brownfield site represents an appropriate expansion area for town centre residential development facilitating compact development in a sequential manner.

iv. Will be essential in achieving compact and sustainable urban growth;

The subject site is a long-standing town centre zoned site. It is considered that the development of this site is essential in realising the compact and sustainable growth of Carlow as it provides for a natural extension to the town centre on an under-utilised central town centre site. It will enable the development of a new attractive neighbourhood to be developed with frontage to the River Barrow. The land also presents the opportunity to create a vibrant town centre through the delivery of an enhanced public realm with improved accessibility for sustainable transport modes, improving connectivity between the town centre and the River Barrow and River Burrin. Development of the site will support compact urban growth by building on existing assets and capacity to create critical mass and scale for sustainable living.

v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement;

The subject lands comprise a significant tract of under-utilised town centre lands that could facilitate a new integrated residential district development within the town contributing to compact and sustainable urban growth. Alternative lands for the particular development, which supports healthy town centre initiatives and the creation of vibrant and viable town centres, is necessary to contribute to the regeneration of the town and sustainable compact growth. Lands to achieve compact urban growth on brownfield/infill lands are unavailable in areas at lower risk of flooding.

3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment.

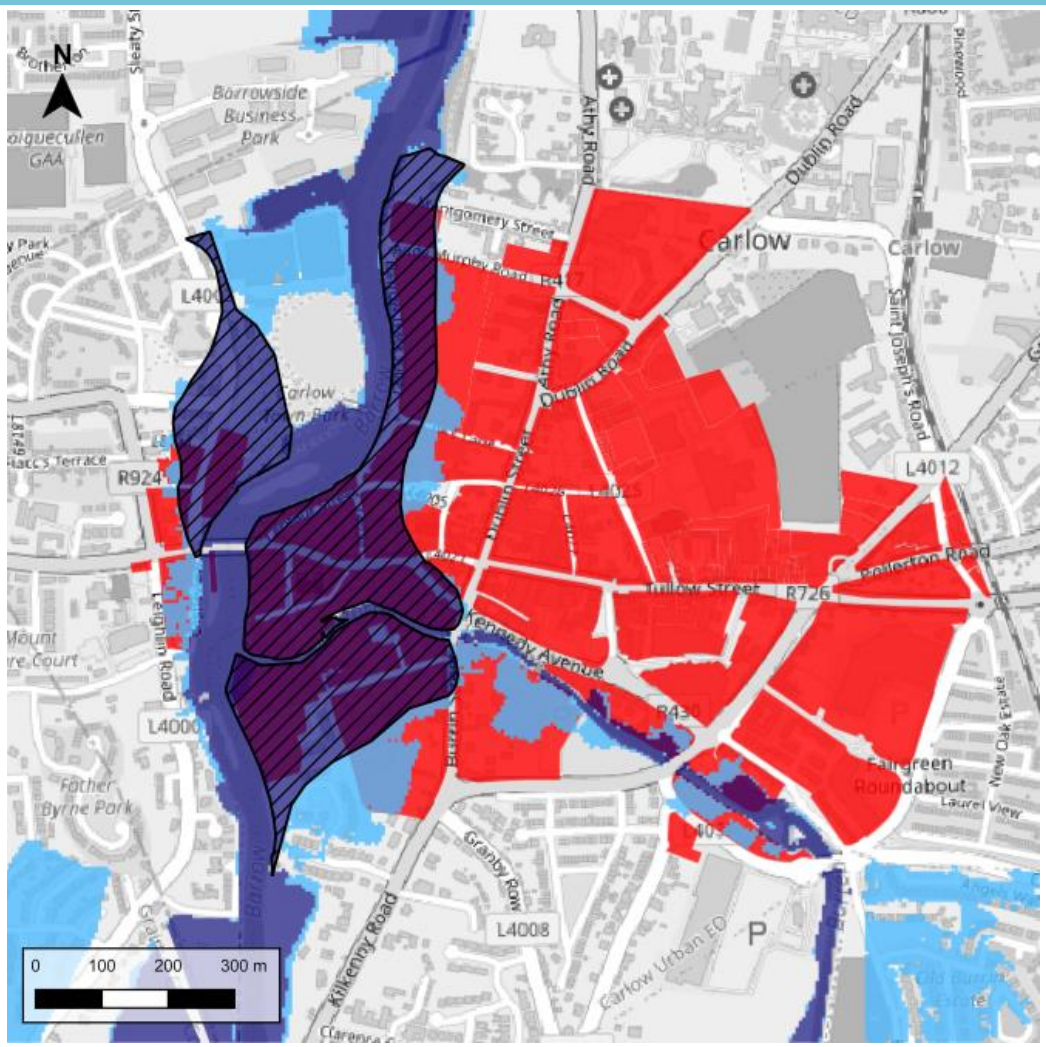
The site is now protected to the 1% AEP standard by the Carlow Flood Relief Scheme. Protection is provided by a floodwall. A masterplan of the area has been provided under the Carlow 2040 document which has been used to guide the consideration of Part 3.

Parts 1 & 2 of the test found that it is considered appropriate to zone the lands as Town Centre.

Future development in this area can develop within the defended Flood Zone A and Flood Zone B. Due to the presence of the defences ground levels can be raised appropriately to achieve the design FFL for the type of development proposed, without the need for compensatory storage. All development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following:

- FRA should address climate change scenarios in relation to FFLs;
- The FRA should also investigate the impacts of defence breach (residual risk) and this should also feed into the FFL;
- Basement levels are permitted, but no highly vulnerable development would be permitted on this level and the access point to the basement and any vents/opes should be above the design flood level including freeboard;
- Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

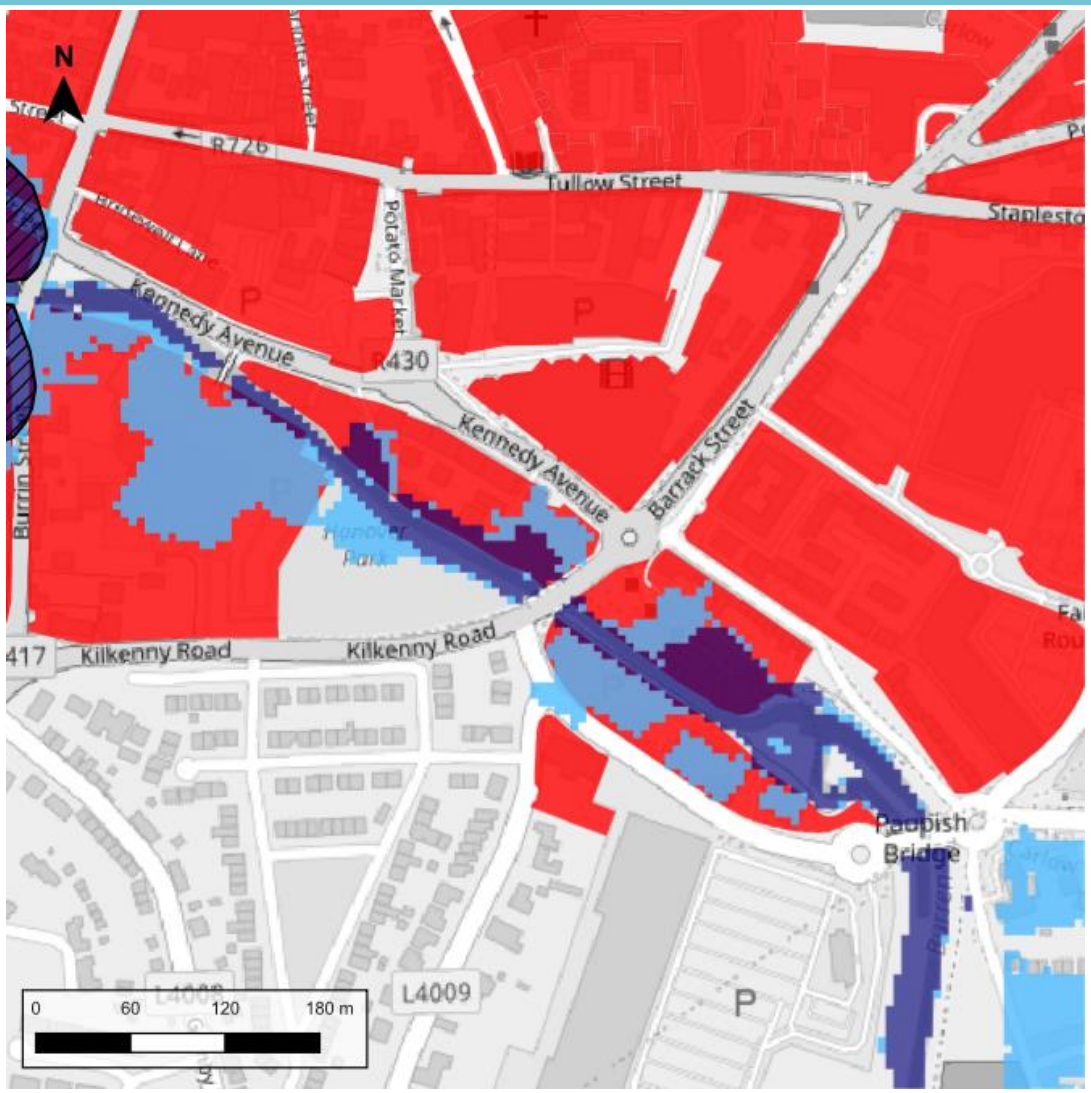
A.1.3 Other Town Centre (defended)



1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.	Carlow Town is designated as a Key Town in the RSES and in the Settlement Hierarchy in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level.
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:	Lands are zoned town centre and amenity and open space reflecting existing established uses on this site.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement:	Existing significantly developed area suitable for regeneration of established uses.
ii. Comprises significant previously developed and/or under-utilised lands:	Yes, comprises significant previously developed land.
iii. Is within or adjoining the core of an established or designated urban settlement:	Yes, is located within the core area of the urban settlement
iv. Will be essential in achieving compact	Lands significantly development with regeneration of this area facilitating the achievement of

and sustainable urban growth;	compact and sustainable growth
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Lands significantly developed
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	Parts of the Town Centre are within Flood Zone A and defended. Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning. Due to the presence of the defences ground levels can be raised appropriately to achieve the design FFL for the type of development proposed, without the need for compensatory storage. All development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • FRA should address climate change scenarios in relation to FFLs; • The FRA should also investigate the impacts of defence breach (residual risk) and this should also feed into the FFL; • Basement levels are permitted, but no highly vulnerable development would be permitted on this level and the access point to the basement and any vents/opes should be above the design flood level including freeboard; • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

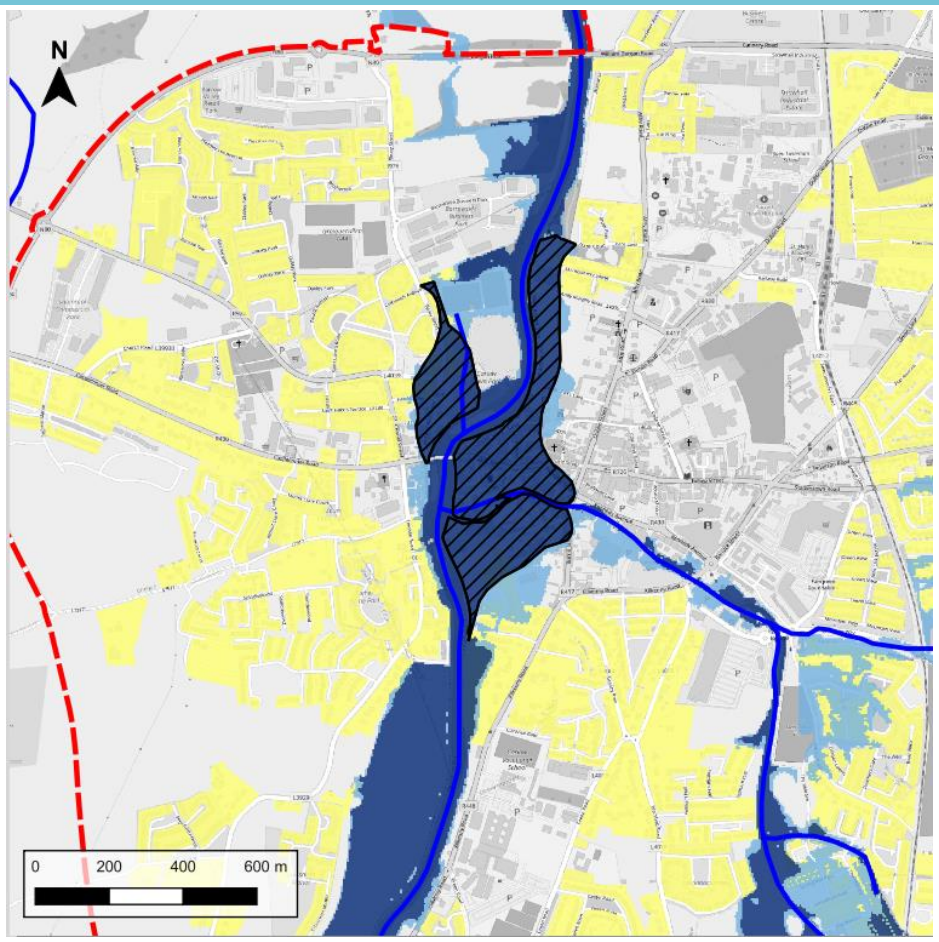
A.1.4 Undefended Town Centre - Burrin River



1. The urban settlement is targeted for growth under the National Planning Framework, Regional Spatial and Economic Strategy (RSES), statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.	Carlow Town is designated as a Key Town in the RSES and in the Settlement Hierarchy in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level.
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	Lands zoned for existing residential / infill and largely developed.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement	Existing development
ii. Comprises significant previously developed and/or underutilised lands,	Yes, comprises significant previously developed lands
iii. Is within or adjoining the core of an established or designated urban settlement,	Yes, is within the established designated urban settlement
iv. Will be essential in achieving compact	Lands already developed

and sustainable urban growth, and	
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Lands already developed
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	The Burrin River overtops its banks and undefended Flood Zone A/B extends into existing developed lands. For the most part Flood Zone A extends into lands that are subject to open space (e.g. Hanover Park) but some areas of existing Town Centre are at risk. Flood Zone B extends into lands that are under existing commercial/retail use and the key site is the Penneys redevelopment which has extant planning permission for redevelopment and was subject to an appropriately detailed FRA. Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning. This is on the basis that within areas not benefitting from the FRS (undefended) development is; • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • FRA should address climate change scenarios in relation to FFLs and potential mitigation measures; • Residential FFLs should be above the 1% AEP level plus climate change and freeboard; • Bedrooms should be located in the upstairs of two-story buildings when extending existing property; • Flood resilient construction materials and fittings should be considered if in Flood Zone A/B; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

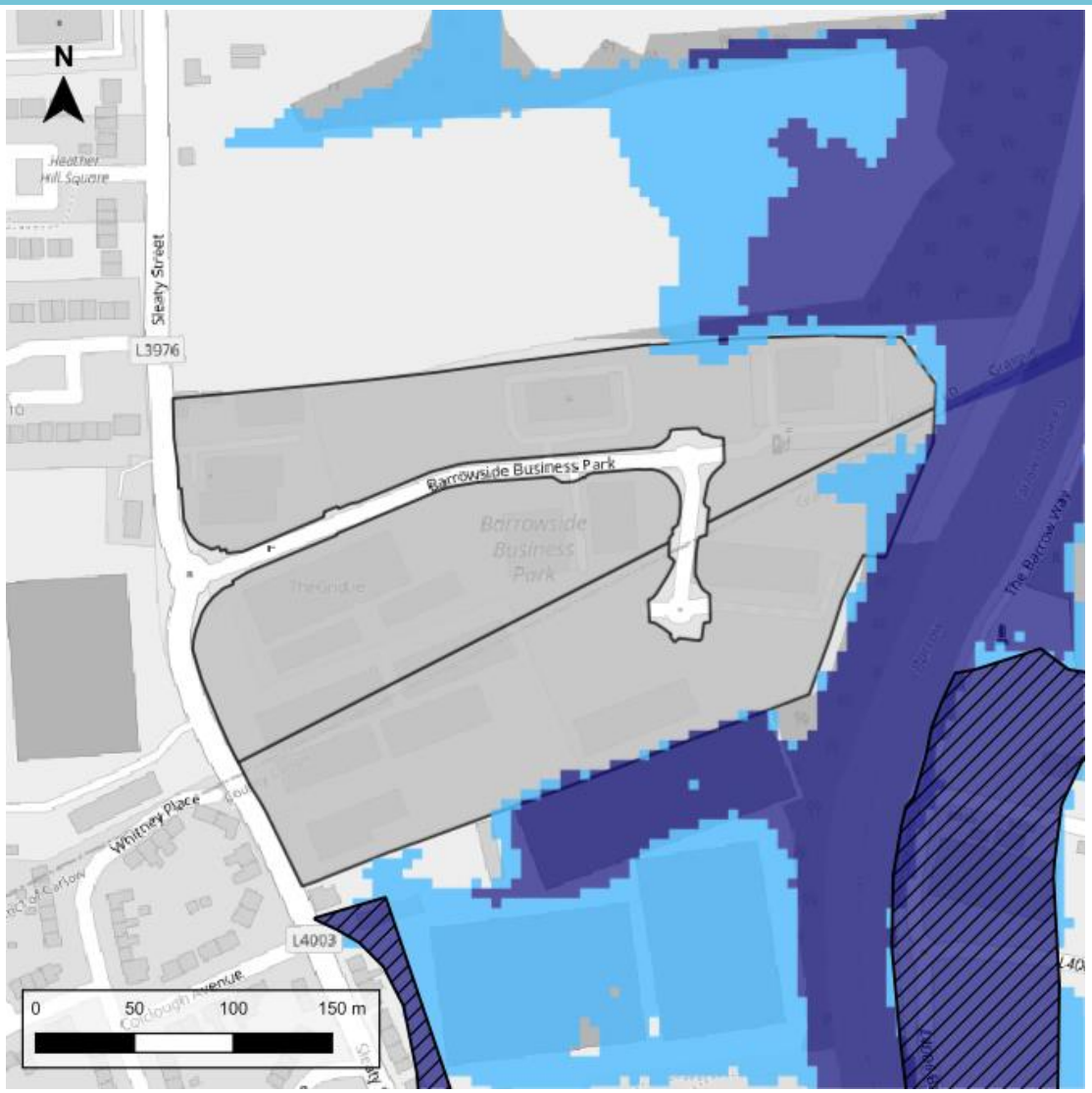
A.1.5 Existing/Infill Residential (undefended) - Barrowville



1. The urban settlement is targeted for growth under the National Planning Framework, Regional Spatial and Economic Strategy (RSES), statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.	Carlow Town is designated as a Key Town in the RSES and in the Settlement Hierarchy in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level.
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	Lands zoned for existing residential / infill and largely developed.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement	Existing development
ii. Comprises significant previously developed and/or underutilised lands,	Yes, comprises significant previously developed lands
iii. Is within or adjoining the core of an established or designated urban settlement,	Yes, is within the established designated urban settlement
iv. Will be essential in achieving compact and sustainable urban growth, and	Lands already developed
v. There are no suitable alternative lands for the particular use or development type, in	Lands already developed

areas at lower risk of flooding within or adjoining the core of the urban settlement.	
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	The Barrow River presents flood risk to a significant area of existing residential land. Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning. This is on the basis that within areas not benefitting from the FRS (undefended) development is; • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • FRA should address climate change scenarios in relation to FFLs and potential mitigation measures; • Residential FFLs should be above the 1% AEP level plus climate change and freeboard; • Bedrooms should be located in the upstairs of two-story buildings when extending existing property; • Flood resilient construction materials and fittings should be considered if in Flood Zone A/B; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

A.1.6 Retail Warehousing - Town Centre lands bounding the Burrin River

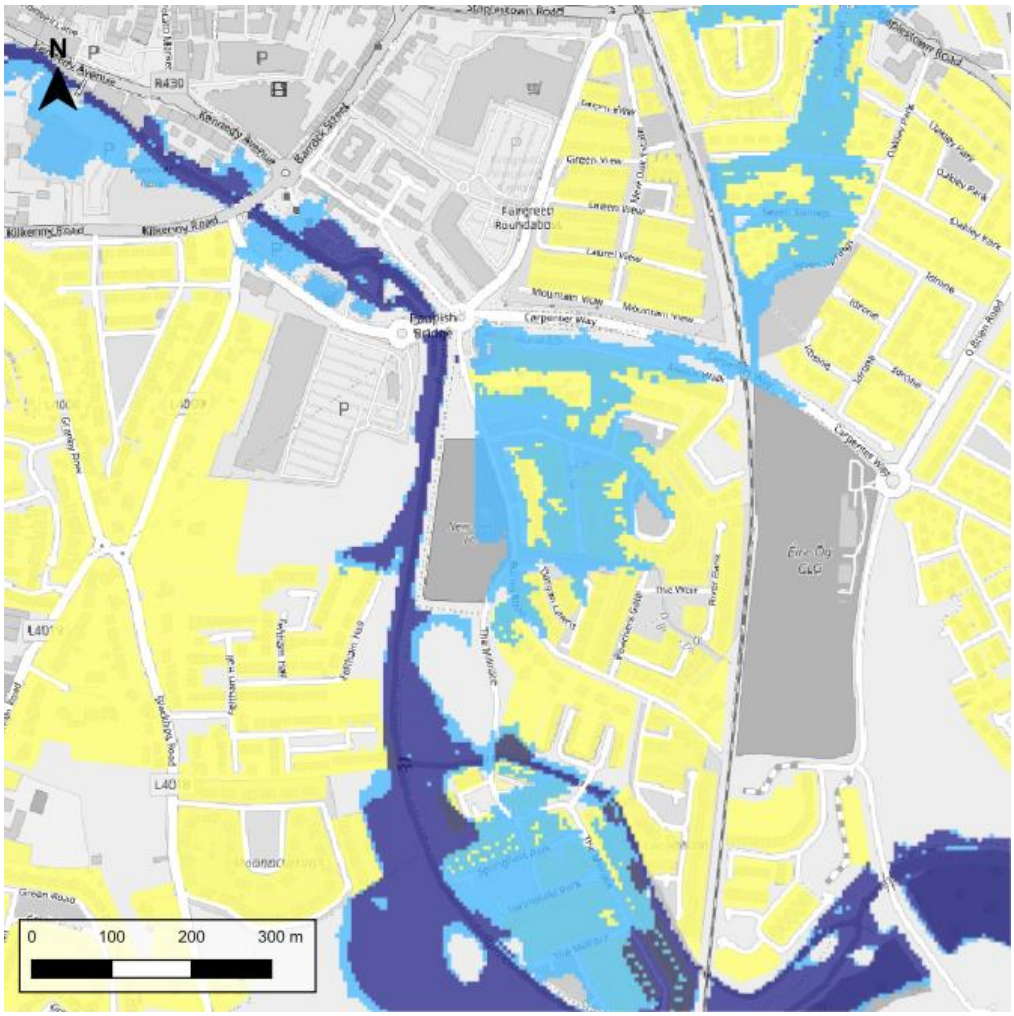


1. The urban settlement is targeted for growth under the National Planning Framework, Regional Spatial and Economic Strategy (RSES), statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.	Carlow Town is designated as a Key Town in the RSES and in the Settlement Hierarchy in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level.
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	Lands zoned for retail warehousing and largely developed.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement	Existing development
ii. Comprises significant previously developed and/or underutilised lands,	Yes, comprises significant previously developed lands
iii. Is within or adjoining the core of an established or designated urban settlement,	Yes, is within the established designated urban settlement

iv. Will be essential in achieving compact and sustainable urban growth, and	Lands already developed
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Lands already developed
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	The Barrow River has a limited overlap with the Retail Warehousing lands. Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning. This is on the basis that development is limited to the existing vulnerability use and extensions/refits/change of use. Significant redevelopment within Flood Zone A/B would not be appropriate as there is no recommended flood relief scheme for the area. Any future planning applications for extensions/refits/change of use should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • The sequential approach should be applied if possible; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

A.2 Mill Race/Springfield Area

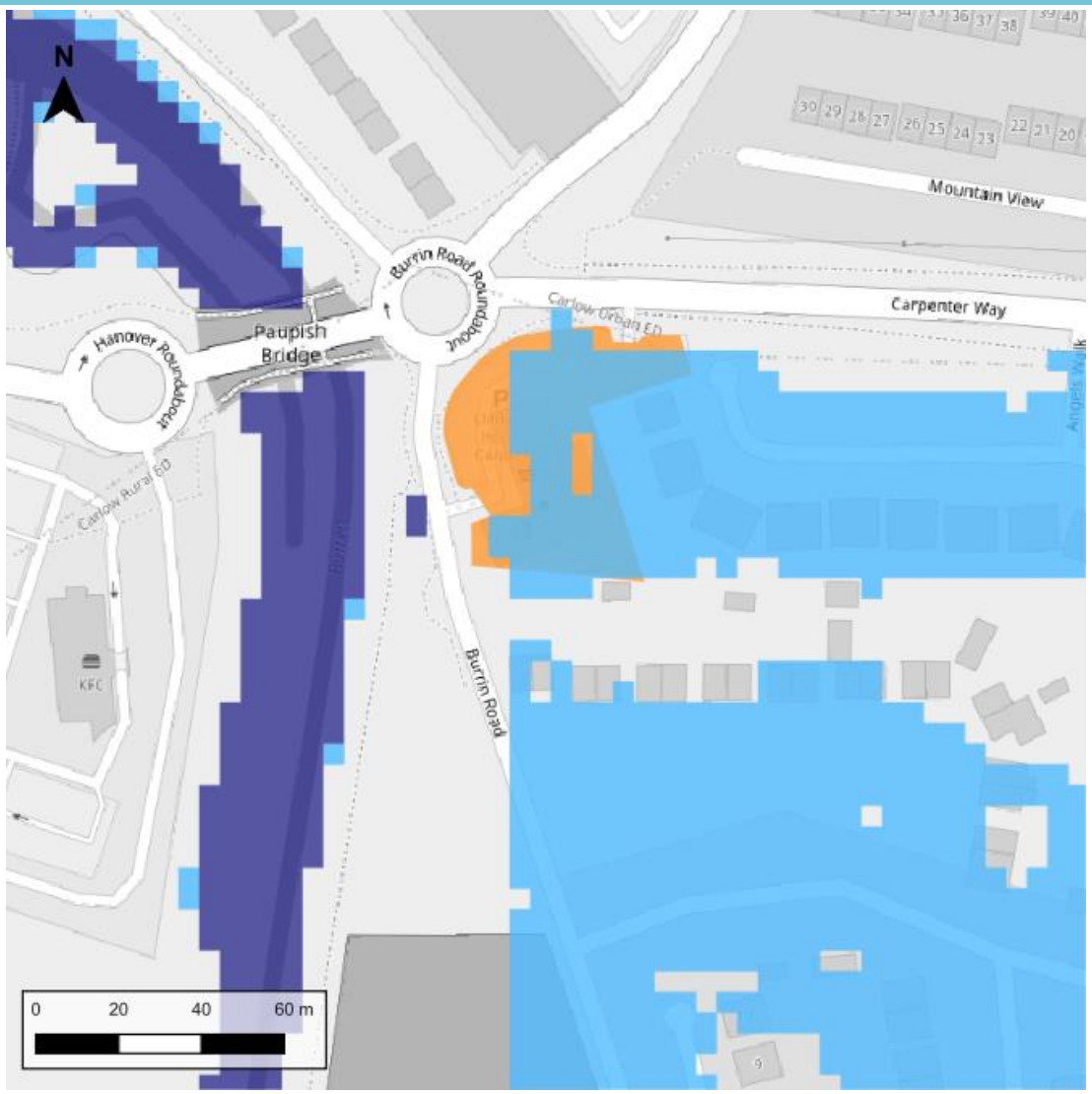
A.2.1 Existing Residential



1. The urban settlement is targeted for growth under the National Planning Framework, Regional Spatial and Economic Strategy (RSES), statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.	Carlow Town is designated as a Key Town in the RSES and in the Settlement Hierarchy in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level.
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	Lands zoned for existing residential / infill and largely developed.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement	Existing development
ii. Comprises significant previously developed and/or underutilised lands,	Yes, comprises significant previously developed lands
iii. Is within or adjoining the core of an established or designated urban settlement,	Yes, is within the established designated urban settlement
iv. Will be essential in achieving compact	Lands already developed

and sustainable urban growth, and	
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Lands already developed
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning. This is on the basis that within areas not benefitting from the FRS (undefended) development is; • Limited to extensions, renovations and change of use. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. Any future development should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • FRA should address climate change scenarios in relation to FFLs and potential mitigation measures; • Residential FFLs should be above the 1% AEP level plus climate change and freeboard; • Bedrooms should be located in the upstairs of two-story buildings when extending existing property; • Flood resilient construction materials and fittings should be considered if in Flood Zone A/B; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

A.2.2 Neighbourhood Facilities/Centre



1. The urban settlement is targeted for growth under the National Planning Framework, Regional Spatial and Economic Strategy (RSES), statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.	Carlow Town is designated as a Key Town in the RSES and in the Settlement Hierarchy in the Carlow County Development Plan 2022-2028. The strategic vision for Carlow Town is to support and promote the role of Carlow Town as a regional and inter-regional economic growth driver and to fulfil its role as a key town, focused on regeneration, sustainable development, quality of life and economic investment. As a designated Key Town, Carlow Town is to play a critical role in underpinning the RSES and ensuring a consolidated spread of growth beyond cities at a sub-regional level.
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	Lands zoned for neighbourhood centre and largely developed.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement	Existing development
ii. Comprises significant previously developed and/or underutilised lands,	Yes, comprises significant previously developed lands
iii. Is within or adjoining the core of an established or designated urban settlement,	Yes, is within the established designated urban settlement

iv. Will be essential in achieving compact and sustainable urban growth, and	Lands already developed
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Lands already developed
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	There is limited overlap with Flood Zone B and the existing Neighbourhood Facilities lands. Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning for the site. Any future expansion of the site should be subject to an FRA which should follow the general guidance provided in Section 7 of the SFRA and must specifically address the following: • The sequential approach should be applied and any extensions or further development should be located in Flood Zone C; • Flood Zone A/B would principally be suitable for playing pitches/water compatible use only; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with CCC SuDS Policy including consideration of nature based surface water management in line with the DHLGH Best Practise Interim Guidance Document; Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas.

Appendix IV
Local Transport Plan

Carlow Graiguecullen Local Transport Plan

Carlow County Council

May 2024

Delivering a better world
Delivering a better world

Prepared for:

Carlow County Council and Laois County Council

Prepared by:

AECOM Limited
One Trinity Gardens, First Floor
Quayside
Newcastle-upon-Tyne NE1 2HF
United Kingdom

T: +44 (191) 224 6500
aecom.com

Table of Contents

Figures

Tables

1. Introduction

1.1 Background to the ABTA

AECOM has been appointed by Carlow County Council (CCC) to prepare a Local Transport Plan (LTP) for the Carlow Graiguecullen area using the Area Based Transport Assessment (ABTA) methodology. Carlow is the main town in County Carlow, with the Graiguecullen area falling within the County Laois boundary. The LTP provides a multi-modal framework which assists in informing future transport infrastructure planning, investment, and delivery. Overall, the LTP aims to facilitate and inform the integration of land-use and transport planning in Carlow Graiguecullen and deliver transport improvements to ensure increased usage of sustainable transport modes.

The LTP presents a comprehensive analysis of the current transport situation in the study area, alongside outlining the impact of future proposed development on the transport network. Potential solutions to improve the transport conditions for active travellers, public transport users, and private motorised vehicles are then presented. The LTP has informed the development of the Draft Carlow Graiguecullen Local Area Plan (2023-2029), which has been produced by CCC and Laois County Council (LCC) to guide the future development of the area. The LTP is informed by relevant national, regional, and local policy as well as appropriate guidance documents.

LTPs are particularly focussed on increased sustainability; therefore, LTP proposals must support compact urban growth, encourage a modal-shift from private motorised vehicles towards sustainable transport and improve key destination accessibility via these sustainable modes. Additionally, promoting Carlow Town as a hub of economic activity and a place of vibrancy is an important aspect of the LTP. This LTP, and other policies and strategies, aim to make the Carlow Graiguecullen area a more attractive place to live, work, study, and visit. For this reason, a key goal of the LTP is providing linkages between residential areas, education, employment, major economic areas, the town centre, and public transport stop / stations. Establishing new links between such areas for sustainable travel modes is essential in promoting sustainable travel and multi-modal sustainable trips.

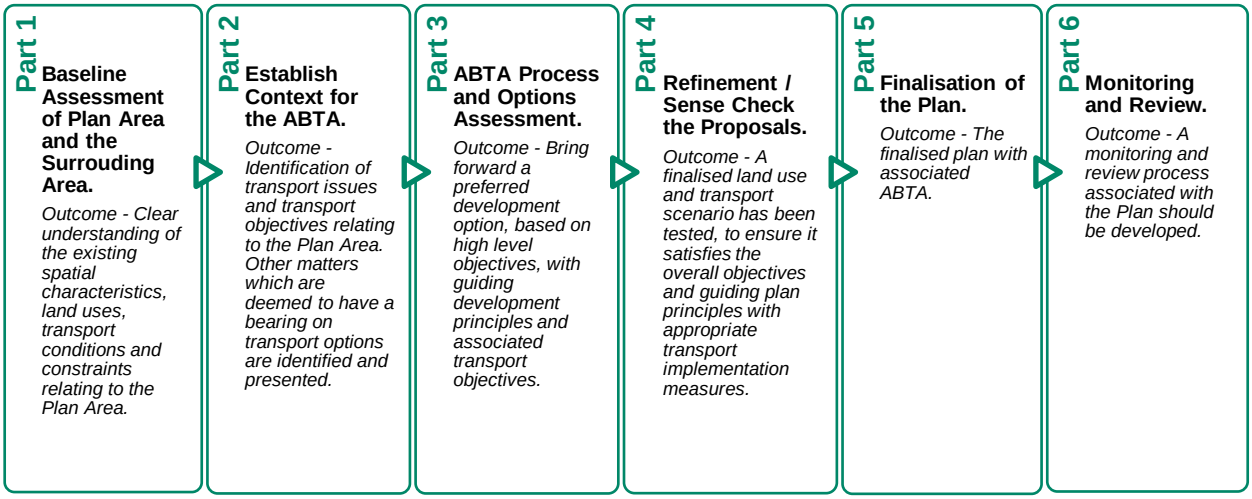
1.2 Area Based Transport Assessments

An ABTA is a structured transport assessment process which takes place to inform the development of a Local Transport Plan (LTP) and, in many cases, a Local Area Plan (LAP). Conducting an ABTA ensures that transport demand is sufficiently assessed and the transport measures in the LTP/LAP are evidence based, outlined as a requirement in the National Planning Framework (NPF), and informed by specialist transport analysis. The ABTA process is defined by the National Transport Authority (NTA) and Transport Infrastructure Ireland (TII) in the 2018 'ABTA Advice Note' and the TII and NTA 2021 'ABTA How to Guide'. The 2021 guidance describes the role of ABTA in the LAP process as follows:

"*An ABTA is recommended as the preferred form of technical assessment which can be used to appraise and guide the formulation of transport policies within the LAP and, more generally, the integration of land use and transport planning in the form of the LAP's accompanying Local Transport Plan (LTP). The ABTA will appraise transport demand and opportunities in a manner which typically results in firm proposals for transport infrastructure and accompanying transport demand management, including non-infrastructural measures to encourage sustainable travel behaviour that can be incorporated into the LAP. Applying the ABTA principles to LTPs and related studies will enable the identification and selection of transport measures that are compatible with the policy objectives set out in the relevant Development Plan and emerging as part of the LAP*".

An ABTA is a structured process which comprises six parts, from the Baseline Assessment in Part 1 to the Monitoring and Review in Part 6, as explained in **Figure 1**. The ABTA approach is structured to describe the process from evidence collection, through option creation, option assessment, refinement and finalisation of the transport strategy recommended for the LAP.

Figure 1. ABTA Process



1.3 Approach to LTP Development

1.3.1 Modal-Shift

A key concern of the LTP is promoting a modal shift away from private vehicles and towards more sustainable methods of travel. Individuals choose their preferred transport mode by weighing the benefits and costs of each mode for their trip purpose and requirements. Where a car is available, driving often has an advantage over sustainable modes of transport as it can provide door-to-door access to any location, whereas public transport is restricted by particular routes, and active travel is limited by a range of factors including trip distance and lack of dedicated infrastructure. However, policy and infrastructure interventions, such as enhanced permeability and increased bus stops can ensure that sustainable travel becomes faster, shorter, and more convenient. This can increase the attractiveness of sustainable modes of transport relative to the car and influence an individual's travel decisions.

The Carlow Graiguecullen LTP proposes a comprehensive network for active travel which will make walking and cycling safer and more convenient. For longer distance travel, the public transport strategy proposes improvements which would enhance the attractiveness of using bus and rail to travel further.

1.3.2 Delivering Sustainable Transport Policy

A sustainable travel focused LTP is in line with national transport policy which emphasises the importance of promoting sustainable travel and reducing the negative environmental, health, and social impacts of private motorised vehicles. The Department of Transport (DoT) published the National Investment Framework for Transport in Ireland (NIFTI) in 2021. This seeks to ensure that transport investment is aligned with four investment priorities:

- Protection and renewal
- Decarbonisation
- Mobility of people and goods in urban areas
- Enhanced regional and rural connectivity

The NIFTI investment priorities are supplemented by Modal and Intervention Hierarchies. Under the Modal Hierarchy, sustainable modes, starting with active travel (walking, cycling, and wheeling) and then public transport should be prioritised for investment before the private car. The intervention hierarchy outlines that protecting and renewing existing transport infrastructure should, where possible, be the first solution considered, followed by maximising the value of the transport network through optimising or improving it and investment in new infrastructure as a last option.

The DoT also published a National Sustainable Mobility Policy in April 2022, this sets out the strategic framework for active travel and public transport up to 2030. The policy aims to deliver at least 500,000 additional daily active travel and public transport journeys by 2030 alongside a 10% reduction in the number of kilometres driven by

fossil fuelled cars. The overall approach set out in the policy to achieving a more sustainable transport sector is based on the 'Avoid-Shift-Improve' principle and implementing measures to:

- Avoid – reduce the frequency and distance of trips
- Shift – move towards more environmentally friendly modes of transport, such as walking, cycling, or using public transport
- Improve – promoting efficient fuel and vehicle technologies

The ABTA seeks to meet the requirements of NIFTI and the National Sustainable Mobility Policy by achieving a modal shift through the creation of strategies which transform travel by sustainable modes within the Carlow Graiguecullen study area.

1.4 LTP Report Structure

The LTP is primarily based on the structure listed in the 2018 guidance, but has also been supplemented by elements of the 2021 ABTA *How To* pilot methodology where appropriate. This guidance is advisory, and the LTP for Carlow Graiguecullen seeks to balance meeting these requirements whilst also facilitating the creation of the joint LAP. In accordance with the guidance, the LTP report is divided into six main parts as outlined below:

- **Part 1**: Baseline Assessment – the Baseline Assessment examines the policy context and local characteristics of the study area in additional to existing travel patterns, transport infrastructure and transport services and environmental conditions. Due to the length of Part 1, it is provided as a separate standalone document contained in **Appendix A**.
- **Part 2a**: Establish the Context for the ABTA – identifies principles and objectives for the ABTA and provides high-level information on the future land-use scenario.
- **Part 2b**: Option Development – outlines the option development process and describes the options.
- **Part 3**: Option Assessment – outlines the option assessment methodology, the assessment of the options and the proposed measures (strategies) for active modes, public transport, roads, and parking.
- **Part 4**: Refinement and Sense Check Proposals – this section contains a sense check of the LTP measures and proposals to check it fulfils the requirements of the 2017/8 ABTA Guidance.
- **Part 5**: Finalisation of the ABTA – this chapter presents the final strategies for each mode of transport.
- **Part 6**: Monitoring and Review – outlines proposals for future monitoring of mode share, LTP implementation and a proposed review process for the LTP in the future.

2. Part 1 – Baseline Assessment of the Study Area

2.1 Study Area

The study area boundary for the Carlow Graiguecullen ABTA is shown in Error! Reference source not found.. The s tudy core is Carlow town centre, but also includes Graiguecullen and suburban sections of Carlow. The River Barrow runs north-south through the town and creates severance between Carlow and Graiguecullen. Additionally, the River Burrin runs east-west to the south of Carlow town centre. Within the area there is a railway station, served by the Dublin-Waterford rail line, the Carlow Coach Park, major employers, and educational facilities as well as other key amenities.

2.2 Baseline Assessment

An initial first step in undertaking the ABTA is a baseline assessment of the study area. Any transport schemes that are developed need to be based on a solid evidence base so that there are clear linkages between the development of the option and the objective it will meet. The baseline assessment is outlined in detail in **Appendix A**, with key elements summarised in the following sections.

2.2.1 Socio-Economic Context

Transport is demand derived from other activity. The activity relates to the economic and social drivers of the area and impacts upon the environment; Carlow Town is considered a regional centre for education, shopping and the arts, and this means there is a volume of movement to, from and within the study area. It is therefore clear that an understanding of the study area's economy and society is critical to understanding how transport demands are derived and how they can be influenced by investment.

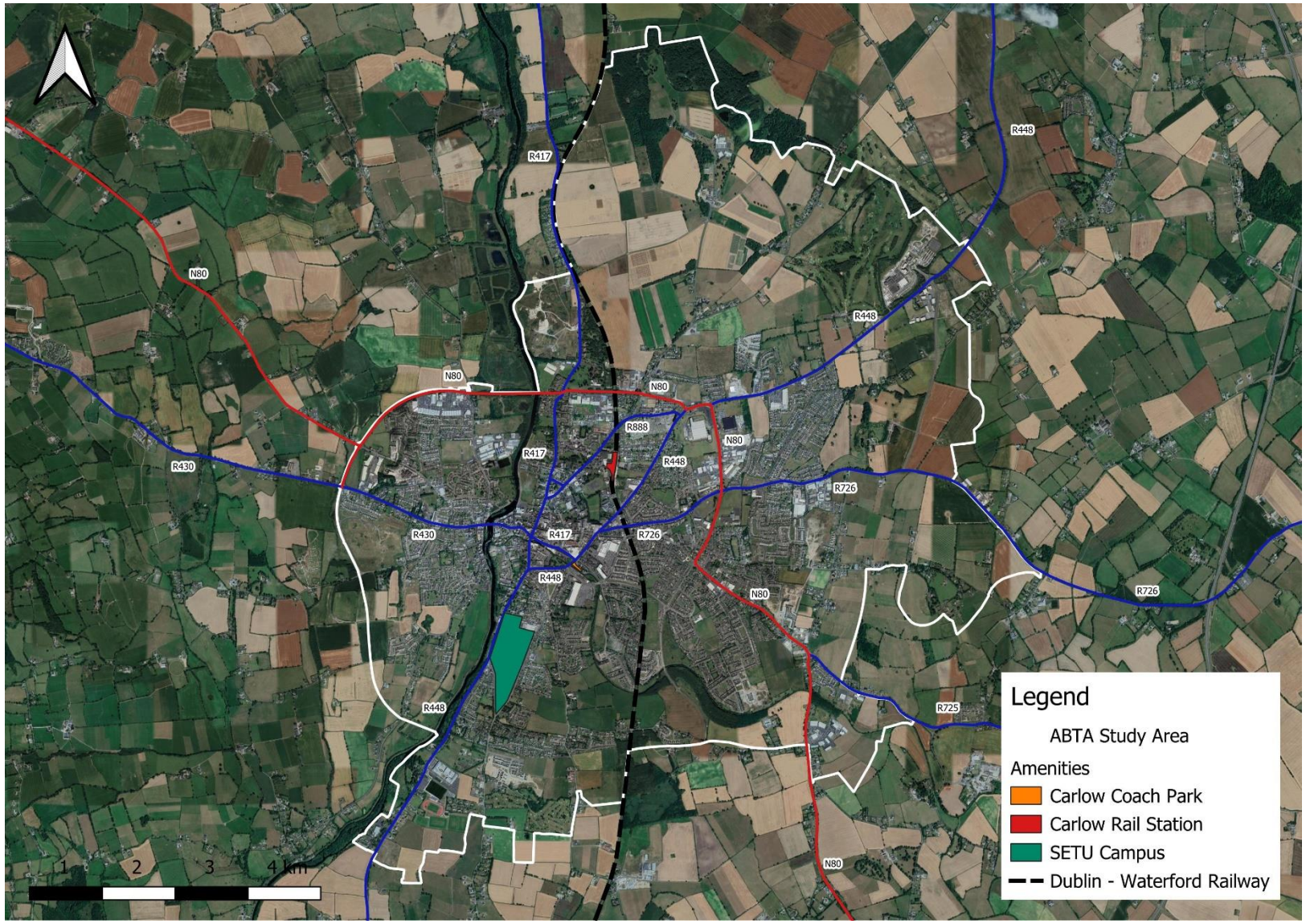
The population of the study area is 24,272 according to 2016 Census data, making Carlow the 13th largest town in Ireland. The 2022 Census is now complete; however, only county level population data was available at the time of reporting. The County Carlow population has increased 9% between 2016 and 2022, this is above the population growth seen across Ireland. This demonstrates that Carlow is a growing area and travel demand is likely to continue to rise; the transport network must be able to accommodate this.

Evidence has shown that the majority of new homes in Carlow have been constructed further out of the town centre and suburbanisation has occurred; this is outlined in greater detail in Appendix A. People residing further away from the town centre is likely to increase trip distances between homes, the town centre, and key services. The provision of sustainable connections to these areas is important to prevent severance and increased private vehicle kilometres.

Central to the development of Carlow is the presence of the South East Technological University (SETU). With 11,000 students and 850 staff, it is a key employer in the town and a generator of much transport demand. With further plans for expansion of the university, there is a real opportunity to attract and retain students within Carlow and improve the economic prosperity of the town. It is essential that the right infrastructure is put in place to make Carlow a place that these students want to stay.

Evidence has shown that there is deprivation with the study area, this is highest in Carlow and Graigue Urban (small census areas). Investment in infrastructure, and the potential wider benefits that could occur due to transport improvements, can assist in alleviating deprivation and improving the livelihoods of the Carlow population.

Figure 2. Carlow Graiguecullen ABTA Study Area



2.2.2 Transport Context

Analysis of 2016 census data shows that the majority of people who live in the Carlow County area remain in this area for work. Despite a high proportion of the population remaining within the Carlow area for work, there is a high dependency on the private car, with 76% of journeys to work in Carlow County, and 72% in Carlow Town, undertaken using this mode of transport. This is higher than the national average. The baseline report in Appendix A provides further information on travel movements within the study area, illustrating key movement patterns.

The fact that many people choose to stay and work within the study area means that sustainable modes of transport should be a real alternative option to the private car given that local trips are likely to be shorter in distance. However, to ensure that people can travel sustainably, the transport infrastructure needs to be in place. The existing transport infrastructure that is present within the Carlow Graiguecullen study area is summarised below.

Active Travel – Walking and Cycling

There is an existing walking and cycling network in Carlow. The cycling network has received investment in recent years but remains disjointed and low-quality in places, meaning infrastructure improvements and investment are required to enhance its attractiveness. Similarly, providing or upgrading walking links, to deliver improved permeability, is an important consideration to reduce active travel trip distances and make these modes more convenient. Permeability is concerned with how well people can move through spaces; key permeability barriers include the rail line, the rivers, and large residential estates.

Public Transport

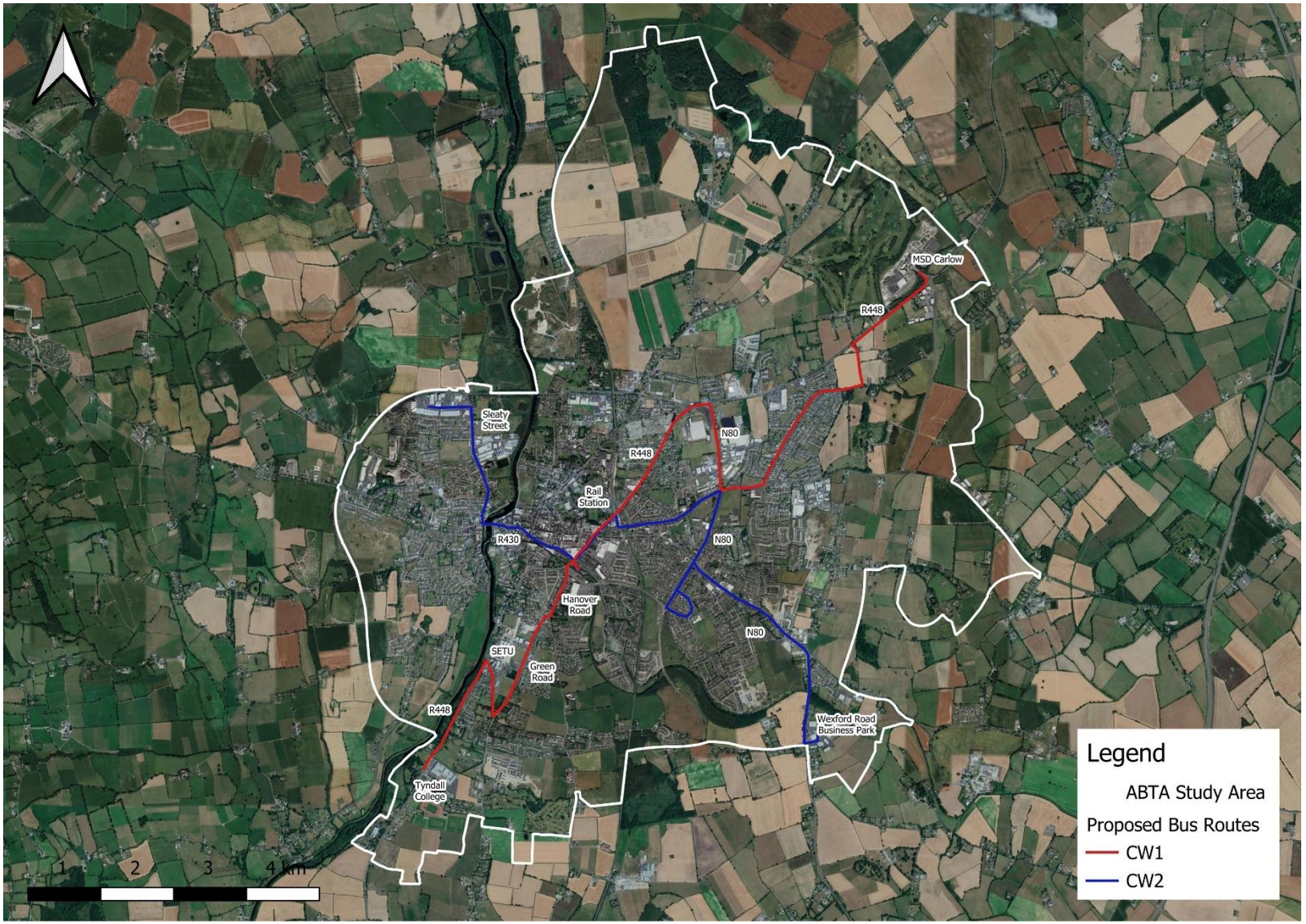
Numerous bus services run through Carlow, with both local and national destinations. However, these services are often infrequent and mean that journeys need to be planned in advance.

Many of the bus services that run through Carlow can be accessed at the Carlow Coach Park. Whilst the Carlow Coach Park has been improved in recent months, there are still limited waiting facilities for passengers, particularly when weather conditions are bad.

A number of other bus stops are located within the Carlow Graiguecullen study area, but these do not adequately serve key residential and employment locations.

Improvements to the provision of public transport within Carlow has been a longstanding aspiration, with the identification of two new bus routes. The new services have been developed by the NTA and CCC and were implemented in summer 2023. The routes are shown in **Figure 3**

Figure 3. New Bus Services



Where journeys are further afield, Carlow is on the Dublin to Waterford rail line, with the train station approximately 1km from the town centre. However, whilst there is currently a rail connection, services are infrequent, with only an hourly frequency at peak times and gaps of up to three hours throughout the day. This often means that the private car or bus services are the only real mode of transport when travelling outside of the local area, with the area being well connected to the rest of the country by road. Where rail could be considered a viable means of transport, better connections between residential settlements and the railway station, through active modes or improvements to the bus network, would provide an integrated sustainable transport offer.

Road

The N80 is the only National Secondary Road within the study area and is a high-capacity road allowing for strategic connections across Ireland; as such, there is a high proportion of freight traffic using this route. However, whilst the N80 is an important strategic connection, the road also serves local traffic, particularly for people commuting to employment located to the north of Carlow. In any option development work, the dual functionality of the road needs to be taken into consideration and must observe *Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG, 2012).*

There are also regional roads within the study area, including the R430, R417, R726, and the R44. These roads provide important connections to the national road network and linkages in the town. Congestion can be seen in the morning peak period at the River Barrow bridge, along Burrin Street, and sections of Kilkenny Road, and in the evening peak period westbound over the River Barrow bridge, Burrin Street, and the N80 Tullow Road junction.

When considering road safety, data shows that collision hotspots include some of the N80 junctions, the River Barrow bridge, and near St. Joseph's Road. The cause of these accidents needs to be taken into consideration when options identified in this LTP are taken forward for development.

Parking

There are numerous car parking facilities within Carlow town centre. Approximately 62% of parking provision is on-street pay and display, and 26% of parking is comprised of larger off-street car parks. There is also other parking available, this includes short-stay or set down only, found near many shops, amenities, and schools, as well as private car parks at retail spaces. The high availability, and affordability, of parking in Carlow reinforces the high car usage.

2.3 Relevant Policy

Relevant National, Regional, and Local Policy has been considered as part of the Baseline Assessment alongside relevant guidance documents. A summary of the relevant policy documents and their relation to the Carlow Graiguecullen LTP is contained within the Baseline Assessment (**Appendix A**). This section highlights key messages from the policies which have influenced the strategy principles as well as the option development process. **Figure 4** shows the different policies considered with the LTP.

Figure 4. National, Regional, and Local Policy

Key Policy Messages

Each policy has its own influence on the Carlow Graiguecullen LTP; the key points are summarised below.

- The main NPF transport goals are reduced car dependency, compact growth, regional accessibility, sustainable mobility. Therefore, the LTP options must try to deliver these.
- Ireland has commitments to reduce carbon emissions and has strategies on securing these. Carlow and the LTP must support this by promoting an active mode uptake and lower private vehicle usage.
- National investment priorities dictate that active modes are the top priority, and that new infrastructure should be a last resort, LTP recommendations have to be aligned with this national investment plan.
- There are goals to increase physical activity by incorporating physical activity into everyday routines – therefore options should help individuals complete pre-existing trips using active travel.
- Create 'safe, accessible, comfortable, and affordable' journeys from homes to services.
- Make the transport network safer to help achieve zero road deaths/serious injuries by 2050.
- Improve permeability by linking destinations direction, giving active travellers priority, and improving link and junction design. This needs to be referred back to when proposing active travel options.
- Try and support Carlow achieving 10-minute towns by linking services and people more directly.
- Support the RSES in promoting Carlow as a key town and making it an attractive place to live, work, and visit. There is a focus on sustainable development which travel options can assist with.
- Support the County Development Plan of Carlow. In particular aim to deliver integration of land-use and transport, a modal shift, prioritised and promoted sustainable travel, keeping car parking controlled, and retaining road capacity whilst not promoting additional car trips.
- Deliver a person-centred town which has a good public realm.
- Assist in making mobility more sustainable to help achieved Carlow environmental goals.
- Provide infrastructure suggestions which could help Carlow thrive and develop economically through further investment in the area but also by better connecting people with jobs and the town centre.

2.3.1 SWOT Analysis

Following the development of the baseline assessment, a summary of the strengths, weaknesses, opportunities, and threats (SWOT) analysis was undertaken for the Carlow Graiguecullen ABTA study. This SWOT analysis has been used to inform the development of the options for each mode.

Table 2-1: SWOT Analysis

Strengths	Weaknesses
• Carlow's geographical location is beneficial, there is relatively easy access to Dublin, other neighbouring counties, and the remainder of the South East region. • SETU presence and potential to provide further education to current Carlow school leavers. • SETU's ability to attract students from other areas who will spend in the Carlow economy. • Residents of Carlow being higher educated can provide businesses with a better labour pool. • Quality of life for Carlow is deemed excellent and it is seen as a great area for those wanting to 'settle down'. • Cost of living is respectable, especially compared to major nearby cities. • The town is reasonably affordable for the student population. • There are strong transport links to areas external to Carlow via the road and rail. • There is a strong presence of businesses, mainly located in the business parks or town centre. • There is presence of some major multi-national companies who are large employers. • Many people who live in Carlow also work here. • Within the town most residential areas are within close proximity of the town centre and amenities. • There is natural beauty and a rich history which can promote tourism. • There is a good agricultural industry which could promote agri-tourism. • There are various shopping areas in Carlow, including high streets, shopping centres, and out-of-town retail parks. • There are bus services between Carlow and other places, in particular Dublin Airport and Dublin. • There is a growing population. • There is a young population with many of the population aged 34 or under.	• Lack of sustainable transport links between residential areas and employment / education opportunities. • High-level of congestion across the town during peak hours. • Parking availability and drop-off opportunities surrounding educational facilities promotes unsustainable travel trips. • Lack of alternative routes leading to high through traffic in the town centre. • A surplus of low-cost town centre parking opportunities. • Lack of safe crossing opportunities for active travellers. • Lack of dedicated cycle infrastructure. • Permeability constraints due to physical barriers (Rivers, Railway, and Developments). • Lack of accessible and high-quality bus stops. • Infrequent public transport services. • Poor perception of public transport acting as a barrier to use. • Limited public realm provision prevents an attractive town centre. • High vacancy rate for retail and employment buildings in the town centre. • Carlow needs greater external market presence to attract more large businesses. • The retail and evening market in Carlow can often struggle and this contributes to a lack of vibrancy. • Often students who graduate SETU do not remain in the area meaning talent and potential employees are lost. • Lack of investment from large eternal sources. • Lack of preparation to accommodate remote and hybrid working lifestyles. • High levels of car dependency.
Opportunities	**Threats**
• Expand the largely untapped tourism industry. • Create 'remote hubs' for new style of working. • Build upon Carlow's excellent quality of life. • Increase links between SETU and businesses to provide graduates with potential jobs and employers with improve labour pool. • Providing more accommodation for town centre living. • Improve the outward brand of Carlow to attract new investment, residents, and visitors. • Improve the skill level of the population. • Improve active travel safety. • Improve public transport frequency and connectivity to other towns. • Increase the number of bus stops to provide greater accessibility. • Provision of two new bus services linking residential areas and amenities. • Create a thriving evening market and café culture for those living, working, and visiting Carlow. • Improved rail services due to Carlow being identified as a key commuter town of Dublin. • Deliver compact growth in town centre. • Reduction of on-street parking to deliver space back to people and improvement the environment. • Improved permeability in the town, especially across River Barrow for residents in Graiguecullen to access the town centre. • Promotion of electric vehicles. • Park and stride for education-related trips to promote active travel and reduce congestion. • Provision of apprenticeships to give Carlow school leavers greater opportunities.	• Objection to the reallocation of space to active modes. • Objection of changes in the town centre, particularly parking and one-way systems or pedestrianisation suggestions which will have a large impact on general traffic. • Continuing vacancy issue if new businesses cannot be attracted. • Lack of demand for town centre living is not seen as vibrant and attractive. • Unwillingness to undertake a modal shift. • Southern Relief Road Phase 3 not being delivered meaning many journeys still route through the town. • High level of car commuting to the university. • Increased travel demands due to population growth and further development of SETU. • Negative impact of COVID-19 and unwillingness to use public transport services. • Broadband provisions need to be improved to allow for better technology in relation to businesses, homes, and education.

3. Part 2 – Establish the Context & Option Development

3.1 Part 2A – Establish the Context for the ABTA

3.1.1 ABTA Principles

Following on from the completion of the Baseline Assessment and SWOT analysis, a set of ABTA principles were development and agreed with Carlow County Council, Laois County Council, and the National Transport Authority to help inform the option development process and as a future monitoring tool once implementation begins. The agreed set of principles encompasses six overall strategy principles alongside mode specific principles for walking, cycling, public transport, roads, and parking.

Later in the LTP (Part 6) recommendations for ongoing monitoring of the delivery and impact of the LTP measures are outlined. A wide range of suggested indicators are put forward which will help CCC, LCC, and key stakeholders to understand the extent to which the principles set out during this section are being met.

3.1.1.1 Overall Strategy Principles

The following principles have been used to guide the overall development of the LTP:

- Promote Carlow Town Centre as the core of activity and improve the transport system to make the town centre a more attractive place in which to live, work, visit and recreate.
- Seek to reduce the number of car-based trips through a shift to sustainable modes.
- Prioritise providing for walking, cycling, and public transport accessibility.
- Ensure sustainable development and compact growth through integrated land-use transport planning.
- Provide sufficient transport infrastructure to accommodate population and employment growth.
- Improve public health and well-being by promoting active travel.

3.1.1.2 Walking Principles

In respect to walking, the guiding principles of the LTP are:

- Create an integrated walking network for Carlow Town which allows convenient, safe, and efficient travel across the town and also facilitating recreational walking.
- Improve permeability to enhance access to homes, schools, jobs, shops, SETU, and the public transport network
- Improve the safety for pedestrians, especially those in vulnerable groups, through the provision of high-quality footpaths and crossing points.
- Provide walking links between transport hubs, workplaces, and homes.
- Promote a modal shift from private car towards walking, especially for trips that are short or medium distances.

3.1.1.3 Cycling Principles

In respect to cycling, the guiding principles of the LTP are:

- Provide an integrated and inclusive network for Carlow Town.
- Improve the safety and security of those cycling in Carlow Town.
- Improve connections for cyclists between homes and key trip attractors, i.e., the town centre, train station, educational facilities, and supermarkets.
- Provide safe and convenient crossing points at major junctions for both new and existing cycle infrastructure.
- Promote a modal-shift from the private car to cycling, particularly for short and medium trip distances.
- Provide satisfactory cycle parking at key destinations and mobility hubs which allow for the safe storage of cycles.

3.1.1.4 Public Transport Principles

In respect to public transport, the guiding LTP principles are:

- Improve access from residential, employment, education, healthcare, and retail facilities to public transport stops.
- Improve the coverage, frequency, and capacity of public transport.
- Provide bus priority infrastructure where it is necessary to improve journey times and reliability.
- Improve public transport stops/stations in respect to location, information, accessibility, infrastructure, and visibility.
- Improve interchange experience for passengers changing between different modes of public transport or routes.
- Promote modal shift from the private car to bus or rail, particularly for medium/long distance trips.
- Ensure interchanges are convenient and allow for access to various key destinations to enhance the attractiveness of public transport.

3.1.1.5 Road Principles

Furthermore, the guiding principles in relation to road are:

- Reduce car dependency by promoting mode transfer to walking, cycling, and public transport.
- Reduce options vehicular trips through Carlow Town Centre through road layout and access changes as well as parking and policy.
- Improve road safety and eliminate collision hot spots.
- Overcome issues relating to pinch points which threaten capacity and network reliability.
- Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow.
- Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift.

3.1.1.6 Parking Principles

Additionally, the guiding principles in relation to parking are:

- Manage the provision of car parking to support and improve the economic vitality of the town centre.
- To ensure car park provision encourages sustainable travel, particularly around railway station.
- To reduce on-street parking, where appropriate, in the town centre to facilitate public realm and walking, cycling, and public transport infrastructure improvements.
- Improve the quality of parking information with new parking signage and technology.
- Introduce parking demand management measures to reduce car dependency and enhance the attractiveness of sustainable travel.
- Make high-level recommendations regarding suitable locations for electric charging hubs.
- Ensure parking pricing and availability are suited to helping secure a modal-shift and promoting sustainable travel.
- Ensure the needs of mobility-impaired and disabled drivers are considered in the design and implementation of transport schemes.

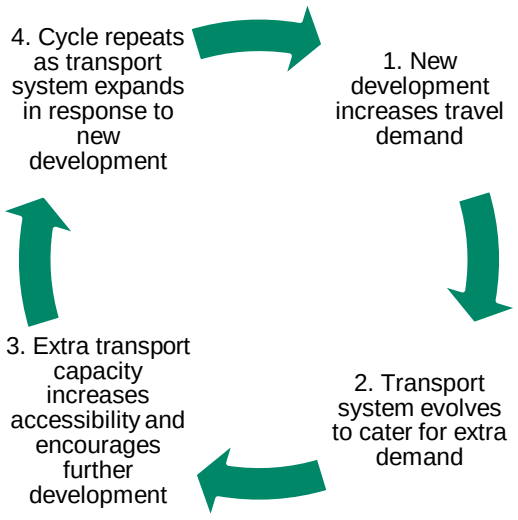
3.1.2 Future Population and Job Growth in Carlow Town

The integration of land-use and transport planning is key to promoting compact growth and travel by sustainable modes. This section summarises the land-use assumptions, which have been included in the LTP to identify the required transport infrastructure for the future.

3.1.2.1 Integrated Land-Use Transport Planning

Land-use and transport are closely related. They feed into each other through the process of the land-use-transport feedback cycle, shown in **Figure 5**. This cycle means when transport improvements are delivered, growth is promoted. This growth results in the need for further transport improvements to cater for the additional travel demand; when these improvements are delivered further transport capacity is created promoting further growth.

Figure 5. National, Regional, and Local Policy



Appreciating the importance of the land-use-transport feedback cycle is vital in understanding the need for an integrated approach to land-use-transport planning during the ABTA process. Local Area Plans with an associated LTP process can be successfully used to strategically locate new transport infrastructure and services in areas where development will be promoted. This ensures the best chance of encouraging a modal shift and increased usage of sustainable transport modes. The Carlow Graiguecullen population is likely to continue to grow in the coming years, as is SETU. Such growth will apply further pressure to the existing transport network and therefore future land-use-transport planning is important to prevent this and ensure that transport network can accommodate future growth.

3.1.2.2 Land-Use Assumptions

The Join Urban Local Area Plan (JULAP) for the Carlow Graiguecullen area will replace the existing Joint Spatial Plan and will set out proposed land uses for the town between 2023 and 2029. Previous land use zones were identified and adopted in July 2022 as part of the Carlow County Development Plan 2022-2028; these land use zoning will be brought forward as part of the JULAP. The aim of the land use zones is to promote compact urban growth in a phased and sequential way from the centre of Carlow Town, and with a focus on potential brownfield sites. The location of development zones is illustrated in Figure 6.

The key growth sites illustrated by the plan represent approximately 1255 new dwellings across the study area, as well as the regeneration of a number of sites for employment use, including the Braun site off O'Brien Road.

In addition to development aspirations which are set out as part of the JULAP, consideration has also been given to developments that are currently under construction or where live planning applications are in place. Significant sites include:

- SETU campus upgrades.
- IDA Advance Factory - Dublin Road.
- MSD – Dublin Road.
- Residential Development (Cois Dara) – completed section and area under construction– Tullow Road.
- Braun site – site is to be reoccupied soon; however, it has been identified as a key regeneration site as part of the JULAP.

Sites which are currently under construction, or are live within the planning system, are illustrated in Figure 7. Consideration will be given to any additional sites, which have come forward before this LTP is finalised.

Figure 6. Location of Development Sites

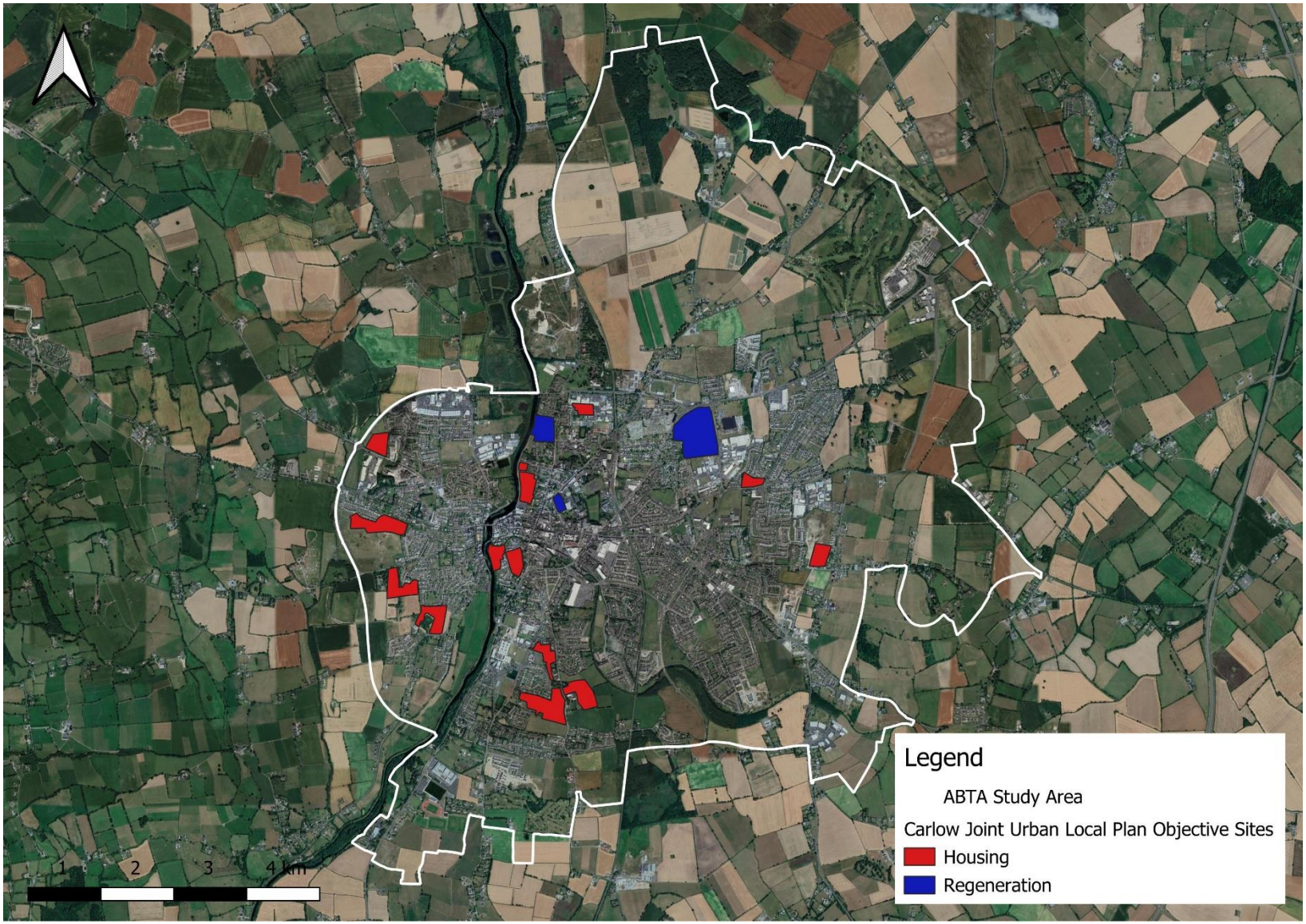


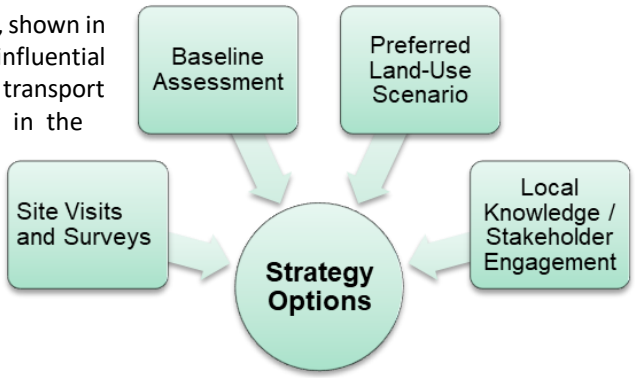
Figure 7. Sites Under Construction and Live Planning Applications

The information outlined in the following sections has been used to develop future demand scenarios, which can be used to assess the impact of the measures outlined in the LTP. Further information is outlined in subsequent sections of the LTP.

3.2 Part 2B – Option Development

3.2.1 Option Development Process

Figure 8. Option Development Inputs



The LTP strategy options were developed based on the inputs, shown in Figure 8. The baseline assessment and site visits were highly influential in providing an in-depth understanding of the current transport network in Carlow Graiguecullen. The analysis completed in the baseline assessment provided the focus to create options which solved existing transport issues in the study area. In relation to future growth, the land designated for development in the land-use scenario was the guide for creating the expanded sustainable transport network. Local knowledge and input were sought through engagement with CCC and LCC, as well as key stakeholders.

3.2.2 Options Description

The following section describes the options for each transport mode: walking, cycling, public transport, roads, and parking. Within each section, brief descriptions of the option development process, mode principles, and the proposed options are outlined.

3.2.3 Active Modes

The walking and cycling strategies have separate objectives and options, but the two strategies are linked, with options set out in one strategy influencing the other mode.

3.2.3.1 Walking

The walking strategy options mainly comprise new or upgraded walking links to improve permeability. The principles for this strategy are summarised below (**Figure 9**) and contained fully within **3.1.1.2**.

Figure 9. Walking Principles

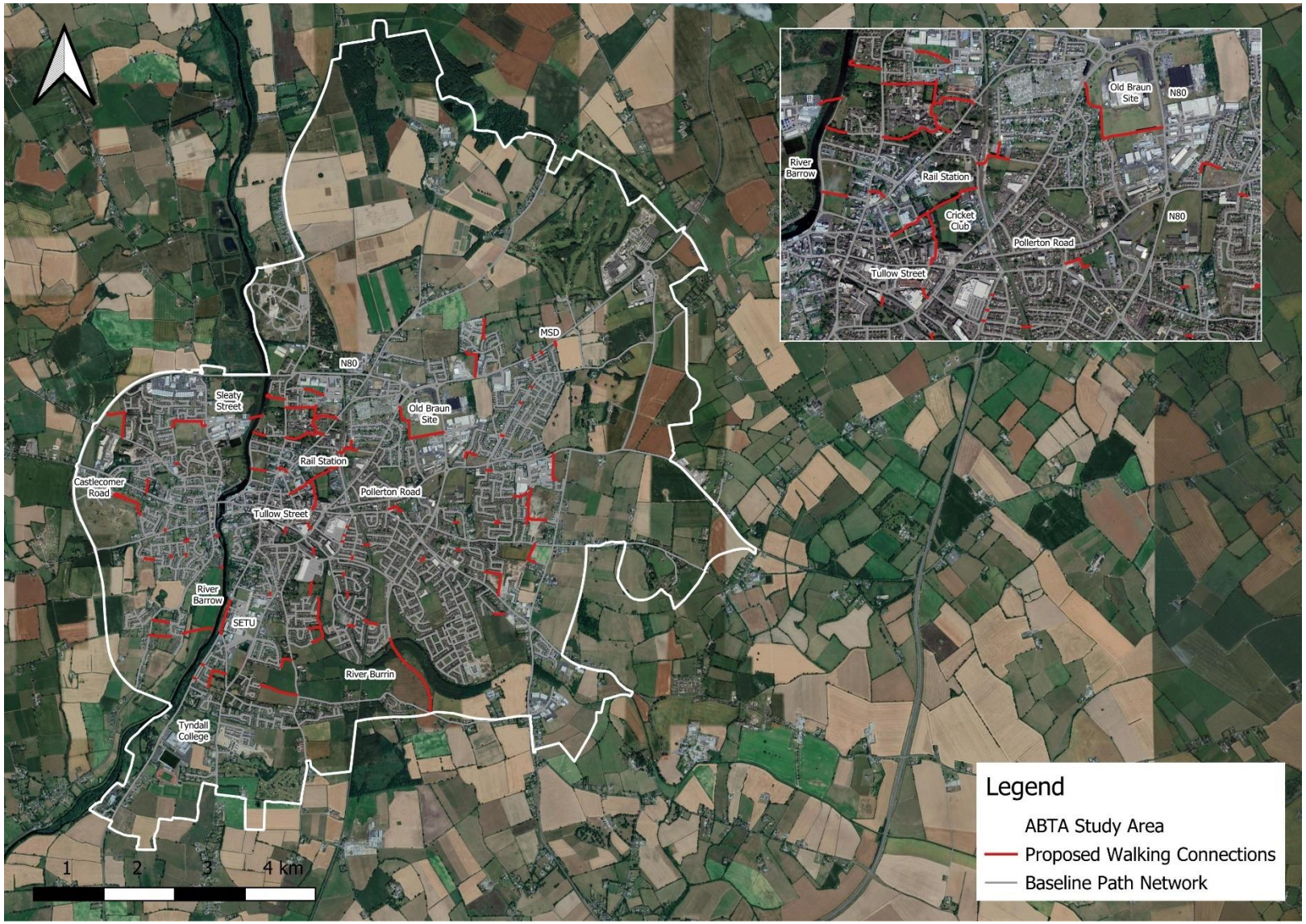
As mentioned, the walking strategy seeks to create convenient and efficient routes between homes and key trip attractors and reduce walking distances through enhanced permeability. This would give active modes of travel a competitive advantage over private cars. The strategy seeks to also facilitate recreational walking through the delivery of routes which are attractive.

To develop the options, an in-depth desktop study, which explored satellite imagery, on-street views, baseline path network, and OS map, was completed. This firstly established where paths already existed in Carlow Graiguecullen before suggesting high-level link options to better connect parts of the study area to each other.

In developing the options, consideration was given to the existing transport network in the area of the proposed new links. This was particularly important where proposing new links, which would connect to high-speed strategic roads, with it being essential that new links connected into an existing pedestrian network and safe crossing points. Consideration was also given to potential objections to proposed walking links where this may raise security concerns.

The preferred option for the walking mode is an improved walking network, which delivers permeability enhancements to improve active travellers' connectivity. Although these options are contained within the walking strategy, it is thought that cyclists could also benefit from the new links, albeit on some routes cyclists would be expected to dismount. The proposed permeability connections across the study area are shown in **Figure 10**; new or upgraded paths are shown in green. These permeability connections are recommended as a network and therefore an individual breakdown of each link is not provided.

Figure 10. Proposed Walking Network



The improved permeability connections will be delivered as follows:

- Cut-Throughs – removing a small permeability barrier, such as fencing or a wall, to allow for the easy flow of pedestrians between two areas.
- New Paths –provision of an entirely new connection, for example through a field or along the edge of residential estates.

Figure 11. Visualisation of Bridge over River Barrow.

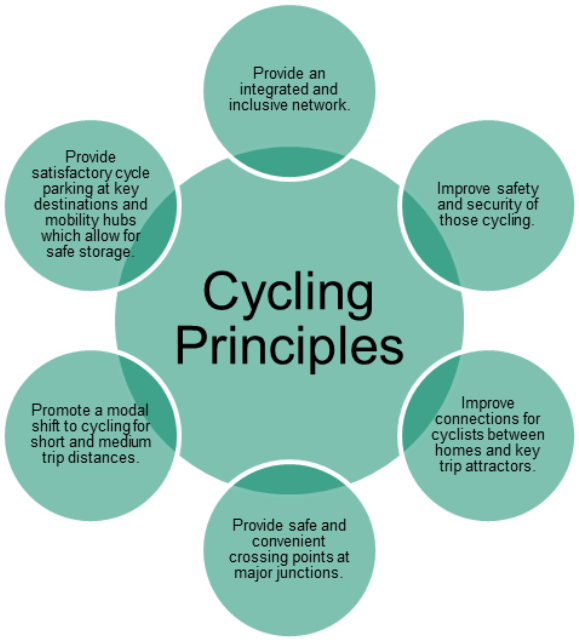
As demonstrated in the walking network map above, the new permeability proposals include a new active travel bridge crossing the River Barrow. Provision of this bridge to the south of the study area could remove a major permeability barrier and allow easier movement, for pedestrians and cyclists, between the two sections of the LTP study area currently severed by the River Barrow.

Additional measures are proposed to further enhance the attractiveness and likelihood of walking in Carlow Graiguecullen. These include the promotion of walking in Carlow Graiguecullen, as well as a pedestrian wayfinding strategy for the town. Promotion of walking as a mode of transport will focus on the benefits of increased physical activity, such as improved mental and physical wellbeing, reduced carbon emissions, and a nicer environment. The wayfinding strategy will highlight walking paths and routes that can be used around the town, for example signage from the town centre to SETU to provide both route direction and information on how long the walk may take. Providing information on routes and possible walking times can show that walking can be a quick and convenient method of travel around Carlow Graiguecullen and again increase the likelihood of walking.

3.2.3.2 Cycling

The cycling strategy seeks to provide a well-connected and high-quality cycle network across the study area. The principles for the cycling network are briefly outlined below.

Figure 12. Cycling Principles



New and upgraded cycling routes are intended to be used for strategic and recreational trips. The provision of higher-quality infrastructure which is safe, well-connected, and accessible aims to encourage people to choose cycling over the private vehicle for their transport.

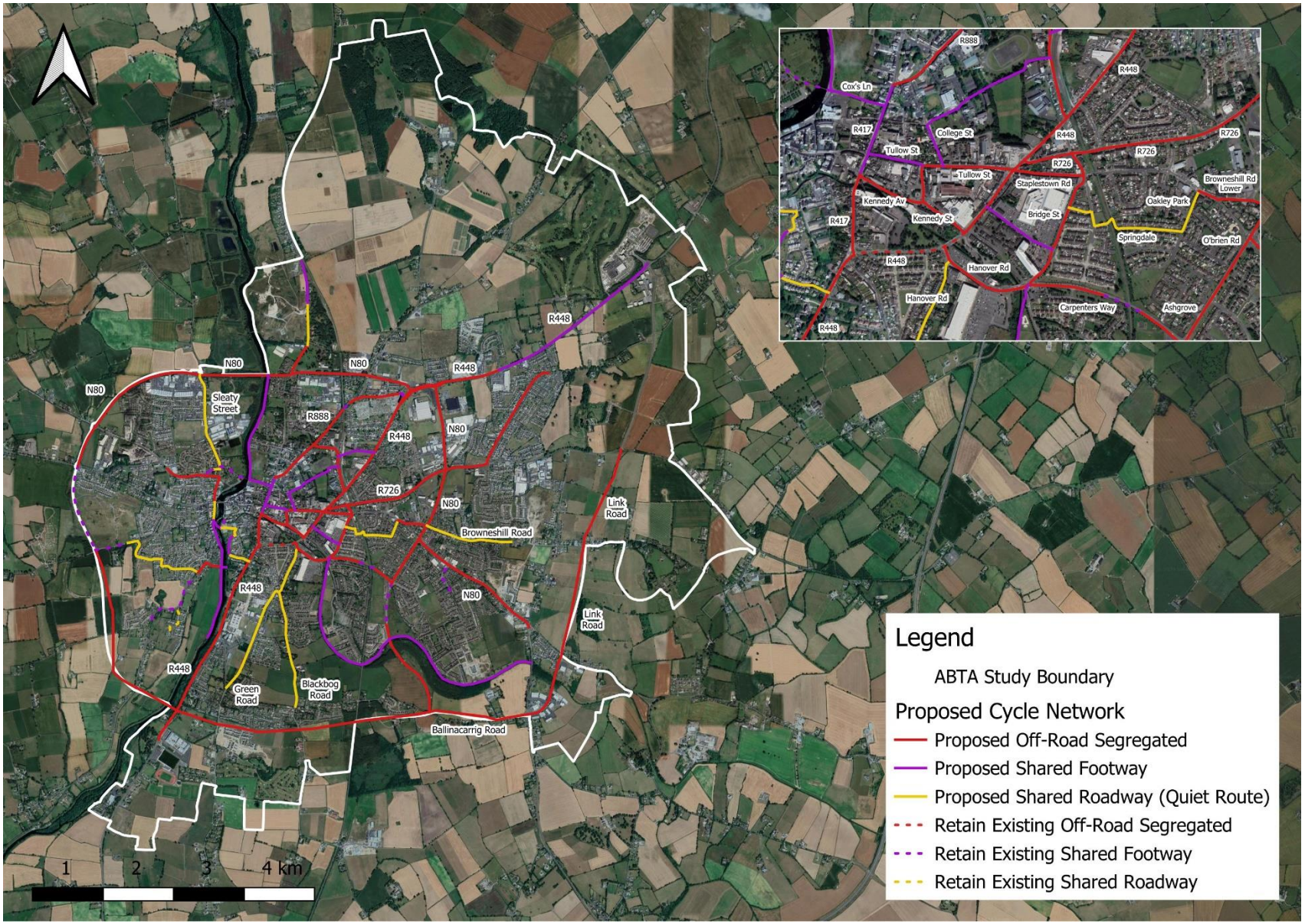
Options have been developed building upon the existing cycle connections in Carlow Graiguecullen and also to provide cycling connections between residential areas and key amenities. The starting point for the option development proposals was the national Cycle Connects strategy, which was a desktop study to identify extensive cycling proposals across key towns in Ireland, including Carlow.

There are varying levels of cycle infrastructure proposed, depending on the constraints that are encountered on each route. In some cases, there is a requirement for road or parking alterations, such as one-way road system or parking removal, in order to provide high-quality cycling infrastructure.

The main option of the cycling strategy is the creation of a cycle network providing connectivity and accessibility through high-quality cycle infrastructure for Carlow Graiguecullen. The provision of high-quality cycle infrastructure can make this method of travel safer, quicker, easier, and more attractive.

Figure 13 outlines the cycle proposals, which will provide a network of connected routes across the Carlow Graiguecullen area.

Figure 13. Proposed Cycle Network



There are varying levels of cycle infrastructure proposed across Carlow Graiguecullen. The different levels of infrastructure provision, are defined as follows:

Off-Road Segregated: cyclists are segregated from pedestrians and road traffic, meaning each mode has their own designated space. This is the optimal level of infrastructure provision and has been proposed in as many places as possible in the study area.

Shared Footway: cyclists and pedestrians share the footpath, which is indicated through markings on the pavement and appropriate signage. This option does not allow for segregated space between all modes; however, it still ensures segregation between active modes and road traffic.

Shared Roadway (Quiet Route): cyclists and traffic share the road. In terms of the LTP, shared roadway is only suggested for a quiet route, for example through a residential street which is quieter generally or where traffic calming measures (e.g., speed bumps or chicanes) could be implemented.

Further measures have also been identified to complement the proposed cycle network in Carlow Graiguecullen. These measures aim to improve the attractiveness of cycling as a mode of transport and are summarised below:

- Cycle Parking – the provision of secure cycle parking at key destinations across the study area. It is important that individuals can store their bikes in safe, covered, and convenient locations once they reach their destination. Without the provision of cycle parking, barriers to cycling still remain. A map of proposed cycling parking locations is included in the figure overleaf.
- Bike Maintenance Stands – provision of bike maintenance stands at key locations. Bike maintenance stands provide the tools to handle quick-fix bike issues, such as pumping a flat tyre. Some maintenance stands can also be used to re-inflate the tyre of a pushchair or wheelchair, therefore stands could benefit more than just cyclists. This again is important to boost the convenience of cycling.
- Cycle Hire Scheme – explore the option of implementing a cycle hire scheme in Carlow. This will improve cycling accessibility for those who do not own a bike.
- Advertising – Advertise, with appropriate signage, the new cycling links and use adverts to promote cycling and sustainable travel. The demonstration of benefits of active travel, for the individual and environment, can encourage people to choose this mode. This could be especially true for children who could be educated at school.
- Cycle Training – explore the option of providing cycle training for both children and adults so people can become competent riders and be more confident in using cycle infrastructure.

3.2.4 Public Transport

The provision of public transport options within the Carlow Graiguecullen area is limited but has recently been improved with the implementation of two new town bus services in 2023. Draft public transport options have been developed to complement the existing provision, with a recognition that CCC and LCC will work with the NTA and public transport providers to further enhance the public transport offer as part of an on-going process of bus network design to respond to changing demand patterns. The improvements to public transport aim to make public transport travel more accessible, convenient, and attractive so that this mode can become a more viable transport option for Carlow Graiguecullen.

Figure 14. Cycle Parking Locations

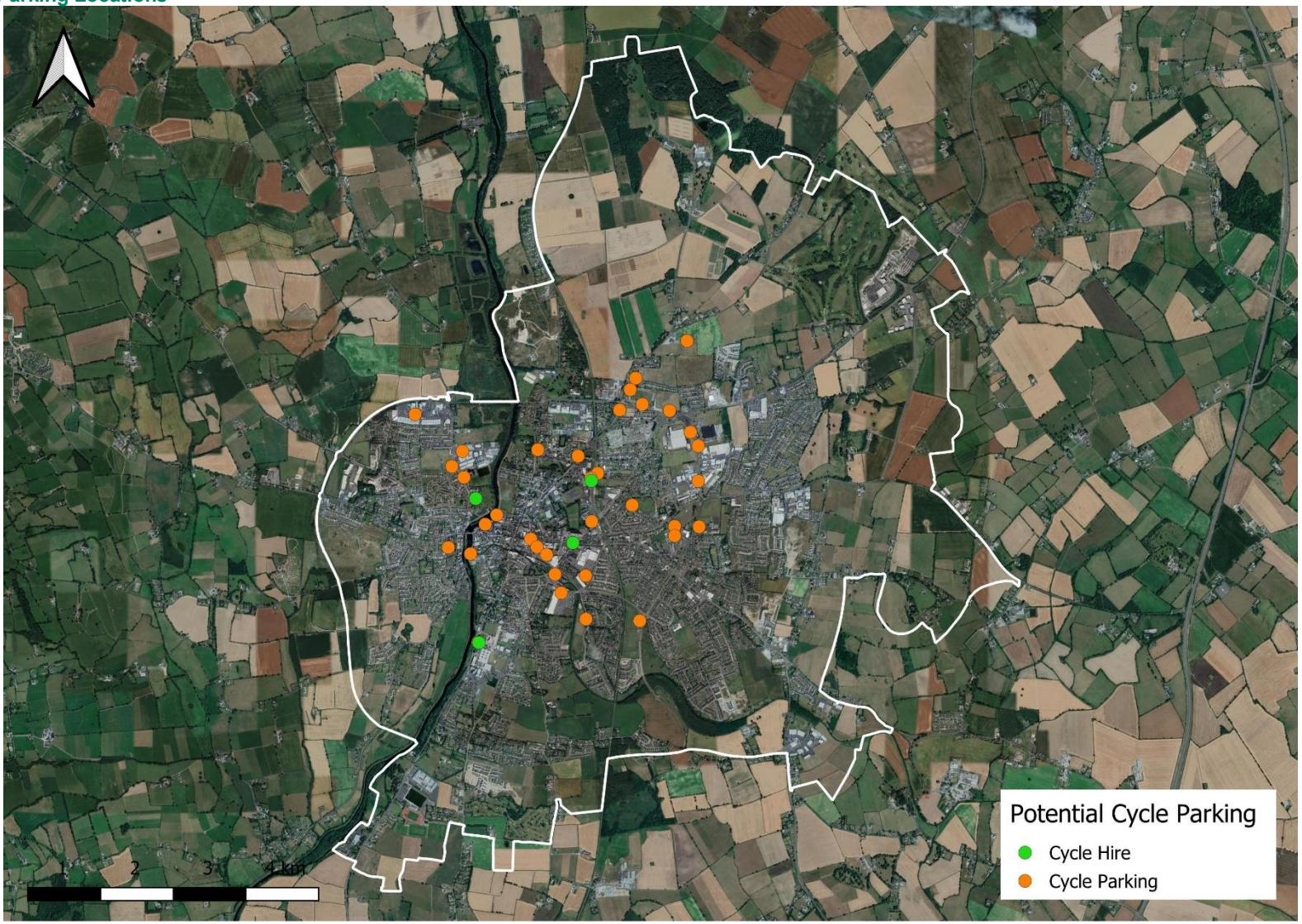
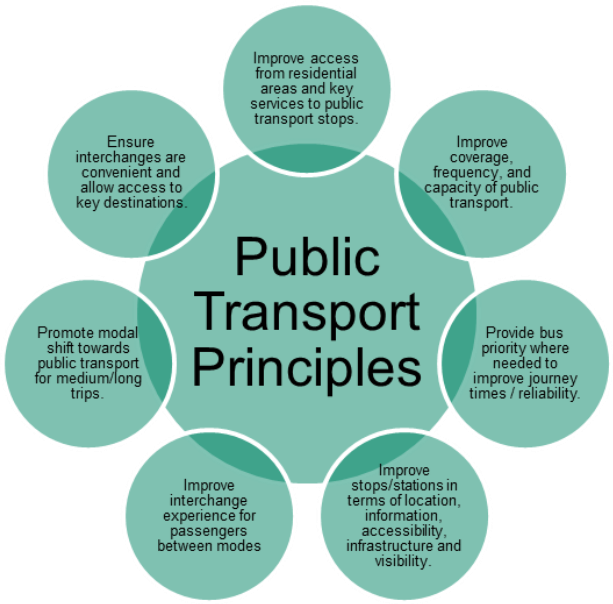


Figure 15. Public Transport Principles



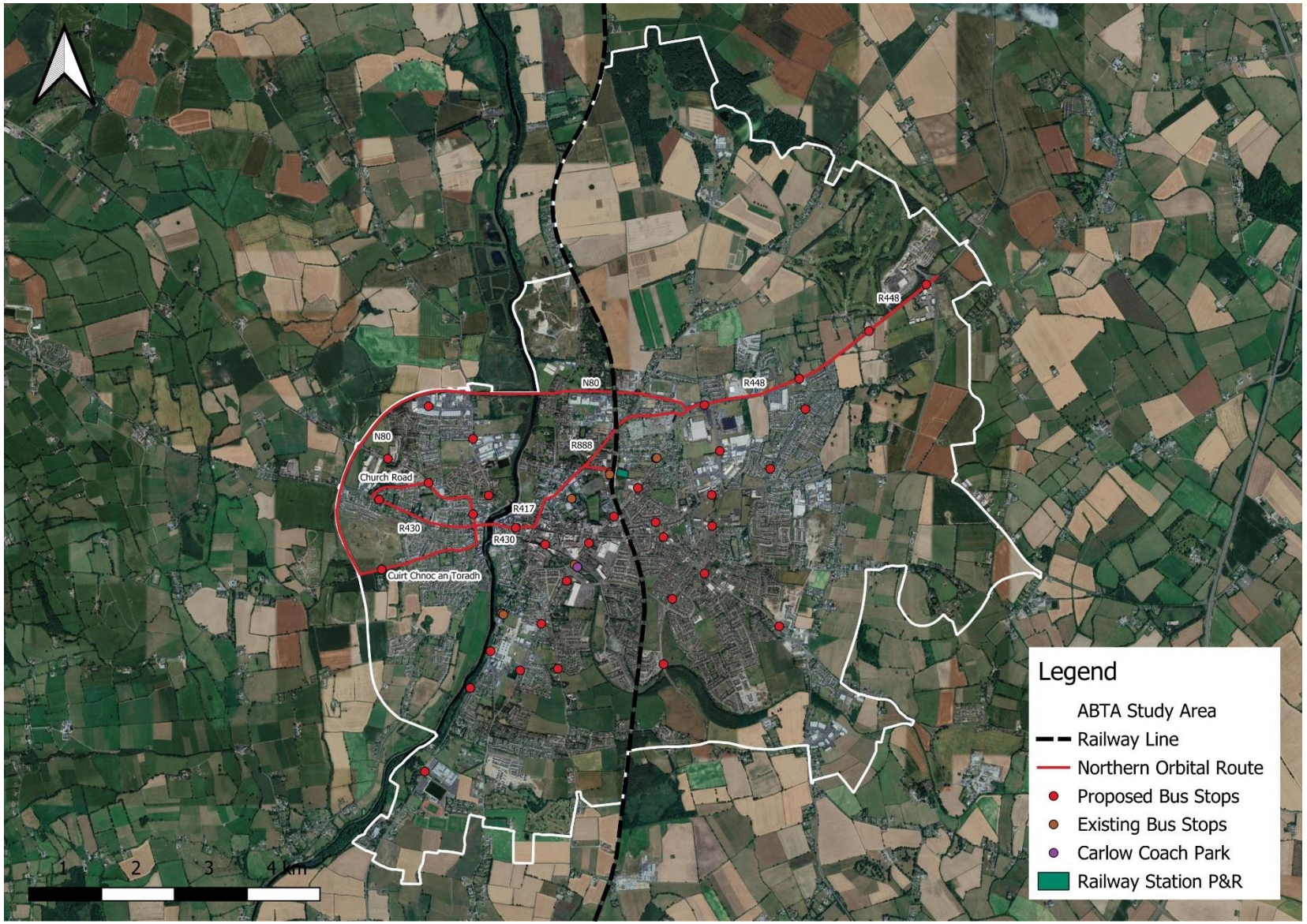
The public transport option development is different for bus and rail.

The bus options build upon the commitments made by CCC and NTA in terms of the new bus services. Therefore, LTP options were developed to cover routing gaps or bus stops not provided in the CCC/NTA plans. In terms of bus stops, the ideal benchmark is that all areas of urban Carlow Graiguecullen will be within 500 metres of a bus stop.

For rail, there is recognition that improvements to the frequency of services between Carlow and Dublin would improve the attractiveness of rail as a mode of transport. However, such large-scale rail improvements lie outside the scope of this LTP and are being addressed in the All-Island Strategic Rail Review, but CCC and LCC will continue to work with partner organisations to develop options for improvements to the rail network.

Central to the public transport strategy is the ongoing review of the two new bus services and the potential extension of existing routes, or provision of new routes to support changing demand patterns; a potential new route has been identified along the N80, but this will be subject to ongoing review depending on the uptake of new services. The provision of the N80 orbital bus route would ensure that the national secondary road and the northern section of the study area, including the north west of Carlow Town, is covered by a bus route. It has been outlined in policy that an N80 bus route is desirable to provide connections along this strategic route. This route would call near key destinations such as homes in Graiguecullen, at retail spaces along the N80 and R448, Carlow Train Station, and MSD, a major employer. The provision of a new route, or extension to existing routes, would improve the viability of public transport as a mode of transport. The potential N80 route is shown in **Figure 15**.

Figure 16. Proposed N80 Orbital Route



With the implementation of new bus services, there will need to be improvements to the existing public transport infrastructure, with the installation of new bus stops and upgrades to public transport interchanges. The proposed location of new bus stops can be seen in **Figure 15,** although this would be subject to a detailed review following agreement on extension to any bus routes.

A significant increase in the number of bus stops in Carlow Graiguecullen is essential to ensure that bus routes are accessible. Reducing the distance between stops and homes/destinations can make bus travel more attractive as bus journey times can become more competitive with the car. Additionally, the improvement to infrastructure so that it is higher quality, for example lighting, shelter, better information regarding public transport (fares, ticketing, timetables) can make wait times and necessary transfer easier. Such improvements will improve the overall attractiveness of public transport and could encourage increased usage.

Alongside extensions to the bus network and provision of bus stops, it is proposed that major public transport stations (Carlow Coach Park) will become mobility hubs. This will create stations which can act as a seamless transfer point for all modes as well as an enjoyable place to wait for public transport services, buy tickets and seek out information. An example visualisation of what Carlow Coach Park could look like is provided below. NB: This is indicative only.

Figure 17. Carlow Coach Park Visualisation

There is a recognition that the provision of additional measures, outlined below, could further enhance the quality and attractiveness of the public transport services for Carlow Graiguecullen.

- **Real-time passenger information (for buses) –** Once sufficient bus services are established within Carlow, CCC and LCC will work with operators regarding the need for, and benefits of, real-time information. Real-time information will allow individuals to have better live tracking of buses and allow them to be better informed about travelling by public transport. This information could be available at the bus stop or through a mobile phone application.

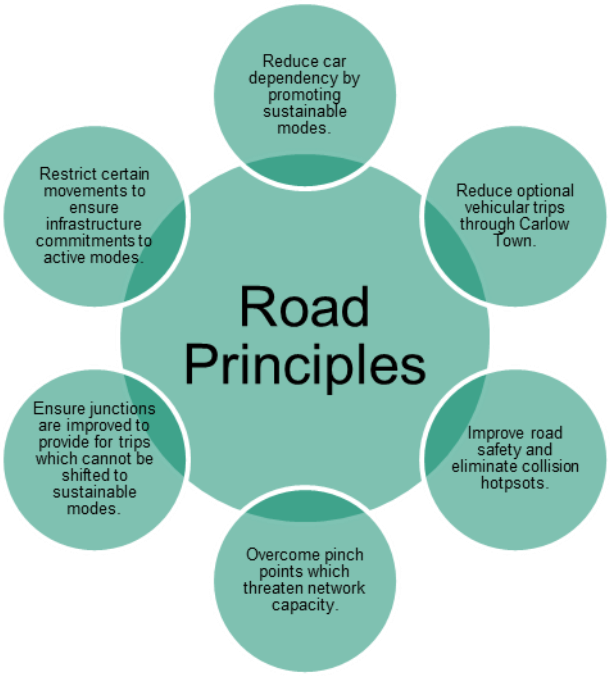
- **Flexible and affordable ticketing** – CCC and LCC will endeavour to work with the necessary parties to provide tickets for public transport services which are flexible and affordable. Improving flexibility could allow individuals to buy a single ticket that would cover multiple bus routes or multiple public transport modes. Ensuring ticketing is flexible and affordable is important to making public transport more accessible to all. If ticketing is complex or unaffordable, it can make public transport services unattractive.

- **Marketing campaign** – To improve awareness of the public transport offer within Carlow Graiguecullen, CCC will run a marketing campaign. This would outline the improvements made to bus services and other key information e.g., prices, running times, journey times between key destinations. Providing travellers with information on the public transport options that are available to them ensures that they can make informed choices about their mode of transport.

3.2.5 Road

Due to the hierarchy of different transport modes, it will not be appropriate within this LTP to make the case for significant road construction in isolation. Instead, future road construction, or improvements, will be linked to improvements for sustainable transport as part of multi-modal solutions. As such, many of the road options are based around changes necessary to facilitate segregated cycling infrastructure. That said, there is recognition that given the rural nature of the study area, there will still be a need for many people to drive; the N80 also provides a strategic connection for freight which must be protected through the option development process and any changes which impact on the operation of the N80 must be developed in full collaboration with TII. Options have therefore been included within this LTP, which ensure the safe and efficient operation of the road network for the movement of people and goods.

Figure 18. Road Principles



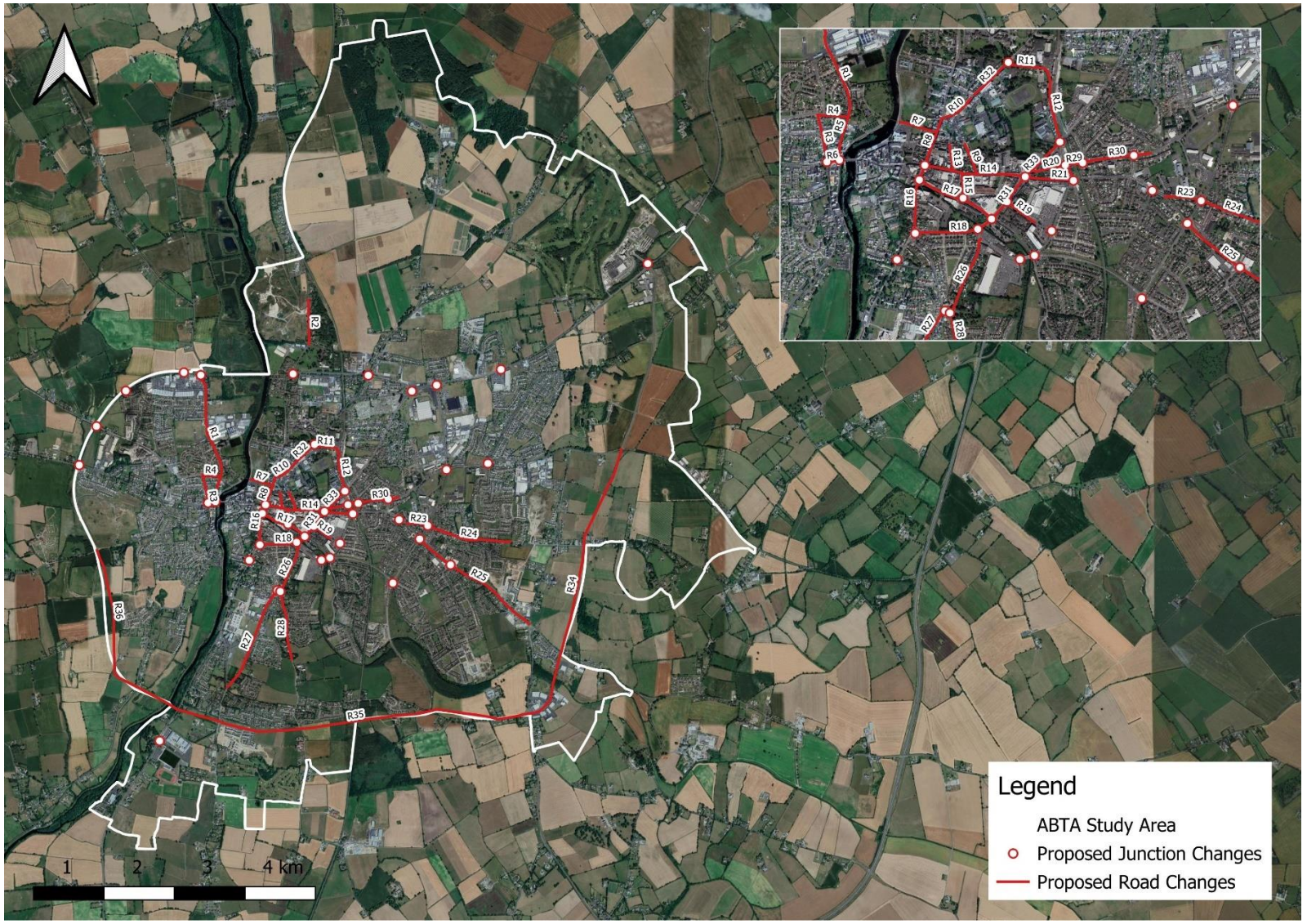
Road options have been split into two categories; changes to the road layout or changes to junctions. In a number of locations, there are a subset of options, whereby a number of different measures could be implemented to achieve the same outcome.

Whilst many of the options proposed are around provision for active travel infrastructure, CCC is committed to measures, which will better manage the existing network, such as the optimisation and control of traffic signals.

Given some of the measures, which are proposed to reallocate road space to sustainable modes of transport, in the longer term, CCC is promoting the construction of a Southern Relief Road. This will provide alternative routes for those that need to drive, removing traffic from the town centre and ensuring measures which reallocate road space to sustainable modes of transport are more palatable. Funding for this road scheme is currently being sought.

The following map shows the location of potential changes to roads and junctions across the Carlow Graiguecullen study area.

Figure 19. Proposed Road and Junction Changes



Details of each option are outlined in the below table, the reference number from the table correlates with the map seen in **Figure 19**.

Table 3-1: Road and Junction Options

Reference	Option Name	Option Description
	Junctions	Upgrades are required to junctions to provide improved facilities for pedestrians and cyclists. Whilst at this stage, options at each individual junction have not been identified, design principles set out in the Design Manual for Urban Roads (DMURS) and the NTA's Cycle Design Manual (CDM) have been used to identify where junction upgrades are considered necessary. Where junction upgrades are proposed, these will be subject to a detailed design and option assessment process, to ensure the junction provides the necessary infrastructure for pedestrians and cyclists whist maintaining the function of the road network. It is envisaged that junction upgrades will include the installation of traffic signals and the reduced footprint of larger junctions.
	Traffic Signal Management	Linked traffic signals to provide a green wave through key areas. This will reduce traffic congestion and improve journey time reliability.
R1	Sleaty Street	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.
R2	Athy Road	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.
R3	Chapel Street	Proposed one-way loop with Ninety-Eight Street, Maryborough Street, and Bridge Street to facilitate active travel improvements.
R4	Ninety-Eight Street	Proposed one-way loop with Chapel Street, Maryborough Street, and Bridge Street to facilitate active travel improvements
R5	Maryborough Street	Proposed one-way loop with Chapel Street, Ninety-Eight Street, and Bridge Street to facilitate active travel improvements
R6	Bridge Street	Proposed one-way loop with Chapel Street, Ninety-Eight Street, and Maryborough Street to facilitate active travel improvements
R7	Cox's Lane	Proposed closure to Cox's Lane for general traffic so that the space can become a place solely for pedestrians and cyclists.
R8	Dublin Street	There are potential options for Dublin Street which are interlinked with cycling; - Convert Dublin Street to one-way; this would allow for off-road segregated cycle paths (optimum infrastructure) to be accommodated with no change to the footway. - Removal of parking along Dublin Street to widen footpaths and allow cyclists and pedestrians to have shared space on the footway.
R9	College Street	Closure of the lower section of College Street (between Tullow Street and Brown Street) to general traffic to provide a nicer space for pedestrians and cyclists. The section from Brown Street northwards towards Dublin Road would remain open.
R10	Dublin Road	On the one-way stretch of Dublin Road, near to the courthouse, it is proposed that one of the lanes is removed to accommodate cycle infrastructure.
R11	Railway Road	There are potential options for Railway Road which are interlinked with cycling: - Railway Road becomes one-way to accommodate off-road segregated cycle infrastructure and make the area nicer for active travel. - The drop off zones / parking on Railway Road are removed to allow for increased space for pedestrians and cyclists and again off-road segregated cycle infrastructure can be provided.
R12	St. Joseph's Road	There are potential options for St. Joseph's Road which are interlinked with cycling: - St. Joseph's Road becomes one-way to accommodate off-road segregated cycle infrastructure and make the area nicer for active travel. - The parking on St. Joseph's Road is removed to allow for increased space for pedestrians and cyclists and again off-road segregated cycle infrastructure can be provided.

Reference	Option Name	Option Description
R13	Charlotte Street	There is no direct proposed change to Charlotte Street however, if Tullow Street is pedestrianised then access from Tullow Street will no longer be available. No changes are proposed to the exit from the car park onto Charlotte Street.
R14	Tullow Street	Tullow Street has been broken down into three sections, with proposals for each section outlined below: - It is proposed that Tullow Street, between Barrack Street junction and Carlow Shopping Centre entrance remains open as it is currently, and parking is removed to provide off-road segregated cycling infrastructure. - It is proposed that Tullow Street between Carlow Shopping Centre entrance and Potato Market becomes one-way to provide off-road segregated cycling infrastructure. - It is proposed that Tullow Street from Potato Market to Dublin Street is closed to general traffic and becomes pedestrianised.
R15	Potato Market	It is proposed that Potato Market will become one-way, and more street space will be given to pedestrians and cyclists. This is an important option in making Carlow town centre a nicer place to spend time.
R16	Burrin Street	It is proposed that Burrin Street becomes one-way to accommodate off-road segregated cycle infrastructure.
R17	Kennedy Avenue	There are two options for Kennedy Avenue: - Proposed one-way movement on Kennedy Avenue (to form a loop with Burrin Street and Kilkenny Road). - Alternatively, if one-way is not provided, parking could be removed to provide off-road segregated cycle infrastructure.
R18	Kilkenny Road	Proposed one-way movement on Kilkenny Road (to form a loop with Burrin Street and Kennedy Avenue) and provide active travel infrastructure.
R19	Fairgreen Retail Access	Access to Fairgreen Retail Park from Barrack Street is closed to make the space safer for pedestrians and cyclists.
R20	Pollerton Road	There are two proposed options at Pollerton Road, this is in reference to the lower section between Green Lane and Bridge Street. Options are dependent on proposals for Staplestown Road and Bridge Street. - Proposed that the one-way movement on Pollerton Road is reversed and parking removed. The one-way movement would tie in with Staplestown Road. - Proposed that the parking is removed with no change to the road.
R21	Staplestown Road	There are two proposed options at Staplestown Road, this is in reference to the lower section between the Barrack Street junction and Bridge Street. Options are dependent on proposals for Pollerton Road and Bridge Street. - Proposed that the one-way movement on Staplestown Road is reversed, this would tie in with Pollerton Road. - Proposed that the parking is removed with no change to the road.
R22	Bridge Street (Carlow)	Road to become one-way to accommodate the one-way loop of Pollerton Road and Staplestown Road (if implemented).
R23	Browneshill Road Lower	Proposed one-way of Browneshill Road Lower and removal of parking to gain extra space for pedestrians and cyclists and provide off-road segregated cycle infrastructure.
R24	Browneshill Road	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.
R25	Tullow Road	Proposed removal of turning pockets and hatched lines to allow for narrowing of general traffic lanes and providing off-road segregated cycle infrastructure.
R26	Hanover Road	There are two proposed options for Hanover Road to provide the desired level of cycling infrastructure: - Proposed one-way system (along with Green Road) to allow for off-road segregated cycle infrastructure to be implemented.

Reference	Option Name	Option Description
		- Proposed traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer and cyclists would share road space.
R27	Green Road	There are two proposed options for Green Road to provide the desired level of cycling infrastructure: - Proposed one-way system (along with Hanover Road) to allow for off-road segregated cycle infrastructure to be implemented. - Proposed traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer and cyclists would share road space.
R28	Blackbog Road	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.
R29	Pollerton Road (under railway bridge)	It is proposed that the section under the railway bridge becomes signalised allowing for movement in one direction only at each time. The narrowing of the road will allow for off-road segregated cycle infrastructure.
R30	Pollerton Road (railway bridge to St. Mary's Park)	Parking to be removed accommodate off-road segregated cycle infrastructure.
R31	Barrack Street	Parking is removed to improve the public realm space.
R32	Dublin Road (Greenbank Road to Railway Road)	Proposed removal of parking to accommodate cycle infrastructure along this stretch of Dublin Road (between Greenbank Road and Railway Road).
R33	Green Lane	Proposed removal of parking on Green Lane (between Staplestown Road and St. Joseph's Road) to accommodate cycle infrastructure.
R34	Southern Relief Road	Southern Relief Road Phase 1 - support the construction of this section of the Southern Relief Road to provide an entire ring road for Carlow.
R35	Southern Relief Road	Southern Relief Road Phase 2 - support the construction of this section of the Southern Relief Road to provide an entire ring road for Carlow.
R36	Southern Relief Road	Southern Relief Road Phase 3 - support the construction of this section of the Southern Relief Road to provide an entire ring road for Carlow.

3.2.6 Parking

Figure 20. Parking Principles

Options for parking have also been proposed as part of the LTP. CCC and LCC recognise that parking restrictions can only be successful if they are suitably enforced. The Councils will continue to review available resources and look at opportunities to increase parking enforcement across the town. The parking options are outlined below, some of these options would be necessary to provide improved infrastructure for other modes or a nicer street environment in the Carlow Graiguecullen study area.

Please note, some of the road section covers the removal of on-street parking – these options will not be repeated in this section. The below table (**Table 3-2**) outlines the parking options put forward in the parking strategy.

Table 3-2: Parking Options

Option	Description
Parking Pricing	Review of pricing for car parking across Carlow town centre.
Parking for Blue Badge Holders	Ensure provision for blue badge holders is maintained and improved where possible.
New Railway Station Car Park	New car park to the east of the railway line, accessed from Glendale Avenue.
Current Railway Station Car Park	Convert the current railway station car park into a place for cycle parking, a drop-off zone for those trying to access the station, as well as an upgraded bus stop and waiting area
Carlow Retail Park	Make use of some of the spaces in the Carlow Retail Park to provide parking for SETU students and workers who could then walk to campus.
School Drop-Off Restrictions	Remove set down or drop-off zones immediately outside schools Resident permits on streets near to schools.
Electric Vehicle Charging	Provision of electric vehicle charging at convenient locations
SETU	Provide a new car park near to SETU
Parking App	Consider benefits of a parking app to make sure parking in Carlow can be easily located and paid for.
Parking Enforcement	Ensure adequate enforcement of parking restrictions to ensure benefits of the other parking options are captured.
Vehicle Wayfinding	Provision of signage which can identify where car parking is located and number of spaces available.

4. Part 3 – Options Assessment

4.1 Options Assessment Methodology

This section summarises the Multi-Criteria Analysis (MCA) approach used to appraise options identified in the Carlow Graiguecullen LTP.

4.1.1 Multi-Criteria Analysis (MCA) Use in Option Assessment

The MCA assessment is used to provide scores for public transport, road, and parking options. The standard MCA approach is to compare similar options in the same table, in order to identify a preferred option. However, in this LTP, the options are significantly different and not directly comparable. Therefore, options will be grouped into a combined table only when there are comparable options, e.g., two different options for the same road, otherwise individual MCAs will be used to assess each option on its own merit.

4.1.1.1 MCA Assessment Criteria

The criteria for the MCA assessment are displayed below in **Table 4-1**. This is based on the principles of the LTP, outlined in **3.1.1**. The use of the principles to score options will ensure that the best options are taken forward to address the overall objectives of the LTP. Under each criterion, a number of elements will be considered, as outlined in the table below, based on evidence collected during the study, project analysis, consultation feedback and CCC/LCC direction. It should be noted that the MCA analysis has not been undertaken for active travel proposals, as it is assumed that all active travel proposals will be taken forward as and when funding becomes available and following a detailed design and assessment process.

Table 4-1: MCA Criteria

	Criteria (Principles)
Public Transport	Improve access from residential areas and key services to public transport stops.
	Improve coverage, frequency, and capacity of public transport.
	Provide bus priority where needed to improve journey times/reliability.
	Improve stations in terms of location, information, accessibility, infrastructure, and visibility.
	Improve interchange experience for passengers between modes.
	Promote a modal shift towards public transport for medium/long trips.
	Ensure interchanges are convenient to allow access to key destinations.
Roads	Reduce car dependency by promoting sustainable modes.
	Reduce optional vehicular trips through Carlow Town.
	Improve road safety and eliminate collision hotspots.
	Overcome pinch points which threaten network capacity.
	Ensure junctions are improved to provide for trips which cannot be shifted to sustainable modes.
	Restrict certain movements to ensure infrastructure commitments to active modes.
Parking	Manage provision of parking to support economic vitality of town.
	Ensure parking provision encourages sustainable travel.
	Reduce on-street parking in centre to facilitate public realm and sustainable travel upgrades.
	Improve quality of parking information.
	Introduce parking demand management to reduce car dependency and promote sustainable travel.
	Provide high-level recommendations for locations for electric vehicle charging.
	Ensure parking pricing and availability secure a modal shift.

4.1.1.2 MCA Assessment Scale

In the MCA assessment, a seven-point scale is used. This scale is outlined in **Table 4-2**. Given that most impacts are qualitative at this stage, each criterion is scored on the extent to which the option offers a positive or negative impact. For illustrative purposes, this seven-point scale is colour coded with advantageous options graded varying shades of green and disadvantageous options graded in shades of red/orange. It should be noted that principles not addressed by a specific option will be given a neutral score in that MCA.

Table 4-2: MCA Colour Coded Scoring Scale

Colour	Description
	Major Benefit – proposal is expected to have a clear and considerable benefit or positive impact.
	Moderate Benefit – proposal is expected to have a moderate benefit or positive impact.
	Minor Benefit – proposal is expected to only have a minor benefit or positive impact.
	Neutral – overall the proposal is expected to have neither a positive nor negative impact.
	Minor Disbenefit – proposal is only expected to result in a minor negative impact.
	Moderate Disbenefit – proposal is expected to result in a moderate disbenefit or negative impact.
	Major Disbenefit – proposal is expected to result in a clear and considerable disbenefit or negative impact.

4.2 Walking Measures Assessment

The walking options are outlined in section **3.2.3.1**. The main walking option is to provide new or upgraded links to provide an improved walking path network and greater permeability across the Carlow Graiguecullen LTP study area. These links are not outlined individually as it is the delivery of them in combination which will help deliver an improved path network which can provide connections to key trip attractors. As a result, the network as a whole is assessed to quantify the number of key destinations which will now be accessible within a walking distance. The paragraph below outlines the ATOS assessment undertaken, prior to results been contained further down in the section.

4.2.1 ArcGIS ATOS Use in Options Assessment

Walking accessibility was examined using the NTA's Access To Opportunities and Services (ATOS) tool. This tool is maintained by the NTA to investigate accessibility to a range of different services and opportunities by active modes including employment, education, GPs, food outlets, and open spaces. The tool is based on a methodology originally developed by Transport for London (TfL), but some minor adjustments have been made by the NTA to make it more suitable for use outside of large metropolitan areas in Ireland. The baseline assessment, contained with Appendix A, describes the full methodology of ATOS assessments.

Table 4-5 presents the change in the ATOS assessment outcomes between the baseline path network and the proposed future path network, following the development of the walking strategy. The score ranges for the ATOS assessment are shown in the tables below. It should be noted that the ATOS assessment was undertaken prior to a change to the study area boundary for the LTP; the study area boundary change is small and is not expected to have any significant impact on the ATOS assessment conclusions.

Table 4-3: ATOS Score Ranges (All Destinations – excluding employment)

ATOS Score	Score Range	Map Colour
A	More than one standard deviation below the average	
B	Below the average, but not by more than one standard deviation	
C	Average or above, but not by more than one standard deviation	
D	Between one and two standard deviations above the average	
E	More than two standard deviations above the average	
NULL	More than specified maximum travel time	

Table 4-4: ATOS Score Ranges (Number of Accessible Jobs)

ATOS Score	Score Range	Map Colour
A	More than one standard deviation above the average	
B	Above the average, but not by more than one standard deviation	
C	Average or below, but not by more than one standard deviation	
D	Between one and two standard deviations below the average	
E	More than two standard deviations below the average	

4.2.1 Assessment Outcomes

The following table summarises the outcomes of the ATOS assessment, in terms of how many key services are available within a 20-minute walking distance of where people live (the table first shows what percentage of grid squares have 2 facilities within a 20-minute walking distance, with the next column showing the percentage of grid squares with 1 facility within a 20-minute walking distance) . Please note, due to the slightly different way of scoring employment, it is not included in the table and is summarised in section **0**.

Table 4-5: Expansion of Walking to Key Service Areas

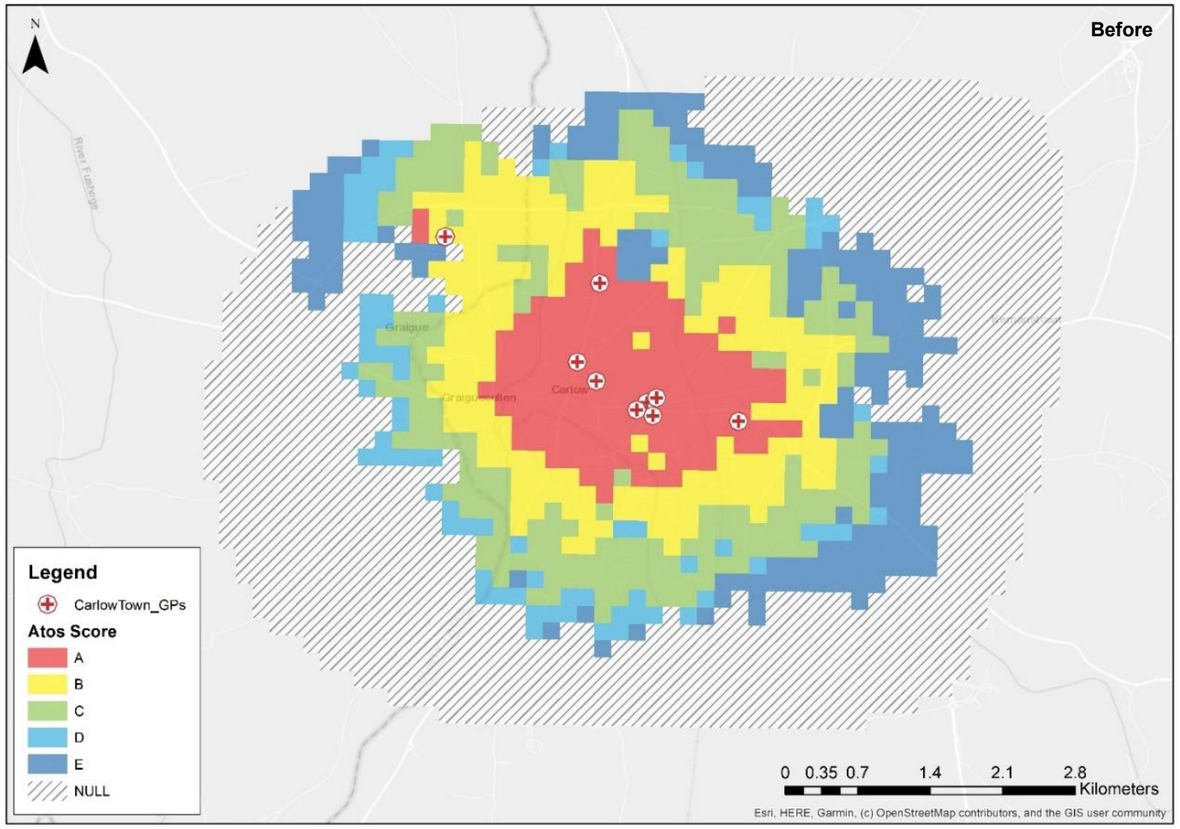
	Existing Path Network		Future Path Network		Difference	
	% with 2 within 20-minute walk	% with 1 within 20-minute walk	% with 2 within 20-minute walk	% with 1 within 20-minute walk	% with 2 within 20-minute walk	% with 1 within 20-minute walk
GP	39	52	41	54	2	2
Parks	N/A	69	N/A	74	N/A	5
Post-Primary	42	50	49	57	7	7
Primary School	34	60	38	68	4	8
Supermarket	N/A	88	N/A	93	N/A	5

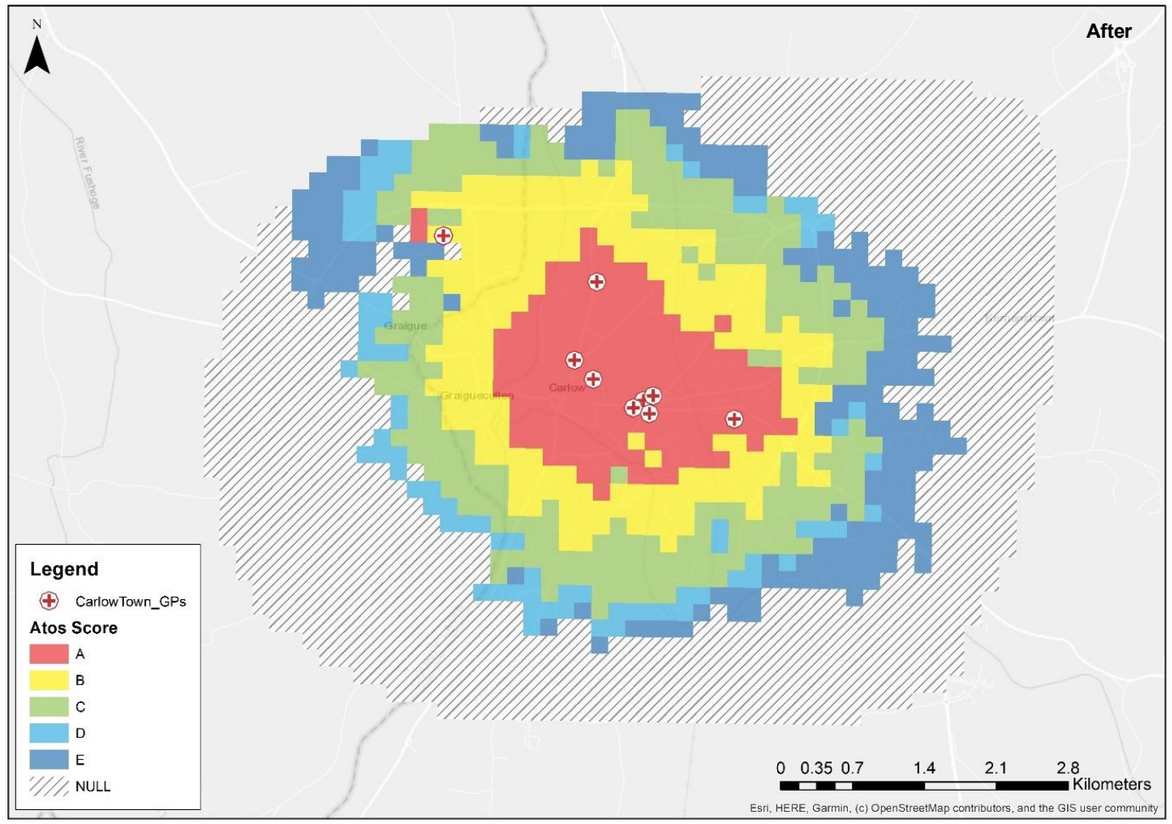
Overall, the implementation of the walking strategy will improve access to key services and facilities across Carlow Graiguecullen. This is summarised in more detail in the following text.

4.2.1.1 Impact on GPs

The following figure presents the accessibility to GPs based on the proposed future path network. The majority of the GP surgeries are located in close proximity to the town centre, with the exception of one sitting just off Sleaty Street. Outputs from the ATOS assessment show that access to GP surgeries increases by 2% with the proposed changes to the future path network. The proposed path network is not as beneficial in improving GP service accessibility, when compared to other key services, however, this is likely due to the location of services.

Figure 21. GPs Accessibility Based on Future Path Network

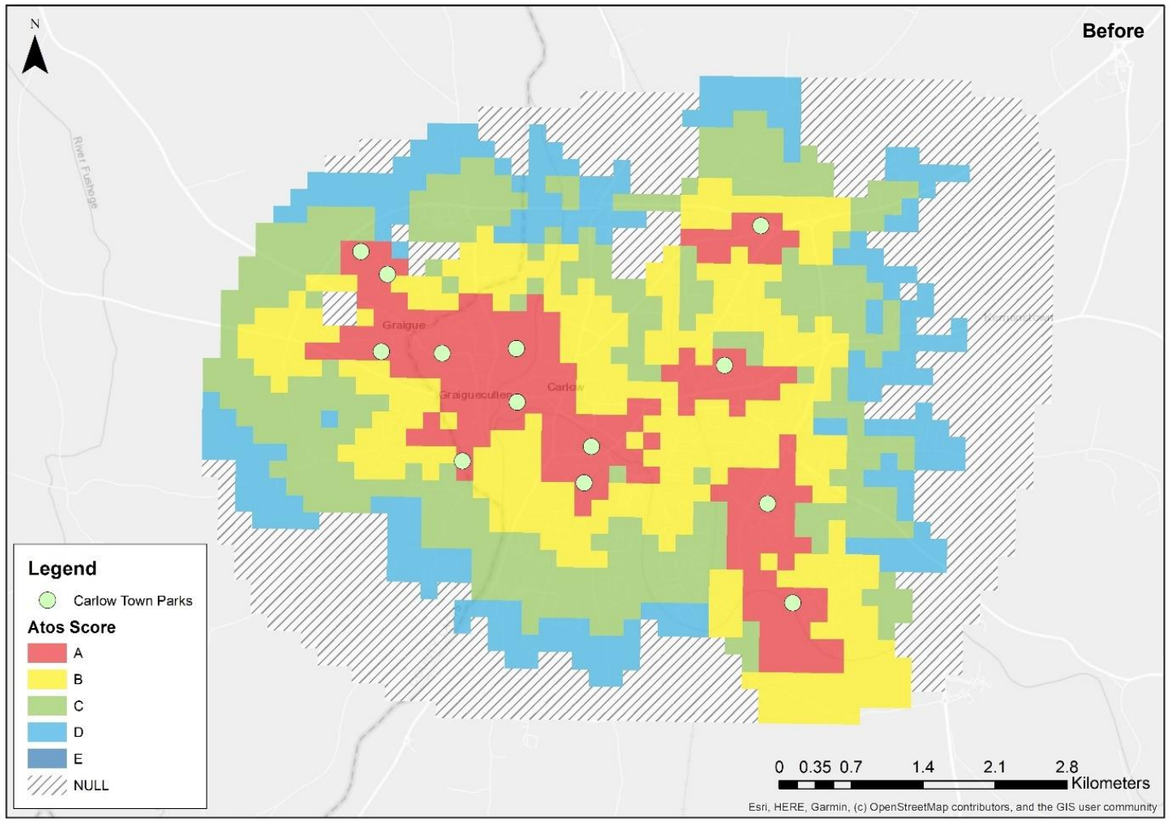


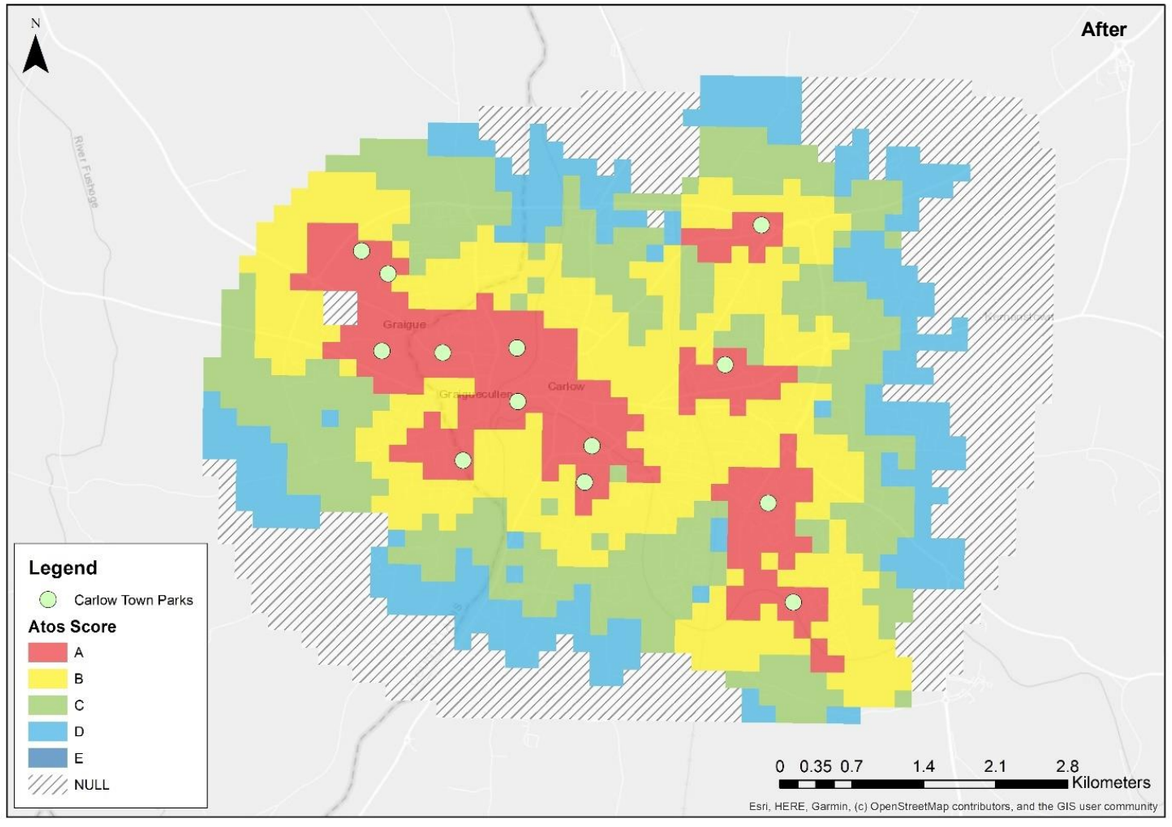


4.2.1.2 Impact on Parks and Open Spaces

Figure 22 shows the accessibility to parks and open spaces based on the proposed future path network. It should be noted that the points represent either the centre point of the open space or the park/space entranceway. A comparison of the accessibility based on the baseline path network and the proposed future path network highlights that a few areas have seen notable improvements in park and open space accessibility. These areas include the area between Athy Road and Dublin Road, near the Hospital and Delta Sensory Gardens, west of Sleaty Street, below Barrow Valley Retail Park, as well as west (including Graiguecullen) and east of Kilkenny Road to the south of SETU. Data analysis supports the improvement of park and open space accessibility based on the future proposed path network. 74% of grid squares fall within a 20-minute walk of one park or open space, compared to 69% with the baseline path network.

Figure 22. Park and Open Space Accessibility Based on Future Path Network



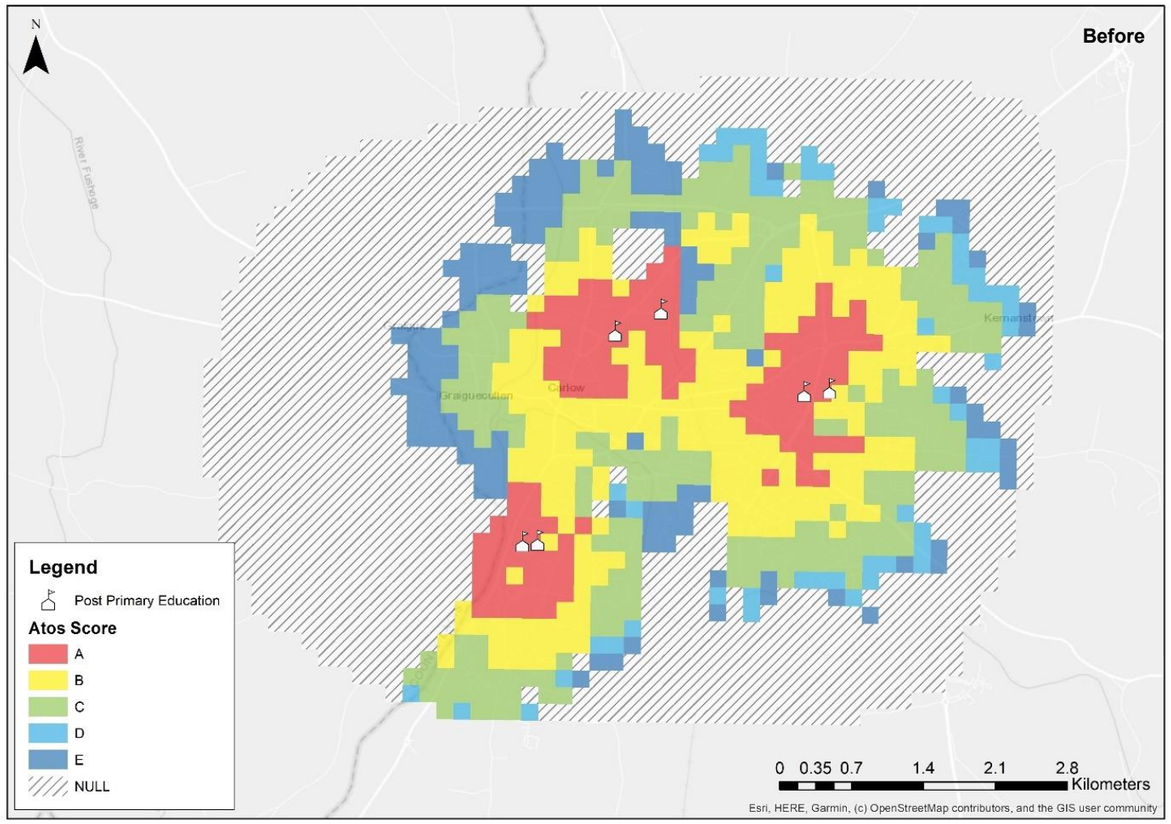


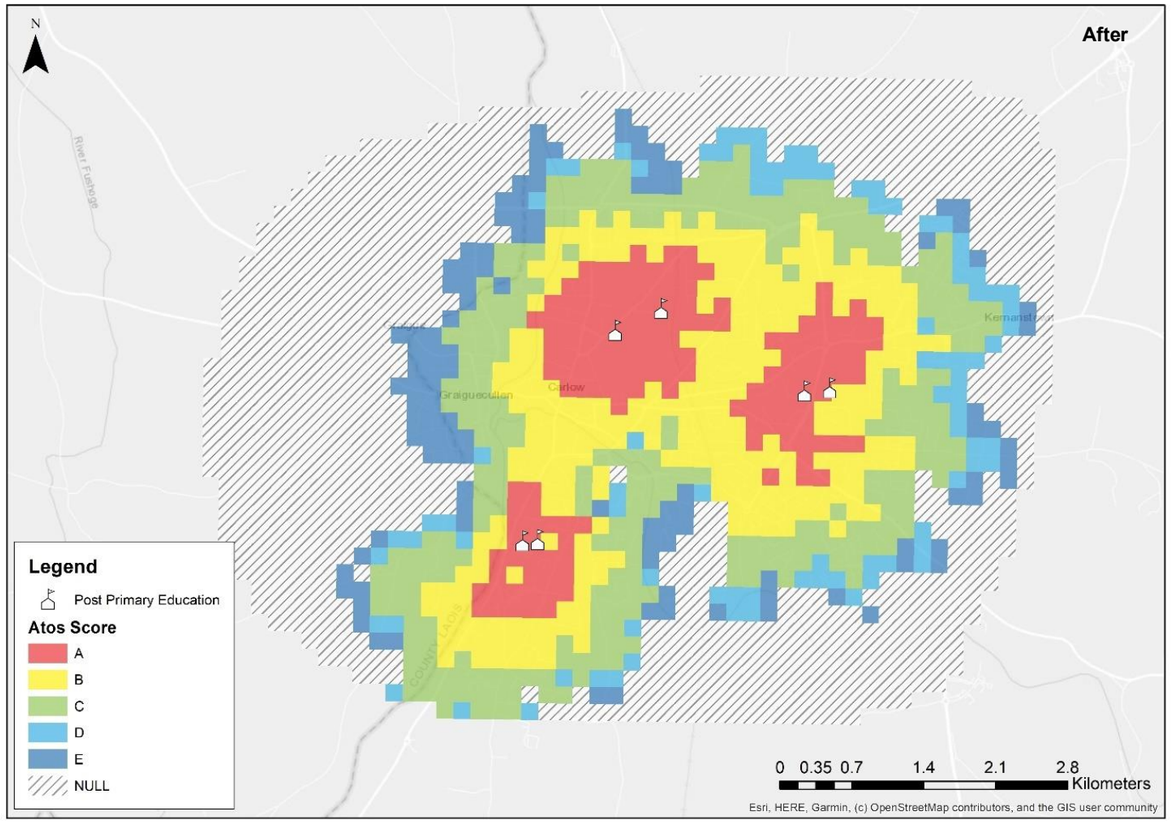
4.2.1.3 Impact on Post-Primary Education Facilities

Figure 23 highlights the accessibility of post-primary educational facilities based on the proposed future walking network. The implementation of the proposed walking network is shown to have a beneficial impact on improving accessibility to post-primary educational facilities. It should be noted that walking accessibility to these locations is limited based on the spread of them across Carlow Graiguecullen.

Data analysis demonstrates that the number of grid squares which have two post-primary educational facilities within a 20-mintue walk is 49%, compared to 42% based on the baseline path network. Similarly, the number of grid squares within a 20-minute walk of one of these facilities also improves, from 50% to 57%, with the implementation of the proposed walking links. Key locations which experience the greatest improvements, include between Athy Road and Dublin Road, west of the River Barrow towards the southern end of the study area due to better connections across the river, and a small section of north west Graiguecullen.

Figure 23. Post-Primary Education Accessibility Based on Future Path Network

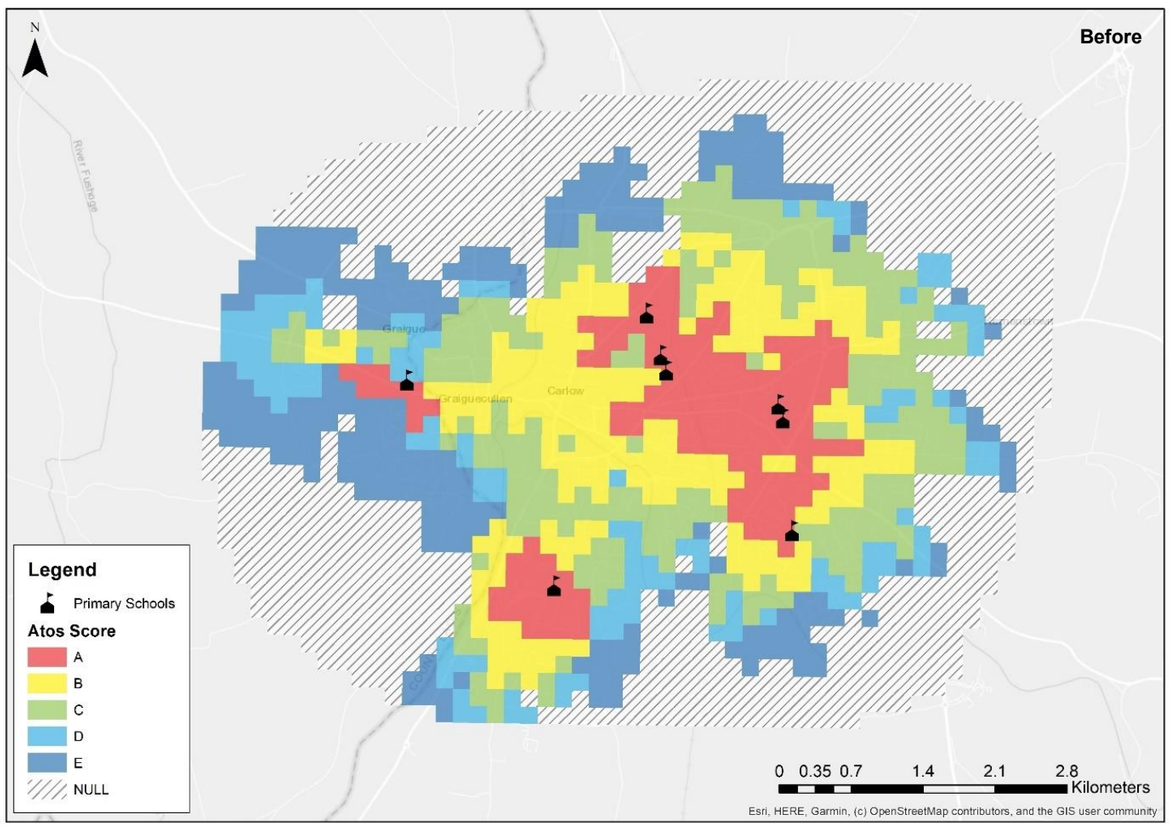


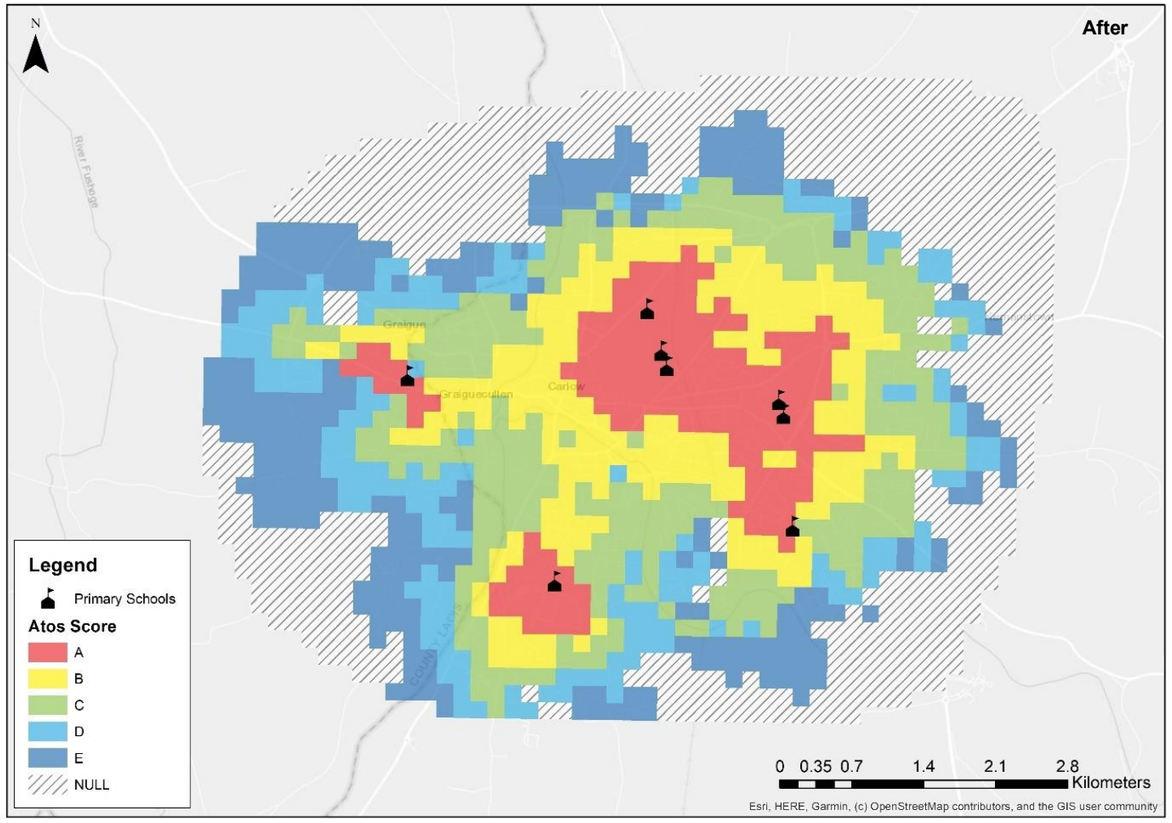


4.2.1.4 Impact on Primary Schools

Figure 24 presents the ATOS assessment outcomes showing primary school accessibility based on the proposed future walking network. Again, the improvement of accessibility through walking is somewhat limited by the location of the schools. The data shows that there is a 4% increase in the number of grid squares that are within a 20-minute walk of two primary schools, whereas the number of grid squares within a 20-minute walk of one primary school increases by 8%. With this future walking network in place, 68% of grid squares would be within a 20-minute walking distance of one primary school. Specific locations that notably benefit from the proposed future walking network, in terms of primary school accessibility, are areas in the southern sections of Graiguecullen, near Leighlin Road and Springhill Road, surrounding the three primary schools located near the railway station, and in the northern sections of the town near the N80.

Figure 24. Primary School Accessibility Based on Future Path Network

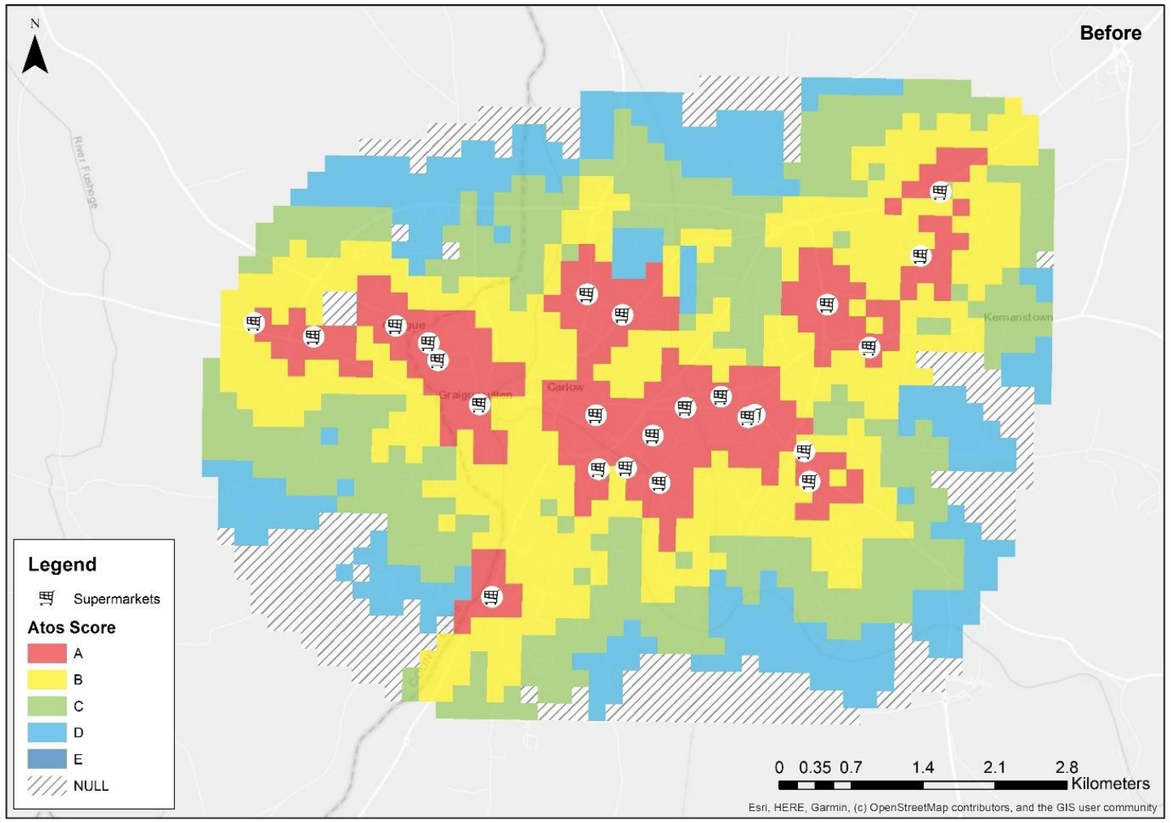


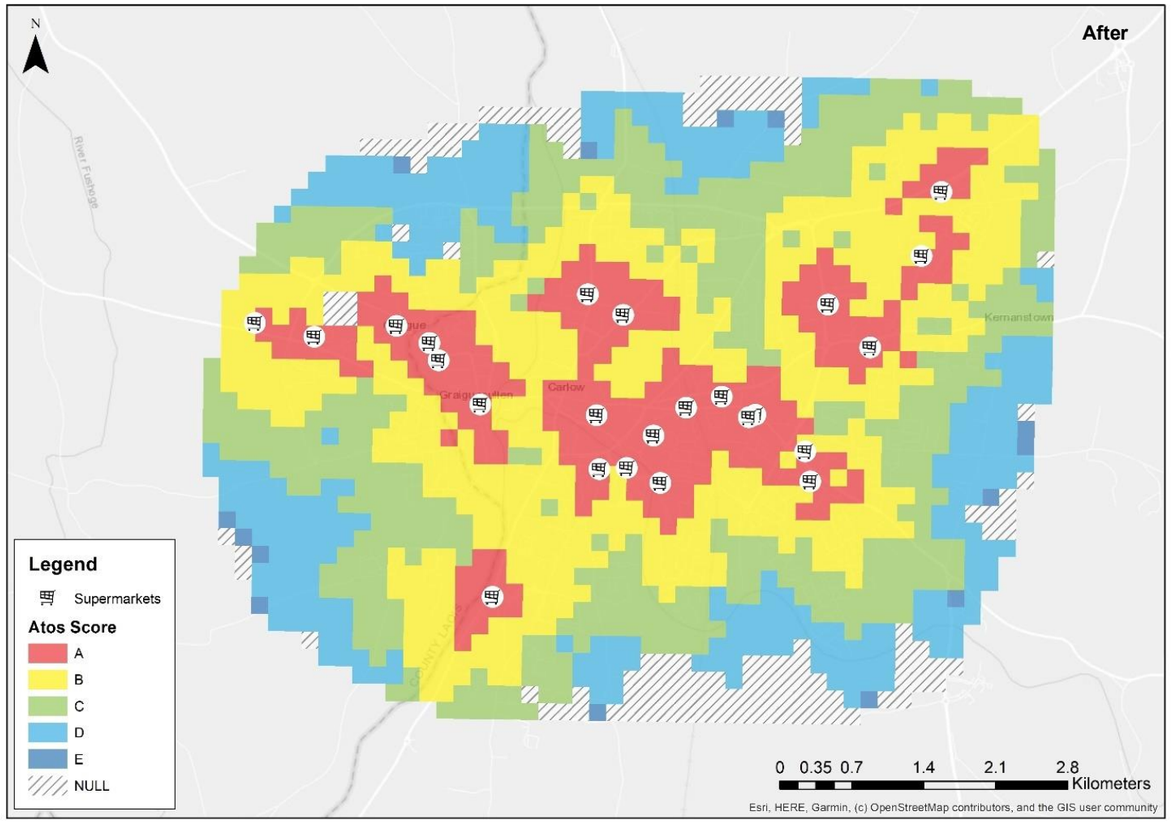


4.2.1.5 Impact on Supermarkets

Figure 25 presents the supermarket accessibility based on the proposed future path network. The figure demonstrates that supermarkets are vastly spread across the Carlow Graiguecullen area. Areas directly surrounding the supermarkets score favourably for accessibility, as expected, and due to the good spread of supermarkets this means that many homes in the urban and sub-urban areas of Carlow and Graiguecullen can access supermarkets within a reasonable walking time. Detailed data analysis demonstrates that the provision of the new walking links would reduce the number of grid squares not able to access any supermarket within a 20-minute walk from 12% to 7%. This shows the walking connections are providing improved connections to this key service for some areas.

Figure 25. Supermarket Accessibility Based on Future Path Network

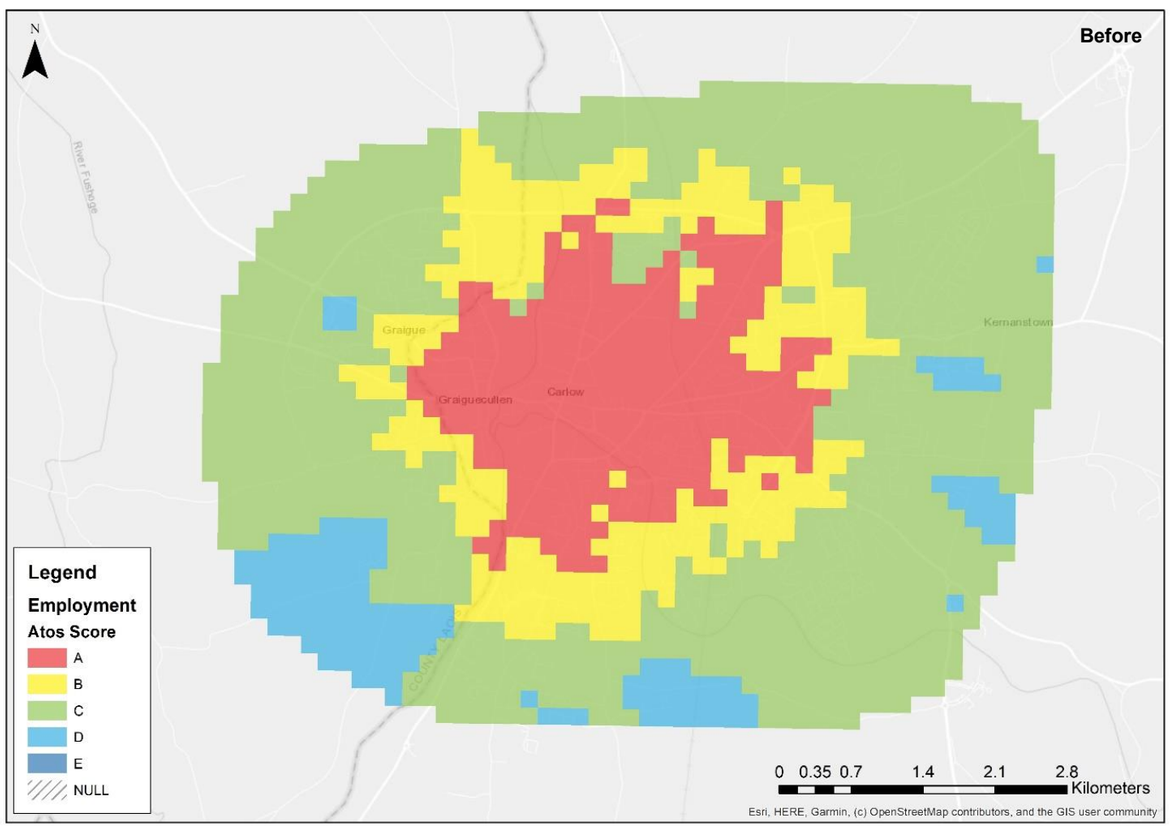


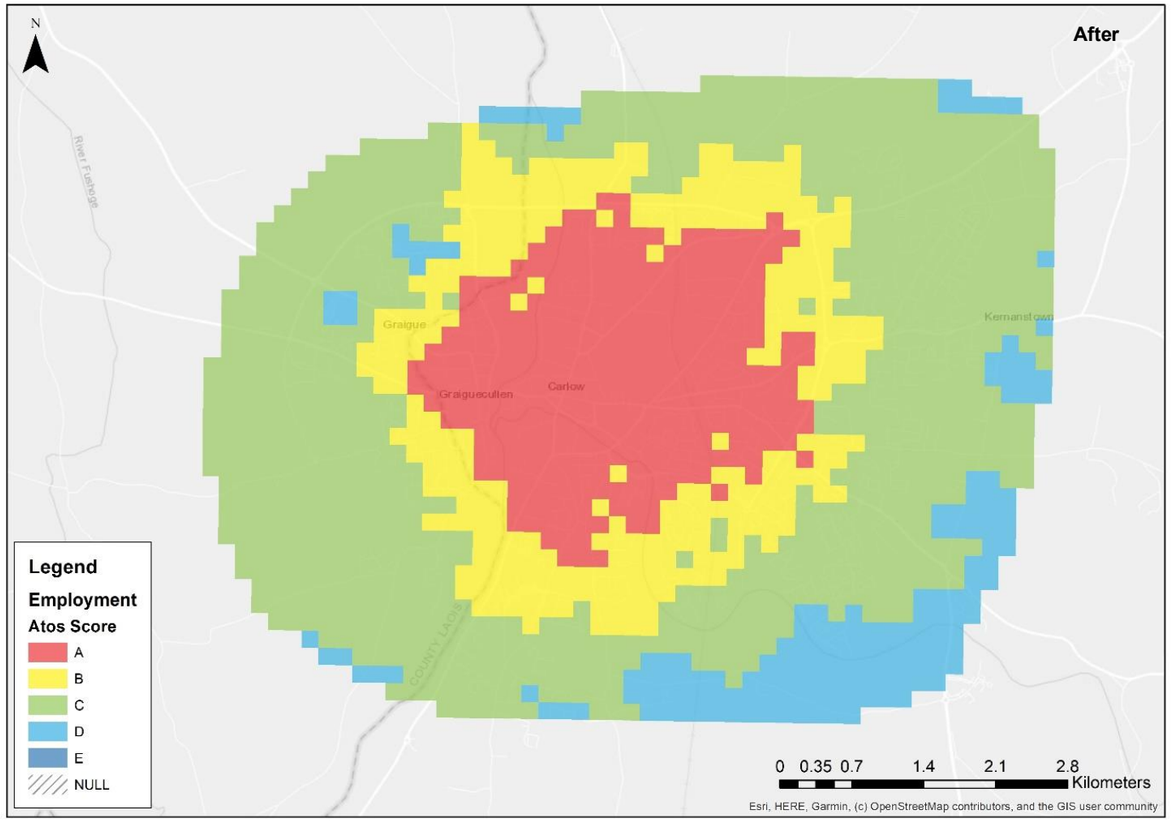


4.2.1.6 Impact on Employment

Figure 26 shows the ATOS assessment outcomes based on the proposed future path network. The figure demonstrates that the number of accessible jobs is higher in the centre of the study area, which is to be expected given this is where a number of employment opportunities are located. The number of accessible jobs remains above average just outside of Carlow Town, likely due to the existence of major employers on the town peripheries, such as business and retail parks as well as SETU. The number of accessible jobs reduces with increasing distance from the town centre, more towards suburban and rural parts of Carlow. Detailed analysis of results demonstrates that the number of grid squares falling in the top two scores has increased by 12%, showing the implementation of the permeability links would have a beneficial impact on employment accessibility.

Figure 26. Employment Accessibility Based on Future Path Network





4.2.2 Summary of Benefits of Walking (Permeability) Options

Overall, the above sections have highlighted the benefit of introducing the walking strategy in the Carlow Graiguecullen LTP study area.

4.3 Cycling Measures Assessment

Cycling options are split into the provision of a cycling network for the study area as well as complementary measures. Further details on the cycling options are outlined in section **3.1.1.3**. Given the benefits that the cycling measures will deliver, at this stage it is assumed that improvements will be made across all routes identified, although the level of infrastructure in some places is still to be confirmed. As each measure is taken forward, proposals will be subject to a detailed design and assessment process and the impact of the proposals on the operation of the rest of the transport network understood.

4.4 Public Transport Measures Assessment

The impact of the proposed public transport options is assessed through the completion of an MCA. The following table outlines the scoring of these options against the public transport principles. Full details of the public transport options can be found in **3.2.4**, and are summarised below.

- Ongoing review of bus services within Carlow Graiguecullen with potential extension of existing routes, or new route, to serve the N80.
- Increased bus stop numbers: New bus stops along public transport routes
- Station and stop upgrades: Better bus stops across the Carlow Graiguecullen study area, which provide improved shelter and facilities for passengers; improved waiting facilities at Carlow Coach Park
- Real time passenger information: Real time information to be provided at bus stops and interchanges, or via an app, to allow people to make informed choices about travel
- Flexible and affordable ticketing: A review of pricing and ticketing structure to ensure public transport is accessible to all, and it is easy to transfer between different modes of transport
- Public transport marketing campaign: Ensure people are aware of the services that are available, particularly with the introduction of new services

Table 4-6: Public Transport MCA

Principles (Scoring Criteria)	N80	Increased Bus Stop Numbers	Station and Stop Upgrades	Real Time Passenger Information	Flexible and Affordable Ticketing	Public Transport Marketing Campaign
Improve access from residential, employment, education, healthcare, and retail facilities to public transport stops						
Improve the coverage, frequency and capacity of public transport services						
Provide bus priority infrastructure where it is necessary to improve journey times and reliability						
Improve public transport stops/stations in respect to location, information, accessibility, infrastructure, and visibility						
Improve interchange experience for passengers changing between different modes of public transport or routes						
Promote modal shift from the private car to bus or rail, particularly for medium/long distance trips						
Ensure interchanges are convenient and allow for access to various key destinations to enhance the attractiveness of public transport						

The public transport options could all be delivered and would offer some benefit to transport provision within the Carlow Graiguecullen study area and help achieve the overall strategy objectives. All options should therefore be taken forward and included within the strategy.

It is noticeable that the proposed N80 bus route would go some way to meeting the majority of the public transport principals. The introduction of the N80 orbital bus route will have a positive impact on public transport accessibility to key services if the demand is there to use it. This is because the route will provide a service in some areas currently not served by a bus route and new bus stops will be provided. A new route, or extension to existing route, should result in a modal shift from private car to bus, but is unlikely to significantly impact on longer distance trips. A public transport marketing campaign will complement the new bus routes being proposed and will contribute to the modal shift from private car.

Bus priority has been considered within the development of the LTP, but there are currently no roadspace reallocation proposals for bus services. However, it is proposed that smarter traffic signals are implemented across the study area, which would provide an opportunity to prioritise public transport movements through a junction. The need for bus priority will be reviewed throughout the lifetime of the plan, to see if further bus priority should be identified, as and when new public transport services are implemented.

4.5 Road Measures Assessment

The assessment for the road options is presented in this section of the LTP. Road options have been grouped into three different categories as follows

- Options which are required to deliver active travel infrastructure and only one option has been identified
- Options which are required to deliver active travel infrastructure and several options have been identified
- Options which have been identified to improve the operation of the highway network.

No MCA has been undertaken for group 1, but the options are again summarised in this section. Assessments have been undertaken for groups 2 and 3.

4.5.1 Road Options Required for Active Travel Infrastructure (only one option proposed)

Road options necessary to enable provision of active travel infrastructure are outlined in the following table.

Table 4-7: Road Options for Active Travel Infrastructure

Option	Description	Assessment
R1 Sleaty Street R2 Athy Road R24 Brownshill Road R28 Blackbog Road	Traffic calming provided to make it safer and more attractive for cyclists and pedestrians to use road	The physical constraints in these locations mean that it is not considered feasible to implement segregated cycling infrastructure without causing significant impact to the operation of the road network and long detours for those people who need to drive.
R3, R4, R5 and R6 Laois Loop	It is proposed that a one-way loop is provided near to the River Barrow bridge. This one-way loop would involve one-way restrictions on Chapel Street, Ninety-Eight Street, Maryborough Street, and Bridge Street. Creating this one-way loop would allow for the provision of off-road segregated cycle infrastructure.	This option is the only option to provide optimal cycle infrastructure here and connect this area up to the wider cycle network. The option would also remove conflict at key junctions, reducing highway delay and contributing to the roads' principles.
R10 Dublin Street	Convert small one-way section of Dublin Road, passing Carlow Courthouse, to one lane to allow the provision of off-road segregated cycle infrastructure.	Enables the provision of segregated active travel infrastructure, whilst minimising the impact on the operation of the highway network. It therefore contributes to the overall objectives of the LTP strategy.
R19 and R31 Fairgreen Retail Access and Barrack Street	Removal of on-street parking on Barrack Street to accommodate public realm improvements and active travel infrastructure. Restrict access to Fairgreen Retail Park from Barrack Street to continue the improvements.	Measure promotes walking and cycling as a mode of transport, as well as improving the environment of Carlow. The measure will therefore meet several principles across the different modes of transport.
R23 Browneshill Road Lower	Convert to one-way and remove on-street parking to enable off-road segregated cycle infrastructure to be provided.	Only reasonable measure identified to enable high quality active travel infrastructure to be delivered in this location.
R25 Tullow Road	Removal of turning pockets and hatching to provide off-road segregated cycling infrastructure.	Enables the provision of segregated active travel infrastructure, whilst minimising the impact on the operation of the highway network. It therefore contributes to the overall objectives of the LTP strategy.

R29 Pollerton Road (under railway bridge)	Reduced to one lane under railway bridge to be managed through signalisation. This will enable provision of segregated cycling facilities.	Measure is necessary to provide segregated cycling facilities; does not restrict highway movements and therefore caters for all modes.
R30 Pollerton Road (railway bridge to St Mary's Park)	Removal of on-street parking to provide segregated cycling infrastructure as part of the overall cycling network.	Only reasonable measure identified to enable high quality active travel infrastructure to be delivered in this location.
R32 Dublin Road (Greenbank Road to Railway Road)	Removal of on-street parking to provide segregated cycling infrastructure as part of the overall cycling network.	Only reasonable measure identified to enable high quality active travel infrastructure to be delivered in this location.
R33 Green Lane	Removal of on-street parking to provide segregated cycling infrastructure as part of the overall cycling network.	Only reasonable measure identified to enable high quality active travel infrastructure to be delivered in this location.

4.5.2 Road Options Required for Active Travel Infrastructure (several options proposed)

In a number of locations, several options have been identified, which require modifications to the road network to enable the provision of active travel infrastructure. An MCA assessment has been undertaken on each of these options to identify the preferred option; options have been scored against the roads' principles and parking principles, where considered necessary.

Town Centre North (R7, R8, R9, R13)

There are multiple options for the Town Centre North (TCN), which include options R7, R8, R9, and R13 shown in **Figure 19.** The options are outlined below.

- TCN01: pedestrianisation of Cox's Lane, pedestrianisation of College Street between Tullow Street and Brown Street, pedestrianisation of Charlotte Street up to car park exit (cars exiting the Hotel car park will have to turn left), Dublin Street is one-way southbound and shared footway provided for active travellers.
- TCN02: pedestrianisation of Cox's Lane, pedestrianisation of College Street between Tullow Street and Brown Street, pedestrianisation of Charlotte Street up to car park exit (cars exiting the Hotel car park will have to turn left), Dublin Street is one-way northbound and shared footway provided for active travellers.
- TCN03: pedestrianisation of Cox's Lane, pedestrianisation of College Street between Tullow Street and Brown Street, pedestrianisation of Charlotte Street up to car park exit (cars exiting the Hotel car park will have to turn left), Dublin Street is one-way southbound and off-road segregated cycle infrastructure is provided.
- TCN04: pedestrianisation of Cox's Lane, pedestrianisation of College Street between Tullow Street and Brown Street, pedestrianisation of Charlotte Street up to car park exit (cars exiting the Hotel car park will have to turn left), Dublin Street is one-way northbound and off-road segregated cycle infrastructure is provided.
- TCN05: pedestrianisation of Cox's Lane, pedestrianisation of College Street between Tullow Street and Brown Street, pedestrianisation of Charlotte Street up to car park exit (cars exiting the Hotel car park will have to turn left), Dublin Street remains two-way with on-street parking removed to allow for shared footway infrastructure for active travellers.

Table 4-8: Town Centre North MCA

	Principles (Scoring Criteria)	TCN01	TCN02	TCN03	TCN04	TCN05
Road Principles	Reduce car dependency by promoting mode transfer to walking, cycling, and public transport					
	Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy					
	Improve road safety and eliminate collision hot spots					
	Overcome issues relating to pinch points which threaten capacity and network reliability					
	Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow					
	Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift					
Parking Principles	Manage the provision of car parking to support and improve the economic vitality of the town centre					
	To ensure car parking provision encourages sustainable travel, particularly around railway station					
	To reduce on-street parking, where appropriate, in the town centre to facilitate public realm and walking, cycling and public transport infrastructure improvements					
	Improve the quality of parking information with new parking signage and technology					
	Introduce parking demand management measures to reduce car dependency and enhance the attractiveness of sustainable travel					
	Make high-level recommendations regarding suitable locations for electric charging hubs					

The outputs from the assessment show that options TCN01 and TCN02 have the highest score. They score identical to each other as the only difference is the direction of the one-way system through the town centre. The options score higher than TCN03 and TCN04 as Dublin Street is recognised to be constrained, and converting the road to one-way, but also providing segregated cycling infrastructure along the route is likely to still result in conflict points. Having shared footway within the town centre is considered appropriate, to make best use of available space and ensure cyclists are still segregated from car. Whilst it is recognised that this does not accord with guidance within the Cycle Design Manual, space constraints mean that the benefits of alternative measures would not be proportional to the impacts on other transport users.

TCN05 is the only option to score a negative, which is against one of the parking principles. It is expected that in this location, the removal of some of the on-street parking bays, would come under objection from businesses located in this area.

Railway Station (R11, R12)

Several options have been identified for the road network around the railway station to ensure that the station can be accessed safety by pedestrians and cyclists. These options are outlined below. NB: Under the parking strategy, additional options are identified with regard to car parking at the railway station.

- RS01: removal of parking along St. Joseph's Road and Railway Road to provide off-road segregated cycle infrastructure. Shared footway provided along Glendale Avenue and over rail bridge to allow access to station from eastern side.
- RS02: one-way southbound implemented on St. Joseph's Road and set-down areas removed on Railway Road to provide off-road segregated cycle infrastructure. Shared footway provided along Glendale Avenue and over rail bridge to allow access to station from eastern side.
- RS03: one-way southbound implemented on St. Joseph's Road and Railway Road to provide off-road segregated cycle infrastructure. Shared footway provided along Glendale Avenue and over rail bridge to allow access to station from eastern side.
- RS04: one-way northbound implemented on St. Joseph's Road and set-down areas removed on Railway Road to provide off-road segregated cycle infrastructure. Shared footway provided along Glendale Avenue and over rail bridge to allow access to station from eastern side.
- RS05: one-way northbound implemented on St. Joseph's Road and Railway Road to provide off-road segregated cycle infrastructure. Shared footway provided along Glendale Avenue and over rail bridge to allow access to station from eastern side.

Table 4-9: Railway Station MCA

Principles (Scoring Criteria)	RS01	RS02	RS03	RS04	RS05
Reduce car dependency by promoting mode transfer to walking, cycling, and public transport					
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy					
Improve road safety and eliminate collision hot spots					
Overcome issues relating to pinch points which threaten capacity and network reliability					
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow					
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift					

The options which are expected to have the greatest modal shift and improve safety for pedestrians and cyclists are options RS03 and RS05, which will see a one-way system implemented around Joseph Street and Railway Road; the direction of the one-way system would only be determined following more detailed optioneering. It is however noted that the one-way system could increase the number of vehicular trips through some sections of the town centre network, if a modal shift to more sustainable modes of transport is not achieved; this would therefore need to be managed. Options for a one-way system in this location score higher than options whereby on-street parking or set-down areas are removed. The removal of on-street parking in this location is expected to be controversial given that it is the only available parking for some residents. Allowing for vehicles to park outside the school will also create more conflict between vehicles and pedestrians and cyclists.

Town Centre South (R14, R15)

Two options have been identified for the town centre south area, which relates to Tullow Street and Potato Market. These options are summarised as follows:

- TCS01: pedestrianisation of Tullow Street from shopping centre entrance point to Dublin Street, the early section (between shopping centre entrance and Barrack Street) remains open-two way with off-road segregated cycle infrastructure provided. In this option Potato Market is also pedestrianised.
- TCS02: pedestrianisation of Tullow Street from Potato Market to Dublin Street, one-way westbound of Tullow Street between shopping centre entrance and Potato Market, and two-way remains on Tullow Street between shopping centre entrance and Barrack Street, both the two-way and one-way section of Tullow Street will have off-road segregated cycle infrastructure. Potato Market is one-way and off-road segregated cycle infrastructure provided.

Table 4-10: Town Centre South MCA

Principles (Scoring Criteria)	TCS01	TCS02
Reduce car dependency by promoting mode transfer to walking, cycling, and public transport		
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy		
Improve road safety and eliminate collision hot spots		
Overcome issues relating to pinch points which threaten capacity and network reliability		
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow		
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift		

Both options are likely to reduce car dependency and promote a modal shift to walking, cycling and public transport; the options will also mean that additional public realm measures can be delivered in the town centre, improving the environment of Carlow. Whilst both options are considered beneficial to the overall objectives of the LTP, option TCS01 results in greater access restrictions for private vehicles and will therefore likely have the biggest impact in terms of reducing car dependency.

Town Centre Loop (R16, R17, R18)

Two options have been identified for the town centre loop, which includes Burrin Street, Kilkenny Road, and Kennedy Avenue.

- TCL01: one-way loop across all roads, this would mean one-way northbound on Burrin Street, one-way eastbound on Kennedy Avenue, and one-way southbound on Kilkenny Road. All major junctions would be upgraded to signalised and off-road segregated cycle infrastructure provided on all roads.
- TCL02: Kennedy Avenue and Kilkenny Road remain two-way, and Burrin Street is one-way. All major junctions upgraded to signals, and if on-street parking is removed on Kennedy Avenue then off-road segregated cycle infrastructure can be provided on all roads.

Table 4-11: Town Centre Loop MCA

Principles (Scoring Criteria)	TCL01	TCL02
Reduce car dependency by promoting mode transfer to walking, cycling, and public transport		
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy		
Improve road safety and eliminate collision hot spots		
Overcome issues relating to pinch points which threaten capacity and network reliability		
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow		
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift		

Both options identified will have a positive impact on promoting a modal shift to sustainable modes of transport given the restrictions that are imposed on cars. Whilst restrictions are proposed for cars to enable active travel infrastructure to be provided, highway access is retained to all areas, with reliability issues at some junctions removed through the one-way system. Option TCL01 is expected to have the greatest benefit given this will provide a full one-way loop; the increase in distance drivers need to travel could be a deterrent to using the car. The removal of on-street parking identified in option TCL02 is likely to be controversial.

Pollerton Road / Staplestown Road (R20, R21, R22)

Two options are identified for Pollerton Road and Staplestown Road area to enable provision of active travel infrastructure.

- PRSR01: one-way is reversed on Pollerton Road and on-street parking removed, one-way restrictions implemented on Bridge Street and Staplestown Road. Such restrictions allow for off-road segregated cycle infrastructure on all roads. All major junctions to be signalised.
- PRSR02: on-street parking removed on Pollerton Road and Staplestown Road. Such restrictions allow for off-road segregated cycle infrastructure on all roads. All major junctions to be signalised.

Table 4-12: Pollerton Road / Staplestown Road MCA

Principles (Scoring Criteria)	PRSR01	PRSR02
Reduce car dependency by promoting mode transfer to walking, cycling, and public transport		
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy		
Improve road safety and eliminate collision hot spots		
Overcome issues relating to pinch points which threaten capacity and network reliability		
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow		
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift		

Both options are considered feasible to enable provision of active travel infrastructure in this area. The one-way system identified in PRSR01 is likely to have a greater impact than PRSR02 on promoting a mode transfer to walking, cycling and public transport, as the reduction in vehicular traffic in this area will give the perception that it is more suitable for sustainable modes of transport.

SETU (R26, R27)

Three options have been identified for the road network around SETU.

- SETU01: one-way of Green Road and Hanover Road southbound, with off-road segregated cycle infrastructure provided. The mini roundabouts at the junction of these two roads are to be upgraded.
- SETU02: traffic calming measures provided on Green Road and Hanover Road with shared roadway cycle infrastructure. The mini roundabouts at the junction of these two roads are to be upgraded.
- SETU03: one-way of Green Road and Hanover Road northbound, with off-road segregated cycle infrastructure provided. The mini roundabouts at the junction of these two roads are to be upgraded.

Table 4-13: SETU MCA

Principles (Scoring Criteria)	SETU01	SETU02	SETU03
Reduce car dependency by promoting mode transfer to walking, cycling, and public transport			
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy			
Improve road safety and eliminate collision hot spots			
Overcome issues relating to pinch points which threaten capacity and network reliability			
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow			
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift			

Options SETU01 and SETU03 score identically as there only difference is the direction of the one-way system. These options score higher than option SETU02 against the roads principals as they allow for better quality active travel infrastructure to be provided; this will result in a greater mode shift from private car to sustainable modes. Whilst option SETU01 and SETU03 score more favourably than SETU02, they are likely to be more controversial. Given that Green Road serves few vehicles than the parallel Kilkenny Road, and that cyclists are already using this route, implementing traffic calming in this location has been identified as an alternative measure to improve cycling infrastructure, whilst ensuring necessary capacity on the highway network remains.

The assessment of the proposals at this stage is qualitative. Where there is roadpace reallocation, it is recognised that this could cause increased traffic congestion on the road network until there is a mode shift towards more sustainable modes of transport. As each scheme is taken forward for implementation, more detailed traffic modelling and assessment will be undertaken to ensure the impact of each option is understood and any necessary mitigation measures put in place.

Junctions

Upgrades are required to a number of junctions across the study area to provide improved facilities for pedestrians and cyclists. Whilst at this stage, options at each individual junction have not been identified, options will include the installation of traffic signals and reduced footprint of the junction. The following table shows how the option scores against each of the roads' principles.

Table 4-14: Junctions MCA

Principles (Scoring Criteria)

Reduce car dependency by promoting mode transfer to walking, cycling, and public transport	
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy	
Improve road safety and eliminate collision hot spots	
Overcome issues relating to pinch points which threaten capacity and network reliability	
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow	
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift	

The improvement of junctions will have a positive benefit on safety for all modes of transport. Safety will be improved by the method of control implemented at each junction and the removal of conflict. The improvement to safety should mean that active modes of transport are seen as more attractive options, thus reducing the dependency on the private car. It is recognised that the installation of traffic signals at a number of junctions across Carlow could increase delay to motorised traffic. As designs for each junction improvement are taken forward, a full assessment of the impact of the changes will be undertaken and consultation and engagement with key stakeholders will be carried out. Where junction changes are proposed along the N80, these proposals will be developed in full collaboration with TII to ensure the function of the N80 is protected.

4.5.1 Road Options Identified to Improve Operation of Highway Network

Given the overall strategy objectives, few roads options have been identified. However, there is recognition that given the rural nature of County Carlow, for many people travelling by sustainable modes of transport will not be an option. The transport network therefore still needs to be able to cater for these trips. A number of roads options are therefore proposed as part of this overall strategy.

Traffic Signal Management

An option has been identified to link traffic signals across Carlow Graiguecullen to ensure vehicles receive a green wave through key areas. This will help reduce traffic congestion in these locations. Traffic signals will need to be effectively managed, to ensure timings and plans are optimised for changing traffic conditions. Improving the signal infrastructure, or the installation of new infrastructure, will mean that provision for active travel at these junctions can be improved. It will also mean that further consideration can be given to bus priority, such as hurry calls, in the future once new bus services are operational. The following table shows how this option scores against the roads' principles.

Table 4-15: Traffic Signal Management MCA

Principles (Scoring Criteria)	
Reduce car dependency by promoting mode transfer to walking, cycling, and public transport	
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy	
Improve road safety and eliminate collision hot spots	
Overcome issues relating to pinch points which threaten capacity and network reliability	
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow	
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift	

Whilst this option is unlikely to have a significant impact on promoting a mode transfer to walking, cycling or public transport, the option will help to overcome capacity and network reliability issues on the transport network. This will help improve the overall environment of Carlow and surrounding areas and ensure that the transport network caters for all travellers.

Southern Relief Road (R34, R35, R36)

An option has been identified to provide a Southern Relief Road in Carlow. The overall objective of the road is to remove vehicular trips from the town centre, which will allow further reallocation to sustainable modes of transport. The road will also help facilitate development sites identified in the local plan.

Given cost and deliverability constraints of the Southern Relief Road option, the road has been split into phases, as identified below. However, it is only if the road is delivered in its entirety, that the benefits of the road to the town centre will be felt.

- Phase 1: from N80 northwards to Carlow Eastern Relief Road
- Phase 2: from Kilkenny Road to N80
- Phase 3: from Carlow Northern Inner Relief Road Extension to Kilkenny Road (inc bridge).

The following table shows how the option scores against the roads principles identified in this strategy.

Table 4-16: Southern Relief Road MCA

Principles (Scoring Criteria)	
Reduce car dependency by promoting mode transfer to walking, cycling, and public transport	
Reduce optional vehicular trips through Carlow Town centre through road layout and access changes as well as parking and policy	
Improve road safety and eliminate collision hot spots	
Overcome issues relating to pinch points which threaten capacity and network reliability	
Ensure that junctions are suitably improved to provide for those trips which cannot be converted to sustainable modes, particularly important for rural parts of Carlow	
Restrict certain car movements to try and ensure that infrastructure commitments to active modes and public transport do create a modal-shift	

The provision of the Southern Relief Road is likely to have a major positive impact on reducing optional vehicular trips in Carlow town centre and overcoming network pinch points. This is because the relief road provides an alternative route for vehicles travelling through the town; the additional crossing point of the River Barrow is seen as a particular benefit. The option is also likely to have a positive impact on improving road safety through the reduction in traffic from the town centre.

Whilst it could be argued that the provision of the Southern Relief Road will do nothing to reduce car dependency and promote a mode transfer to more sustainable modes of transport, by removing traffic from the town centre, it offers more opportunity for road reallocation to active travel to provide more direct and safer segregated routes for pedestrians and cyclists. This will increase the attractiveness of active travel as a mode of transport and, alongside complementary measures to promote new facilities, should result in mode shift for shorter distance trips. Without the southern relief road, it is unlikely that support would be given for some of the roadspace reallocation measures identified in this LTP, given the impact that this would have on traffic congestion, with people travelling longer distances not being able to change their mode of travel. Active travel infrastructure will also be incorporated into the design of the Southern Relief Road.

The Carlow SATURN model has been used to look at the impact of the Southern Relief Road on traffic conditions in the study area. Traffic has been forecast to a year of 2029, using the development assumptions informing the LAP. Key network statistics to show the benefit of the relief road are outlined in the following table. It should be noted that this is a higher assignment model only, and therefore any demand responses, such as modal shift, are not reflected in the modelled outputs.

Table 4-17: SATURN Model Outputs 2029

Metric	AM Peak		PM Peak	
	Without relief road	With relief road	Without relief road	With relief road
Total Network Trips (passenger car units (pcus))	12913	12913	11247	11247
Total Travel Time (pcu hrs)	1346	1137	1046	930
Total Distance Travelled (pcu kms)	51576	53224	43834	44340
Average Speed (kph)	38	47	42	48

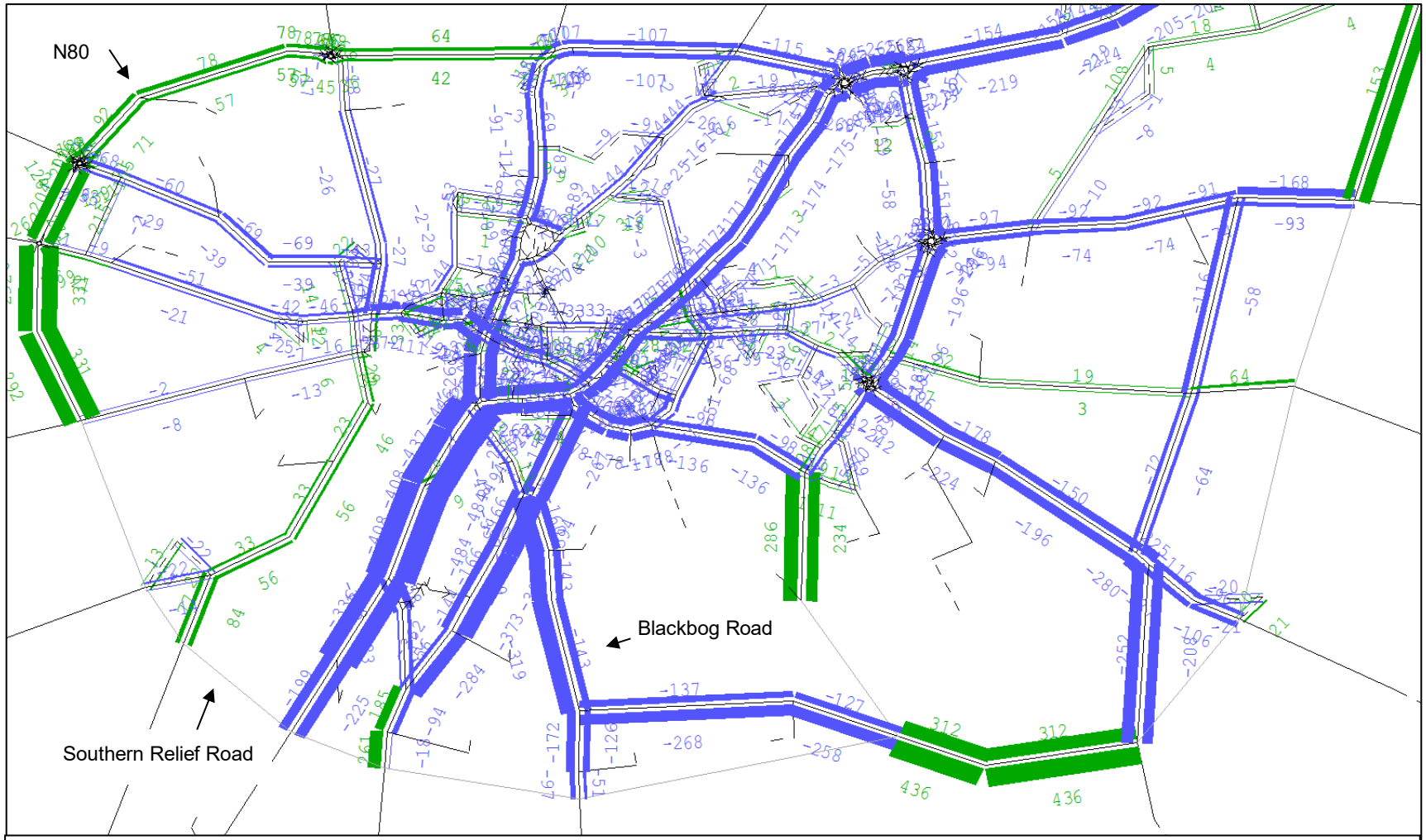
The outputs from the traffic model show that with the proposed Southern Relief Road, there is an increase in vehicle kilometres travelled across the highway network. This is due to drivers being willing to travel longer distances to benefit from the increase in highway capacity that the relief road offers. This trend is consistent in both the AM and PM peaks.

Whilst there is an increase in the total distance travelled, there is a noticeable reduction in total travel time due to reductions in delay across the network. This also results in an overall increase in the average speed travelled across the highway network.

The traffic model shows clear benefits in terms of the Southern Relief Road when looking at network performance statistics from the traffic model. The key benefit however in terms of the Southern Relief Road, will be the removal of traffic from the town centre, which will mitigate the impacts of reallocation of road space to sustainable transport modes in terms of highway delay. This is illustrated in the following figures. Blue indicates a reduction in traffic compared to the without relief road scenario; as the relief road is one of the modelled scenarios, traffic flows on the relief road are not shown.

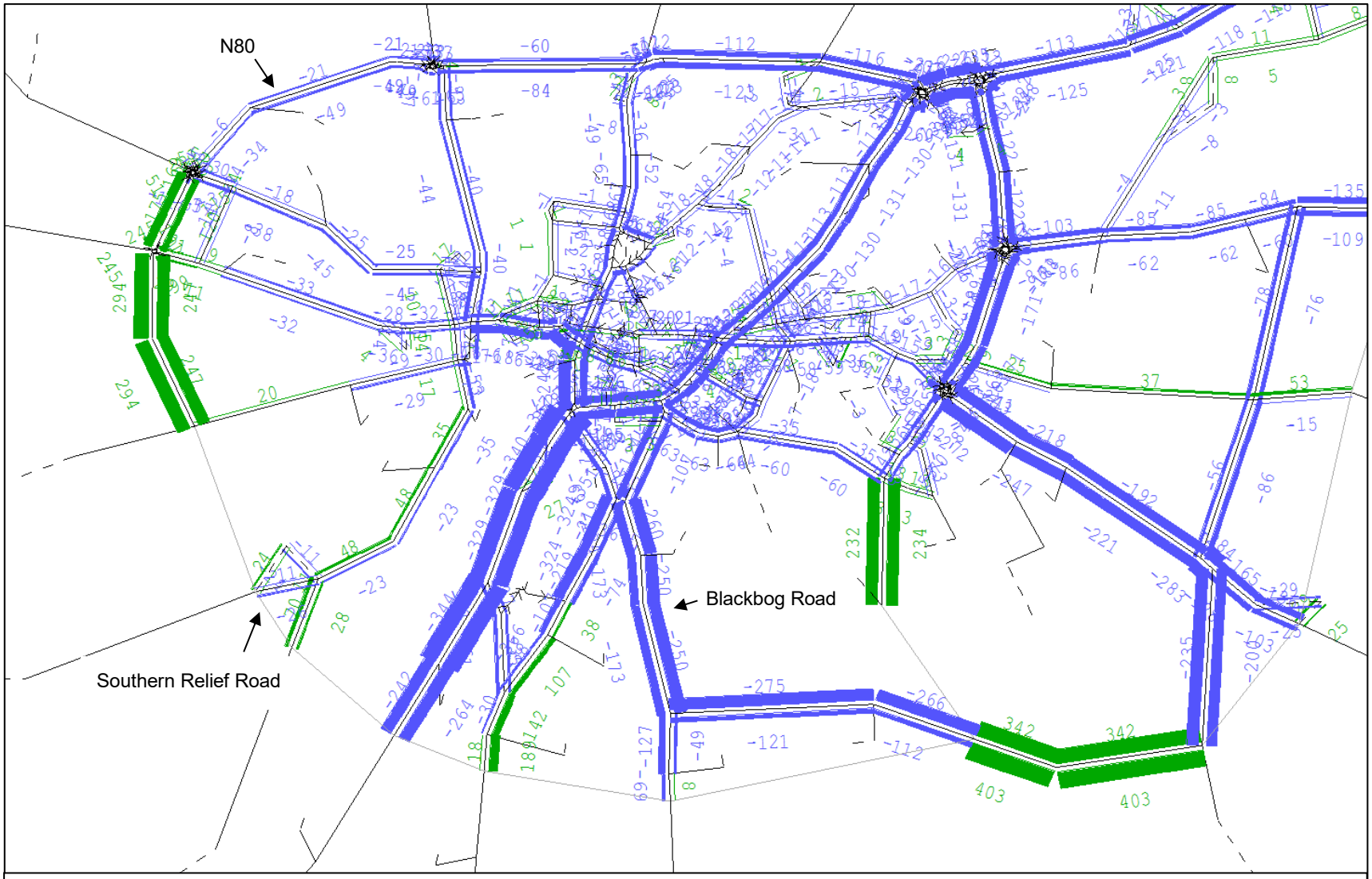
Although the traffic model shows overall benefits to highway users from the relief road, this is across the network as a whole, with trips into/out of the town centre taking longer than currently due to the new road layouts proposed within this LTP.

Figure 27. Traffic Flow Changes in AM 2029 in Passenger Car Units (with relief road minus without relief road)



Noticeable reduction in traffic flows through Carlow town centre, with largest reduction on Kilkenny Road at over 400 pcu's in both directions

Figure 28. Traffic Flow Changes in PM 2029 in Passenger Car Units (with relief road minus without relief road)



Noticeable reduction in traffic flows through Carlow town centre, with largest reduction on Kilkenny Road at over 300 pcu's in both directions

4.6 Parking Measures Assessment

A number of options have been identified to improve the parking offer in Carlow town centre. The impact of the proposed parking options is assessed through the completion of an MCA, scoring against the parking principles. Full details of the parking options can be found in **3.2.6**.

Table 4-18: Parking Options MCA

Principles (Scoring Criteria)	Parking Pricing	Rail Car Park (New)	Rail Car Park (Existing)	Carlow Retail Park	School Drop-Off Restrictions	Electric Vehicle Charging	SETU	Parking App	Parking Enforcement	Vehicle Wayfinding
Manage the provision of car parking to support and improve the economic vitality of the town centre										
To ensure car parking provision encourages sustainable travel, particularly around railway station										
To reduce on-street parking, where appropriate, in the town centre to facilitate public realm and walking, cycling and public transport infrastructure improvements										
Improve the quality of parking information with new parking signage and technology										
Introduce parking demand management measures to reduce the attractiveness of the car relative to sustainable transport alternatives										
Make high-level recommendations regarding suitable locations for electric charging hubs										
Ensure the needs of Mobility-Impaired and Disabled drivers are considered in the design and implementation of transport schemes.										

All of the parking options could be delivered and should help to achieve the objectives of this LTP. In locations where it is proposed to remove on-street car parking, the impact that this might have on local businesses needs to be considered through the consultation process. However, the removal of parking has only been proposed in locations where it will improve overall accessibility to the town and provide a cleaner and more attractive environment. This, in turn, could increase the attractiveness of Carlow as a place to visit and could have a positive impact on businesses.

A review of the parking pricing across Carlow and increasing parking charges in some areas, could deliver real benefits in terms of creating a modal shift and will therefore be investigated further. Whilst it is recognised that this would need to be implemented carefully to ensure access to the town centre is retained for all people, including those living in the rural hinterlands where alternative transport options might not be available, pricing can be set such that it encourages people to park on the outskirts of town and walk into the town centre. Provision for blue badge holders would still be provided in accessible locations.

Providing better information and signing on parking will help better direct people to available car parking; which would be beneficial in terms of reducing the travel within the town centre when looking for a parking space.

Parking has been identified as an issue around SETU, and provision of a new car park could help address this. However, it is felt that this option would score negatively against the objectives of this LTP, and more should be done to enforce parking restrictions around SETU and promote the sustainable transport options. The option has therefore been removed at this stage, although Carlow County Council will continue to engage with SETU to ensure a mobility management plan for the campus is developed. Any further development of the campus will be contingent on this being available and accepted.

To improve on parking across the town, and to ensure the provision of parking encourages the use of sustainable transport options where it is appropriate to do so, a comprehensive parking strategy will be developed for Carlow town centre in consultation with local stakeholders.

5. Part 4 - Refinement and Sense Check Proposals

5.1 Introduction

Part 4 of the ABTA guidance requires that the proposals outlined in previous sections are refined and that a sense check is undertaken to ensure proposals meet the requirements of the ABTA process. The proposals outlined in the previous section were updated following public consultation with the removal of three permeability links to address public and stakeholder concerns; there was general agreement with other proposals outlined in the strategy provided that sufficient engagement takes place during design and implementation. A review of the proposals has therefore been undertaken, with timeframes for possible implementation identified, subject to funding being available.

5.2 Sense Check of Proposals Based on ABTA Guidance

The 2018 ABTA guidance contains a checklist to ensure the transport measures associated with the preferred development scenario in the LTP cover certain key areas. The checklist and content check in the Carlow Graiguecullen LTP is summarised in the following table.

Table 5-1: Sense Check of Proposals

ABTA Guidance Checklist	Check	Carlow Graiguecullen LTP Content
Connectivity and accessibility to public transport services, walking, and cycling networks are safeguarded and provided for.	√	The Carlow Graiguecullen LTP contains a number of options to improve public transport, walking, and cycling networks, in respect to both quality of infrastructure and accessible destinations.
Development phasing and the mechanism for transport infrastructure / services delivery, including the financial requirements, are fully considered.	√	Options have been phased and feasibility of them assessed where appropriate.
Road proposals and associated junctions can meet the anticipated level of trip demand pertaining to each mode.	√	Traffic modelling shows that the implementation of new road infrastructure will improve the capacity available for vehicular trips.
Where applicable, the strategic national road network will be protected from local car trip generation.	√	There is recognition that the N80 serves a dual function of catering for both strategic and local traffic. Measures have been proposed, which will promote a modal shift, thus reducing the level of local traffic using the N80. Prior to implementation of any option which impacts on the national road network, a detailed option assessment exercise will be undertaken. Any proposals which impact on the N80 will be developed in full collaboration with TII.
DMURS (Design Manual for Urban Roads & Streets) is reflected in the design process.	√	The LTP is a strategy, rather than a design document, so DMURS will be referred to in future by designers when it comes to implementing the options. However, the design philosophy within DMURS has been reflected in the identification of options within this LTP.
National Cycle Manual (NCM) is reflected in the design process	√	The LTP is a strategy, rather than a design document, so NCM will be referred to in future by designers when it comes to implementing the options. However, the design philosophy within the NCM has been reflected in the identification of options within this LTP.
The land-use planning process, and transport planning, has been integrated in identifying the most appropriate land-use and transport solutions.	√	Engagement with the LAP team has occurred regularly throughout development of the LTP. Measures have been identified to serve existing and proposed development. Where development has been identified in a location, which would be difficult to serve by sustainable modes of transport, this has been fed back to the planning team.
Proposed transportation options will ultimately ensure that appropriate levels of service will be provided across all modes of transport.	√	Additional bus services will cater for additional demand and create a modal shift from car to public transport, and transport modelling has shown that the provision of a southern relief road will provide alternative routes away from the town centre., which presents an opportunity to reallocate roadspace to sustainable modes of transport.
An appropriate level of contingency has been considered for each mode to allow for development-	√	The strategy is based on development proposals set out in the LAP with an iterative approach adopted to identifying development sites which

related growth in transport demand external to the Plan area.		could be served by sustainable transport options. However, there is recognition that Carlow is a regional centre for employment, education and leisure. As such, trips within Carlow will originate outside of the study area. This has been considered within the option development process.
Due to the proposed transport options, excess capacity in relation to road and public transport networks will arise, notwithstanding the development objectives relating to the wider area.	√	Given the promotion of sustainable modes of transport, increased capacity of the road network has not been central to the option development process. Additional road capacity has been proposed where it allows for further reallocation of roadspace to sustainable modes of transport, resulting in a reduction in vehicular capacity within the town centre. If targets for mode shift to sustainable modes of transport are achieved, this could result in an overall reduction in vehicular trips.

5.3 Implementation of Options and Timeframes

Potential timeframes for the implementation of options identified in this LTP are outlined in the following section. Timescales are defined as follows:

- Short-term – measure intended for implementation within 1-2 years
- Medium-term – measures intended for implementation within 3-5 years
- Long-term – measures intended for implementation within 6-10 years
- Ongoing – measure could commence in the short-term, but will span a number of years

The further development of these options will require corresponding planning and design work to be undertaken on each of the relevant transport measures. As such, these timescales are indicative only and subject to funding and resource availability.

5.3.1 Timeframes of Active Travel Options

Table 5-2 and **Table 5-3** below indicates the proposed timeframes for the active travel options.

Table 5-2: Proposed Timeframes for Walking Options

Option	Description	Timeframe
Walking Network	Provision of new or upgraded permeability links to provide an improved walking network in Carlow	Medium
Walking Advertisement	Promotion of the walking connections and the benefits of walking	Short
Wayfinding Strategy	Provision of signage to highlight clear pedestrian routes	Short

Table 5-3: Proposed Timeframes for Cycling Options

Option	Description	Timeframe
Athy Road (between Irish Sugar Factory and Carlow Educate Together)	Proposed Shared Footway Cycle Infrastructure	Short
Athy Road (Irish Sugar Factory)	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure with traffic calming	Short
Athy Road (between N80 and Irish Sugar Factory)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
N80 (between R924 and Barrow Valley Retail Park)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
N80 (between Barrow Valley Retail Park and Sleaty Street)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
N80 (between Castlecomer Road and R924)	Proposed Off-Road Segregated Cycle Infrastructure	Medium

Option	Description	Timeframe
Sleaty Street	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
N80 (William Dargan Road)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
N80 (Cannery Road and Dr. Cullen Road)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Dublin Road (south of O'Hanrahan's GFC)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Dublin Road (north of old Braun Factory)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
N80 (O'Brien Road – between R448 and R726)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
N80 (O'Brien Road – between R726 and Carpenter Way)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Eire Og Road	Proposed Off-Road Segregated Cycle Infrastructure	Long
N80 Tullow Road	Proposed Off-Road Segregated Cycle Infrastructure	Medium
River Burrin	Proposed Shared Footway Cycle Infrastructure	Short
Carpenter Way (west)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Carpenter Way (east)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Browneshill Road	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
R726 (between N80 and Palatine Road)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Palatine Road	Proposed Off-Road Segregated Cycle Infrastructure	Medium
R448 (between N80 and Four Lakes Retail Park)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
R448 (between Four Lakes Retail Park and MSD)	Proposed Shared Footway Cycle Infrastructure	Short
R448 (approach to N80 roundabout)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Green Lane	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Dublin Road (north of St. Mary's Graveyard)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Dublin Road (east of Hospital)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Dublin Road (between Greenbank Road and Railway Road)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Dublin Road (between Greenbank Road and Athy Road)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Railway Road and St. Joseph's Road	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Railway Bridge (at station)	Proposed Shared Footway Cycle Infrastructure	Short
Link through Carlow College and Cricket Club	Proposed Shared Footway Cycle Infrastructure	Short
College Street (between Tullow Street and Brown Street)	Proposed Shared Footway Cycle Infrastructure	Medium
Tullow Street (Barrack Street to Potato Market)	Proposed Off-Road Segregated Cycle Infrastructure	Medium

Option	Description	Timeframe
Tullow Street (Potato Market to Dublin Street)	Proposed Shared Footway Cycle Infrastructure	Medium
Potato Market	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Dublin Street	Proposed Shared Footway Cycle Infrastructure	Medium
Cox's Lane	Proposed Shared Footway Cycle Infrastructure	Short
River Barrow (north)	Proposed Shared Footway Cycle Infrastructure	Short
Barrack Street	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Fair Green Retail Park Access	Proposed Shared Footway Cycle Infrastructure	Short
Staplestown Road	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Pollerton Road (between Green Lane and Bridge Street)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Bridge Street (between Pollerton Road and Staplestown Road)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Kennedy Avenue	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Burrin Street (North)	Proposed Shared Footway Cycle Infrastructure	Short
Burrin Street	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Hanover Street / Bridge Street	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Green View	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Connection between Green View and Oakley Park	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Oakley Park	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Staplestown Road and Browneshill Road Lower	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Pollerton Road (between Bridge Street and N80)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Hanover Road	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Green Road	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Blackbog Road	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Kilkenny Road	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Southern Relief Road	Proposed Off-Road Segregated Cycle Infrastructure	Long
R924, Ninety-Eight Street, and Maryborough Road	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Governey Park	Proposed Shared Footway Cycle Infrastructure	Short
Croppy Place	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
River Burrin Bridge (near Millbrook)	Proposed Shared Footway Cycle Infrastructure	Medium
River Barrow Bridge (between Mill View and Pembroke)	Proposed Shared Footway Cycle Infrastructure	Medium
Barrowville Court	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short

Option	Description	Timeframe
Green land west of Barrowville	Proposed Shared Footway Cycle Infrastructure	Short
Barrowville	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Castleview	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
River Barrow (South)	Proposed Shared Footway Cycle Infrastructure	Short
The Moorings Entrance	Proposed Off-Road Segregated Cycle Infrastructure	Medium
The Moorings link to Barrow towpath	Proposed Shared Footway Cycle Infrastructure	Medium
Bridge over River Barrow near Moorings	Proposed Shared Footway Cycle Infrastructure	Medium
L7917, Meadows Way, Rochfort Manor	Proposed Shared Roadway (Quiet Route) Cycle Infrastructure	Short
Leighlin Road (between Rochfort Manor and The Moorings)	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Crossing of Leighlin Road at The Moorings	Proposed Off-Road Segregated Cycle Infrastructure	Medium
Cycle Parking	Provision of secure cycle parking at key destinations across the town.	Short
Bike Maintenance Stands	Provision of bike maintenance stands at key locations	Short
Cycle Hire Scheme	Explore the option of implementing a cycle hire scheme in Carlow Graiguecullen.	Ongoing
Advertising	Advertise, with appropriate signage, the new cycling links and use adverts to promote cycling and sustainable travel.	Short
Cycle Training	Explore the option of providing cycle riding training for both children and adults.	Ongoing

5.3.2 Timeframes of Public Transport Options

The following table shows the proposed timeframes for the public transport options. As noted earlier in the strategy document, some public transport options require coordination and collaboration with other parties and for these options the timeframe of "ongoing" will be used to show CCC's and LCC's continuous commitment to supporting these options.

Table 5-4: Proposed Timeframes for Public Transport Options

Option	Description	Timeframe
N80 Bus Route	Provision of an N80 orbital bus route to serve the National Road and the northern section of the Carlow Graiguecullen study area (subject to a review of existing services and demand).	Medium
Increased Bus Stop Numbers	Providing increased bus stop numbers in the study area along new, existing, and proposed bus routes to allow better access to bus services.	Short-Medium
Real-Time Passenger Information	Council to collaborate with necessary parties to encourage the provision real-time passenger information which can provide accurate information about bus arrival times to assist with journey planning.	Ongoing
Support Flexible and Affordable Ticketing	Council to collaborate with necessary parties to encourage the provision of a simple ticketing system which allows passengers flexibility and is affordable.	Ongoing
Station Upgrades	Upgrade stops and stations in the Carlow Graiguecullen study area to allow for easier transfer between modes and improved waiting areas.	Medium
Marketing Campaign	Run a marketing campaign to show the new and improved public transport services and encourage uptake.	Short

5.3.3 Phasing of Road Options

The table below shows the proposed timeframes of the road options.

Table 5-5: Proposed Timeframes for Road Options

Option	Description	Timeframe
Junctions	Upgrades to provide improved facilities for pedestrians and cyclists. Options at each individual junction have not been identified but will include the installation of traffic signals and reduced junction footprint.	Medium
Traffic Signal Management	Linked traffic signals to provide a green waive through key areas. This will reduce traffic congestion and improve journey time reliability.	Short
R1 – Sleaty Street	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.	Short
R2 – Athy Road	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.	Short
R3, R4, R5, R6 – Laois Loop	One-way system across 4 roads in Laois, roads include Chapel Street, Ninety-Eight Street, Maryborough Street, and Bridge Street	Medium
R7, R8, R9, R13 – Town Centre North	Options for Town Centre North, including Cox's Lane, Dublin Street, College Street, and Charlotte Street.	Medium
R10 – Dublin Road	On the one-way stretch of Dublin Road, near courthouse, proposed that one of the lanes is removed to accommodate cycle infrastructure.	Medium
R11, R12 – Railway Station	Option for Railway Station, this would impact on Railway Road as well as St. Joseph's Road.	Medium
R14, R15 – Town Centre South	Option for Town Centre South, alterations to Tullow Street and Potato Market are considered in this option.	Medium
R17, R18, R19 – Town Centre Loop	Option for Town Centre Loop, roads involved include Burrin Street, Kilkenny Road, and Kennedy Avenue.	Medium

Option	Description	Timeframe
R19 – Fairgreen Retail Access	Access to Fairgreen Retail Park from Barrack Street is closed to make space safer for active travellers.	Medium
R20, R21, R22 – Pollerton / Staplestown Loop	Options to improve area to the east of the Town Centre. This option includes impacts on Pollerton Road, Staplestown Road, and Bridge Street.	Medium
R23 – Browneshill Road Lower	Proposed one-way of Browneshill Road Lower and removal of parking to gain extra space for pedestrians and cyclists and provide off-road segregated cycle infrastructure.	Medium
R24 – Browneshill Road	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.	Short
R25 – Tullow Road	Proposed removal of turning pockets and hatched lines to allow for narrowing of general traffic lanes and providing off-road segregated cycle infrastructure.	Medium
R26, R27 – SETU Area	Provision of option near to SETU to better accommodate active travellers, this impacts on Hanover Road and Green Road.	Medium
R28 – Blackbog Road	Traffic calming (such as chicanes, speed limit reduction or speed bumps) to make cyclists and pedestrians feel safer.	Short
R29 – Pollerton Road (under rail bridge)	It is proposed that the section under the railway bridge becomes signalised allowing for movement in one direction only at each time. The narrowing of the road will allow for off-road segregated cycle infrastructure.	Medium
R30 – Pollerton Road (rail bridge to St. Mary's Park)	Parking to be removed accommodate off-road segregated cycle infrastructure.	Medium
R31 – Barrack Street	Parking is removed to improve the public realm space.	Medium
R32 – Dublin Road (Greenbank Road to Railway Road)	Proposed removal of parking to accommodate cycle infrastructure along this stretch of Dublin Road (between Greenbank Road and Railway Road).	Medium
R33 – Green Lane	Proposed removal of parking on Green Lane (between Staplestown Road and St. Joseph's Road) to accommodate cycle infrastructure.	Medium
R34 – Southern Relief Road Phase 1	Southern Relief Road Phase 1 - support the construction of this section of the Southern Relief Road to provide an entire ring road for Carlow.	Long
R35 – Southern Relief Road Phase 2	Southern Relief Road Phase 2 - support the construction of this section of the Southern Relief Road to provide an entire ring road for Carlow.	Long
R36 – Southern Relief Road Phase 3	Southern Relief Road Phase 3 - support the construction of this section of the Southern Relief Road to provide an entire ring road for Carlow.	Long

5.3.4 Phasing of Parking Options

The table below shows the proposed timeframes of the parking options.

Table 5-6: Proposed Timeframes for Parking Options

Option	Description	Timeframe
Parking Pricing	Review of pricing for car parking across Carlow Town centre.	Short
Railway Station Parking	New car park to the east of the railway line, accessed from Glendale Avenue.	Medium
Current Railway Station Parking	Convert current car park into an area for cycle parking, drop-off zone, bus stop, and waiting area.	Medium
Carlow Retail Park	Make use of spaces in the Carlow Retail Park to provide parking for SETU students/staff who could walk to campus.	Short
School Drop-Off Restrictions	Remove set down or drop-off zones immediately outside schools. Resident permits on streets near to schools.	Short
Electric Vehicle Charging	Provision of electric vehicle charging at convenient locations.	Short-Medium
Parking App	Consider benefits of a parking app to make sure parking in Carlow can be easily located and paid for.	Ongoing
Parking Enforcement	Ensure adequate enforcement of parking restrictions to ensure benefits of other parking options are captured.	Ongoing
Vehicle Wayfinding	Provision of signage which can identify where car parking is located and the number of stops available.	Short

Indicative timeframes have been identified for the measures identified in the LTP, which will inform the preparation of the LAP. It must be remembered that individual projects will need to be examined on their own merits and will need to undergo a detailed development process. Projects will need to be designed in accordance with relevant guidance and will be subjected to public consultation, environmental studies, relevant statutory procedures, as well as consultation with relevant statutory stakeholders.

6. Part 5 - Finalisation of the ABTA

6.1 Final Strategies for Each Mode

Consultation of the LTP has now taken place. There was general agreement to the proposals outlined in the LTP, provided that sufficient engagement takes place during the design and implementation phases. There were three material amendments in terms of transport options, which all related to permeability links identified as part of the walking strategy. These permeability links, at Highfield/Oak Park Drive, Sandhills and Kearney's Lane have all been removed to address resident concerns.

7. Part 6 - Monitoring and Review

7.1 Monitoring ABTA Progress

Regular monitoring will be required over the lifetime of the LTP to establish the following:

- Progress on implementation of selected measures for each mode of transport (e.g., changes to transport infrastructure and services); and
- Observed travel patterns and associated transport impacts and how these compare with the LTP's transport principles, development assumptions, and intended outcomes.

Monitoring of the LTP implementation and impacts can also inform any review processes related to the Joint LAP as well as the development of future LAPs.

It is recommended that a report should be compiled annually summarising progress with regard to the implementation of the LTP measures and documenting any other relevant changes to transport infrastructure or services which may impact travel behaviour. This report should also include measures which are not within the remit of CCC/LCC to deliver, but which will nevertheless impact future travel behaviour within the Carlow Graiguecullen ABTA study area. In addition to details regarding the implementation of specific infrastructure measures contained within the LTP for each mode, the report could also include further items such as:

- Details of improvements to public transport frequencies, operating hours and/or geographic coverage;
- Details of significant changes to the number of car parking spaces provided at locations throughout the town (either public or privately managed) and any relevant changes to parking charges or permits;
- Details of advertising or marketing campaigns that have been ran to promote the use of sustainable modes of transport.

The impacts of the LTP measures implemented, or any other relevant measures / changes implemented, within the study area as well as growth within the study should be monitored on a regular basis to support the understanding of how actual outcomes compare with intended outcomes. This will allow an assessment of the extent to which the LTP's transport principles are being met. Some of the key performance indicators which should be monitored are outlined below:

- Primary source of data on mode share (usual mode of travel) for commuting to work and education is the Census. The 2022 Census data will provide a more up to date baseline than the 2016 data contained with the baseline assessment. Future Censuses will take place in 2026, 2031, and 2036.
- In 2022, a Census question was introduced aimed at collecting data on the usual number of days respondents work from home. This will be an important trend to monitor over time as remote working can have a significant impact on travel demand, particularly at peak times.
- Changes in car ownership (e.g., cars per adult (18+) and car per household) should be monitored following each Census to assess the extent to which car dependency is reducing within the study area.
- Travel surveys conducted in workplaces and educational institutions can provide information on mode share for commuting purposes at more regular intervals than the Census and to specific destinations, as well as valuable information on the factors which influence travel choices. It is recommended that CCC/LCC encourage major employers, schools, and SETU to undertake travel surveys at least once every two years at the same time of year to assist with travel planning.
- Residents and visitors to Carlow could also be asked for feedback on travel within the study area through other means. For example, an online survey could be undertaken every few years to assess how attitudes on using the different modes are changing and to help identify any significant remaining barriers to modal shift.
- An annual traffic count could be undertaken at the same time of year each year to provide further information on mode shift and the extent to which sustainable mode usage is increasing.
- Automatic pedestrian and cycle counters which can continuously monitor the use of specific links should be installed on key links throughout the study area, particularly on significant new/upgraded routes. This allows for analysis of trends in overall use as well as fluctuations by day, time of day, and time of year. Cycle counters are now available which can also count and classify e-scooters.

- Cycle parking occupancy surveys should be undertaken regularly (e.g., quarterly, or bi-annually) at key destinations such as the train station, schools, SETU, supermarkets, and leisure destinations. In addition to counting the total number of parked cycles, cycle parking surveys can also monitor the presence of non-standard cycles which can provide information on how Carlow is becoming more inclusive or accessible to a more diverse group of people (e.g., cycles with child seats or trailers).
- Data on the use of public transport for travel to and from the study area, as well as within the study area, should be requested from the NTA on an annual basis, if possible, in order to monitor the increase in passenger numbers over time.
- Car parking occupancy and duration data should be analysed to understand the impact of the measures contained within the LTP. Initially, data may be obtained from manual surveys but over time more data may be collected automatically as additional technologies are deployed to manage parking availability and information.
- Collision statistics should be monitored as they become available to identify road safety issues which could potentially be remedied through the delivery of measures in the LTP or other measures not included in the LTP and assess whether there are any collision trends which could be observed.

7.2 Review Process for the ABTA

It is proposed that the LTP is reviewed every 5 years as part of the revision and update of the Carlow Graiguecullen Joint Local Area Plan. If the LAP is not reviewed every five years, then the LTP can be reviewed independently, considering the progress reports mentioned in the previous section and the changing policy or infrastructure context. The review should amend and update the LTP as required to ensure it is still a relevant document which can inform Carlow Graiguecullen transport and development decisions.

Appendix A Baseline Report

Draft Carlow Graiguecullen Local Transport Plan

Part 1 - Baseline Assessment

Carlow County Council
Laois County Council

November 2022

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
Lois Braithwaite-Vare	Helen Caschetto	Gemma Paget	Gary Macdonald

Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	November 2023	Update to boundary and policy	G Paget	G Paget	Associate Director

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

Carlow County Council

Prepared by:

AECOM Limited

Table of Contents

Figures

Tables

1. Introduction

1.1 Context

AECOM has been appointed by Carlow County Council (CCC), in partnership with Laois County Council, to prepare an Area Based Transport Assessment (ABTA) for the Carlow-Graiguecullen area. This area includes Carlow Town, which lies within County Carlow, as well as Graiguecullen, considered part of the urban footprint of Carlow, but sitting within the County Laois boundary. The Carlow-Graiguecullen ABTA aims to provide long-term transport improvement plans for the study area and ensure there is increased sustainable travel for trips to work and education as well as on business, for social purposes, shopping, and visitor travel. This Baseline Assessment will review relevant policy/strategy, the local urban area, current transport infrastructure and usage, survey data and initial public and stakeholder consultation results. The Assessment will then consider the implications of this data to identify issues across all transport modes; road, parking, rail, bus, cycling and walking. Numerous options for each mode will then be developed based on the conclusions of the Baseline Assessment. These options will then be brought forward for further assessment and to be used in the creation of the draft ABTA.

1.2 Project Background

Carlow Town is the largest urban centre in County Carlow, and the 13th largest town in Ireland, sitting within the South East region of Ireland. Carlow Town is made up of Carlow, which is part of County Carlow as aforementioned, as well as Graiguecullen, which falls into the County Laois boundary. Unlike County Carlow, County Laois is part of the Eastern and Midland region in Ireland.

Carlow sits on the Dublin to Waterford railway line, with the station sitting approximately 1km north-east of the centre. There has been investment in cycling infrastructure in recent years, but provision is currently disjointed and connectivity and general improvements are required in order to reduce barriers to use. In terms of the strategic road network (SRN), the N80 runs around the northern and eastern part of the study area, which then connects to the M9 (Carlow Bypass). Additionally, there are four regional roads which run into/through Carlow town centre. The study area is served by through bus services providing connections to Dublin and major towns around the regions, and a limited local link service. However, bus stops appear infrequent, and the bus/coach station comprises of one bus stand.

There is evidence that many people work relatively close to their residence in the area; however, commuting using private vehicle is still the preferred option in Carlow and Graiguecullen. Across County Carlow, 76% of people use private vehicles for accessing the workplace and for Carlow Town this is 72%, demonstrating the high reliance on the private car.

The population of the town stands at 19,994 according to 2016 Census, meaning roughly 35% of the county population reside in the urban area. With the inclusion of Graiguecullen in the Carlow Town population, the total count is 24,272 according to the 2016 Census. The population has grown consistently since 1996, with County Carlow having the highest percentage of population growth in the entire South East region between 2011 and 2016. However, it should be noted that population growth is not uniform across the county, and population growth has been highest in neighbourhoods nearer to the town centre, whilst the town centre population has shrunk. These factors suggest a process of suburbanisation is occurring.

Traditionally, the economy of Carlow and Graiguecullen was characterised by manufacturing and food manufacturing, utilising the commodities produced in the agricultural hinterland, with a poorly developed service sector. However, like many places in Ireland, when the national economic conditions deteriorated there was growth in unemployment and the loss of major companies like Braun, Lapple and the Irish Sugar Company from the area. A review of the economic performance of the South East region of Ireland, in which County Carlow sits, acknowledged that deficits in skillsets and infrastructure were the main reasoning behind economic underperformance, and many efforts have taken place to correct such deficits and reorientate the economy. Carlow and Graiguecullen now have a diverse economy with many different industries; businesses include multi-national corporations employing hundreds of people as well as small local enterprises tailored to local markets.

Carlow Town is home to the South East Technological University (SETU). This is likely to encourage new prospective students to the area, as well as encouraging school leavers to remain in the town for further study. Overall, there are nearly 11,000 students at SETU, with over 58,000 students graduating since the Institute began in 1970, providing 850 jobs. Carlow Town is identified as the designated regional centre for education, healthcare, shopping, and arts; and therefore, it is a hub for people living across the region and into other regions. In addition to this, there are further attractions in Carlow that provide for residents and generate visitors including VISUAL which hosts a contemporary gallery and performance spaces, the George Bernard Shaw Theatre, County Carlow Museum, Oak Park Forest Park and Barrow Track.

The ABTA aims to provide a multi-modal framework to inform future transport infrastructure planning, investment, and delivery. The ABTA is to be developed alongside the Local Area Plan and reflect the suggestions included. The ABTA is focussed on sustainability, which in practice means it will need to support compact urban growth, encourage a modal shift from car usage to sustainable transport modes, improve access to essential services, workplaces, and education and promote Carlow Town as a core economic and social pillar in the County strengthening Carlow and Graiguecullen position as a 'self-sustaining regional and inter-regional economic driver'.

1.3 Preliminary Aims of the Carlow Graiguecullen Area Based Transport Assessment

The preliminary aims of the ABTA are to achieve the following:

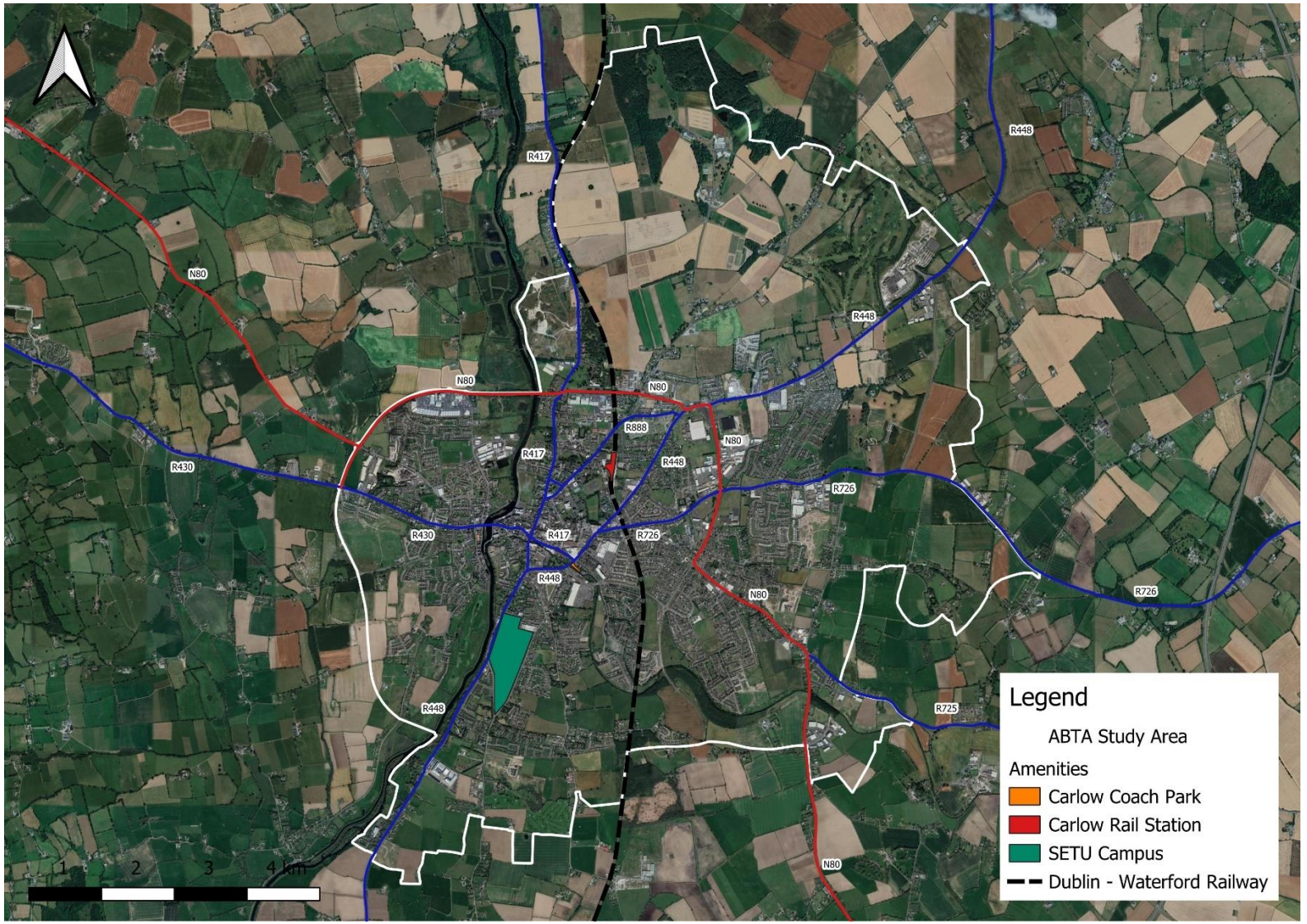
- The ABTA will focus on sustainability by encouraging compact growth and a modal shift away from car transport.
- The ABTA will promote Carlow Town Centre as the core of activity and improve its transport system, making the town centre a more attractive place to live, work, visit, and recreate in.
- The ABTA will examine all transport modes and how they interact in both the town centre and its environs. Focus will be placed on links between residential and employment areas, as well as the town centre, coach park and railway station.
- The ABTA will seek to reduce the number of car-based trips to 45% through a shift to sustainable modes.
- The ABTA will prioritise walking, cycling, and public transport accessibility.
- The ABTA will examine and provide recommendations for: walking, cycling, public transport, parking, and road traffic.

This Baseline Assessment will inform the development of ABTA objectives which will be group by transport mode, including public transport, walking, cycling, road, and parking. The ABTA objectives will be used to assess the options created in the next stage of the ABTA process to resolve the transport issues identified in the Baseline Assessment.

1.4 Study Area

The study area boundary for the Carlow Graiguecullen ABTA is shown in **Figure 1-1**. The study area encompasses Carlow Town, including Graiguecullen.

Figure 1-1: Carlow Graiguecullen ABTA Study Area



1.5 Report Structure

Following this introductory chapter, the ABTA Baseline Assessment is structured as follows:

- **Policy Context** – this section reviews the relevant national, regional, and local planning policy.
- **Study Area Characteristics** – this section reviews key demographic data regarding population change, land-use composition, job density, housing density, deprivation index, environmental constraints, and education facilities to assess the implications for transport and identify issues to resolve in option development.
- **Existing Travel Demand** – this section reviews key transport information regarding the public transport provision, the road network, collisions, modal split, origin-destination of trips, trip length, traffic growth, Strava walking and cycling data and permeability.
- **Transport Infrastructure and Services** – this section outlines the transport infrastructure, which currently serves Carlow and Graiguecullen.
- **Physical Constraints**– this section summarises some of the physical constraints within the study area, which will impact on land use and transport planning.
- **Future Context** – this section outlines some of the future developments proposed, which will have consequences for transport provision.
- **Conclusion and Next Steps** – this section concludes on the key outcomes of the Baseline Assessment in a Strengths, Weaknesses, Opportunities, Threats (SWOT) diagram and outlines the next steps in the ABTA process.

2. Policy Context

This section reviews relevant national, regional, and local policy documents to highlight transport proposals or planned infrastructure which will affect the Carlow-Graiguecullen ABTA study area.

2.1 National Policy

2.1.1 'Project Ireland 2040' – National Planning Framework

Project Ireland 2040 is the National Planning Framework (NPF) for Ireland and provides high-level strategic plans to shape planning policy as well as future growth and development which occurs in Ireland up to 2040. The NPF states it aims to avoid the 'mistakes' of previous planning policy, policy which led to urban sprawl, unbalanced regional development, and increasing car dependency, by ensuring investment is very closely aligned with the overarching principles outlined in the NPF.

The NPF is based on ten 'National Strategic Outcomes' (NSO), which are an expression of the shared national goals/benefits the NPF aims to strive towards. These NSOs are listed below:

- Compact growth
- Enhanced Regional Accessibility
- Strengthened Rural Economies and Communities
- Sustainable Mobility
- A Strong Economy supported by Enterprise, Innovation, and Skills
- High-Quality International Connectivity
- Enhanced Amenity and Heritage
- Transition to a Low Carbon and Climate Resilient Society
- Sustainable Management of Water, Waste, and other Environmental Resources
- Access to Quality Childcare, Education, and Health Services

The NPF also outlines 'National Policy Objectives', which provide more specific details on the actions and investments necessary to achieve the NSO. Several of these objectives are highly relevant to this work, these include:

- ***Objective 4*** - "Ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being."
- ***Objective 5*** - "Develop cities and towns of sufficient scale and quality to compete internationally and to be drivers of national and regional growth, investment, and prosperity."
- ***Objective 27*** - "Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by prioritising walking and cycling accessibility to both existing and proposed developments and integrating physical activity facilities for all ages."
- ***Objective 54*** - "Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives."
- ***Objective 52*** - "The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirement of all relevant environmental legislation and the sustainable management of our nature capital."

Relevance to Carlow Graiguecullen ABTA
NPF is created to shape the future growth and development of Ireland and ensure the country has learnt from past 'mistakes'. Therefore, when producing the Carlow Graiguecullen ABTA, it is important to consider the strategic outcomes and policy objectives outlined in this framework and make sure Carlow assists in achieving these national goals. In particular, Carlow Graiguecullen ABTA, although it deals with all traffic, can help promote sustainable mobility options.

2.1.2 National Development Plan 2021-2030

The National Development Plan (NDP) covers the years 2021-2030. It sets out the investment priorities which underpin the successful implementation of the NPF, as outlined above. The NDP is designed to guide national, regional, and local planning and investment decisions in Ireland throughout the next decade. Generally, the NDP demonstrates a commitment by the Government to meeting Ireland's infrastructure and investment needs during the plan period. In total, there is an expected investment of €165 billion over the lifetime of the plan.

The NDP notes that Carlow Southern Relief Road is one of the projects in the plan period and in September 2021, when the plan was published, it was outlined that the project was in its earlier stages of planning and design. Additionally, the plan also outlines support for minor regional and local roads projects which can demonstrate "significant benefit in areas such as support for the local economy and the Town Centre First policy, improved accessibility (including areas remote from the major road network), protection of lifeline routes, and traffic management" or those which will have a "significant and quantifiable economic impact".

Relevance to Carlow Graiguecullen ABTA
The NDP outlines support for minor, regional, and local roads projects. This shows there is willingness to improve the road network in order to support local economies and protect lifeline routes which are less accessible by public transport. In terms of the Carlow Graiguecullen ABTA, this shows the importance of also considering road usage and ensuring that everyone has accessibility, not just those in the built-up areas.

2.1.3 Climate Action Plan 2023

The Climate Action Plan 2023 is the second annual update to Ireland's Climate Action Plan 2019. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings.

The plan sets out a roadmap for taking decisive action to halve emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. Climate Action Plan 2023 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

The aspiration for transport is a fully decarbonised transport network. Key actions for transport include:

- developing services, communities, and infrastructure in such a manner as to avoid the need to travel as much as is done today
- improving the relative attractiveness of sustainable travel modes such as public transport, cycling and walking, to shift away from car use; this will facilitate increased use of lower-carbon modes and reduce the percentage of total journeys that are made by private car (modal share) from over to 70% (today) to just over 50% in 2030; and
- complement these measures by increasing the proportion of electric vehicles in the car fleet to 30% by 2030, which will improve the efficiency of the national car fleet; electrification of the freight and public transport sector will also be key.

Relevance to Carlow Graiguecullen ABTA
Climate Action and the Low Carbon Development Act outlines the legally binding carbon reduction targets. The Climate Action Plan discusses how these reductions are to occur and emphasises the importance of modal-shift, increased sustainable mode use and public transport investment. This shows the importance of understanding and improving sustainable modes provision in the Carlow Graiguecullen ABTA.

2.1.4 National Investment Framework for Transport Investment in Ireland (NIFTI)

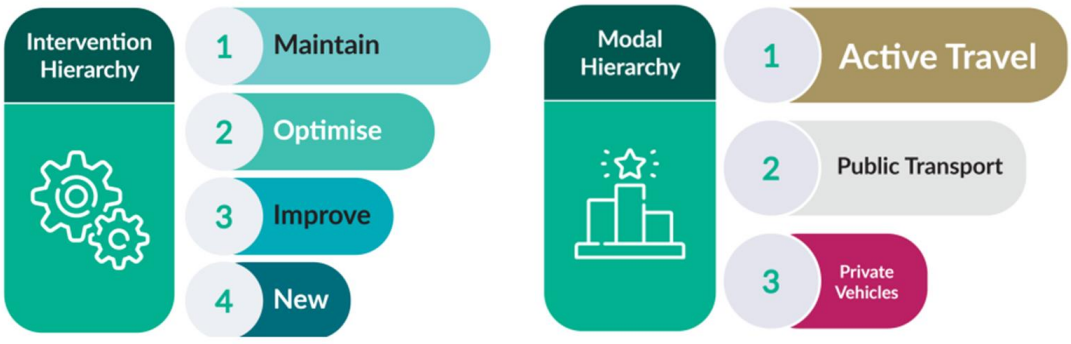
The Department of Transport recently published a draft framework for prioritising future investment in the land transport network to support the delivery of National Strategic Outcomes. The aims are to target investment to:

- "Cater for rising travel demand, while decarbonising the transport sector;
- Invest significantly in sustainable mobility including public transport schemes in cities and major investment in cycling and walking throughout the country;
- Deploying sustainable solutions wherever feasible; and
- Decarbonising the sector through electrifying public transport and providing electric vehicle infrastructure."

The draft framework includes two hierarchies, which specify the order in which transport investment should be prioritised. There is an intervention hierarchy as well as a modal hierarchy, as shown in **Figure 2-1** below.

The intervention hierarchy differentiates between the level of intervention proposed. It states that investment should firstly seek to 'maintain' the existing infrastructure; then to 'optimise' or 'improve' existing infrastructure, before finally, if there is no other possible way to achieve objectives, invest in 'new' infrastructure. The aim of the investment hierarchy is to maximise value for money provided by previous investment and to ensure that more affordable and efficient options for achieving an objective are considered prior to investment in large-scale transport projects. The modal hierarchy differentiates between the modes of travel, and states that active travel (walking and cycling) should be prioritised first, followed by public transport and lastly private vehicles.

Figure 2-1: NIFTI Intervention and Modal Hierarchies



The document also sets out proposals about how the investment framework will be implemented going forward. One of the relevant aspects within this section is the fact that at each Decision Gate in future appraisal and funding process decisions, a project's strategic fit with the framework's investment priorities will need to be assessed. Sponsoring agencies will be required to demonstrate that the development and appraisal of options adhere to the principles of the modal and intervention hierarchies. Specific guidance on how to meet these requirements is set out in the Common Appraisal Framework for Transport Projects and Programmes (CAF).

Relevance to Carlow Graiguecullen ABTA
NIFTI is the framework for prioritising investment. It outlines aims to decarbonise transport, increase sustainable mobility, and support sustainable infrastructure. As well, the intervention and modal hierarchy show the priority consideration for schemes. This will guide the suggestions put forward in Carlow Graiguecullen ABTA, with a particular focus on active modes and building upon existing infrastructure.

2.1.5 National Physical Activity Plan for Ireland 2017

The aim of the Department of Health's National Physical Activity Plan is to increase physical activity levels across the whole population. The Plan sets separate targets for adults, children, and older people to reach the recommended levels of physical activity. Recognising that there are many reasons that people are unable to meet recommended levels of physical activity, the Plan contains some guiding principles to promote and increase physical activity; namely by "creating increased opportunities for people to be active in ways which fit into everyday life's and which suit individual needs, circumstances and interests [and] removing the barriers which people face to being active and encouraging people to recognise how to overcome these barriers".

The Plan highlights walking and cycling as a way to easily incorporate physical activity in everyday life and includes several actions aimed at promoting active travel and recreating, including:

- Ensure that the planning, development and design of towns, cities, and schools promotes cycling and walking with the aim of delivering a network of cycle routes and footpaths;
- Ensure that the planning, development and design of towns and cities promotes the development of local and regional parks and recreational spaces that encourage physical activity;
- Prioritise the planning and development of walking and cycling general recreation / physical activity infrastructure; and
- Explore opportunities to maximise physical activity and recreational amenities in the natural environment.

Relevance to Carlow Graiguecullen ABTA
The National Physical Activity Plan is focussed on increasing physical activity across the entire population. This is to be done via the promotion of active modes in developments and ensuring places are suited to support active travel. This demonstrates the desire Ireland has to encourage active modes of travel, and making them convenient, to bring about health benefits. Therefore, the Carlow Graiguecullen ABTA should be committed to providing infrastructure improvements or provisions that support this goal of increase physical activity.

2.1.6 Sustainable Mobility Policy Review

The Department of Transport's National Sustainable Mobility Policy, published in April 2022, sets out a strategic framework for the year up to 2030 for active travel and public transport in order to assist in achieving Ireland's climate targets, outlined above. It seeks to deliver at least 500,000 daily active travel and public transport journeys, and also generate a 10% reduction in kilometres driven by fossil fuel cars by 2030. It includes a vision for sustainable mobility in Ireland by 2030 to 'connect people and places with sustainable mobility that is safe, green, accessible, and efficient'. The policy builds on and replaces previous active travel and public transport policy as set out in the 2009 policy documents – Smarter Travel: A Sustainable Transport Future and National Cycle Policy Framework.

Supporting mobility is defined in the policy as 'connecting people and places in a sustainable way by supporting:

- Safe, accessible, comfortable, and affordable journeys to and from home, work, education, shops, and leisure;
- Travel by cleaner and greener public transport; and
- A shift away from the private car to greater use of active travel and public transport.'

The policy approach sets out to achieve a more sustainable transport sector based on the 'Avoid-Shift-Improve' principle. This encompasses measures to reduce the frequency and distance of trips, create

a move towards more environmentally friendly modes of transport, and promote efficient fuel and vehicle technologies.

The policy is guided by three key principles which are underpinned by ten high-level goals. There are five goals under the 'Safe and Green Mobility' principle, including:

- Improve safety;
- Decarbonise public transport;
- Expand availability of sustainable mobility in metropolitan areas
- Expand availability of sustainable mobility in regional and rural areas; and
- Encourage people to choose sustainable mobility over the private car.

There are three goals under the 'People Focused Mobility' principle, including

- Take a whole journey approach to mobility, promoting inclusive access for all;
- Design infrastructure according to Universal Design Principles and the Hierarchy of Road Users model; and
- Promote sustainable mobility through research and citizen engagement.

There are two goals under the 'Better Integrated Mobility' principle, including:

- Better integrate land use and transport planning at all levels; and
- Promote smart and integrated mobility through innovative technologies and development of appropriate regulation.

Almost all the above goals are highly relevant to the Carlow Graiguecullen ABTA. Goal 9, which aims to 'support compact growth and transport-orientated development through integrated land use and transport planning' is of particular relevance. Under the heading of Goal 9, the benefits of a transport-orientated development approach and the importance of local transport plans prepared using ABTA guidance are highlighted. Alongside metropolitan area transport strategies, local transport plans are stated to be key for 'coordinating the delivery of multi-modal transport infrastructure and the integration of land use and transport planning at metropolitan and local level'. Related to this, the policy also notes that the Department of Housing, Local Government and Heritage intend to publish 'Sustainable Compact Settlement Guidelines' which will supersede existing 2009 Sustainable Residential in Urban Area Guidelines for Planning Authorities. The new guidance will place a renewed emphasis on compact growth to achieve a greater intensity of uses in central locations, and in close proximity to high quality public transport services.

Relevance to Carlow Graiguecullen ABTA
The 'Safe and Green', 'People Focussed', and 'Better Integrated' mobility principles need to be considered when producing the Carlow Graiguecullen ABTA, to ensure that the proposals work in cohesion with other plans to achieve the wider goals of both Carlow and Ireland.

2.1.7 Programme for Government: 'Our Shared Future' (2020)

The Programme for Government commits to a 'fundamental change in the nature of transport in Ireland' and 'unprecedented modal shift in all areas' by a reorientation of investment to walking, cycling, and public transport. It states the Government needs to make every effort to make active travel and public transport better and more accessible in order to achieve necessary improvements to climate, quality of life, air quality, and physical and mental health.

The Government is committed to a 2:1 ratio of expenditure between new public transport infrastructure and new roads over the lifetime of the Government, while maintain funding for essential road and public transport maintenance and upkeep. The Government will also prioritise plans for the delivery of Metrolink, Luas and other light rail expansions, DART expansion and interconnector and BusConnect in Dublin, Cork, Galway, and Limerick.

In addition to these funding commitments, the Programme also commits to a number of other measures which are relevant to the ABTA including:

- Enhance suburban and commuter rail across the country;
- Mandate that every local authority adopts a high-quality cycling policy, carries out an assessment of their road network and develops cycle network plans; and
- Dramatically increase the number of children walking and cycling to primary and secondary school.

Relevance to Carlow Graiguecullen ABTA
Our Shared Future notes there is need for a fundamental change in the transport sector in Ireland, and active modes and public transport need to be prioritised unlike previously. This supports the focus of the Carlow Graiguecullen ABTA on sustainable transport.

2.1.8 Road Safety Strategy 2021-2030

A new Government Road Safety Strategy was published at the end of 2021. The development of the strategy was led by the Road Safety Authority (RSA) and involved extensive engagement with key stakeholders, as well as an open public consultation. Underpinning the strategy is Ireland's long-term goal of achieving Vision Zero (i.e., zero road deaths or serious injuries) by 2050. The strategy notes that Ireland has also set a target to reduce road deaths and serious injuries by 50% by 2030, in line with the EU. In the 2021-2030 strategy, seven 'Safe System' priority intervention areas have been identified. Of these, the four listed below are particularly relevant to the ABTA for Carlow Graiguecullen.

- Safe roads and roadsides: to improve the protective quality of our road and infrastructure.
- Safe speeds: to reduce speeds to safe, appropriate levels for the roads being used, and the road users using them.
- Safe road use: to improve road user standards and behaviours in line with traffic legislation, supported by enforcement.
- Safe and healthy modes of travel: to promote and protect road users engaging in public or active transport.

The 2021-2030 strategy will feature three phases of action plans. The first action plan (2021-2024) contains 186 different actions, the first fifty of which are describe as 'high impact actions'. Some of the actions which may have particular relevance to the Carlow Graiguecullen ABTA are listed below:

- Action 5: over the period 2021 to 2025, 1000km of segregated walking and cycling facilities will be constructed or under construction on the national, local, and regional road network.
- Action 6: a working group will be established to examine and review the framework for setting of speed limits and as part of this review, specific consideration will be given to the introduction of a 30kmh default speed limit in urban areas.
- Action 8: expand speed management measures on National, Regional and Local roads (including the use the average speed cameras).
- Action 40: continue to implement an active travel infrastructure scheme.
- Action 41: encourage a modal shift to support environmental, safety and health objectives by promoting the use of sustainable and active modes of travel.
- Action 68: each local authority to publish/renew their prioritised plan on road building construction and maintenance (including footpaths and cycle lanes) on an annual basis.
- Action 78: extend the number of 30kmh speed limit zones in high-risk locations (urban city/town centres) for vulnerable road users in line with best practice models.
- Action 79: examine the feasibility of 30kmh speed limit or lower in school vicinities and report on progress.
- Action 134: the Department of Transport will introduce necessary legislation for the safe use of e-scooters on Irish roads in Q1 of 2022.
- Action 177: roll-out the Safe Routes to Schools programme and provide 'front-of-school' treatment to a minimum of 500 schools.

Relevance to Carlow Graiguecullen ABTA
It is essential future proposals to the transport network adhere to the road safety strategy outlined above. As mentioned, there are 4 priority areas relevant to this ABTA. These include providing safe roads and roadsides, safe traffic speeds, safe road behaviour and safe active mode travel. This demonstrates there is commitment to the various transport modes, and such measures should be particularly helpful in supporting and making active travel safer which is essential to increasing active mode usage in Carlow.

2.1.9 Iarnród Éireann Strategy 2027

Iarnród Éireann are the national railway provider in Ireland and state that the rail network throughout Ireland is "an invaluable national asset, providing the backbone for an integrated public transport system". The strategy which Iarnród Éireann outlines for the future is aligned with the National Development Plan and supports committing their investment to assisting in achieving sustainable and compact growth. They key deliverables of the strategy are listed below:

- Playing a central role in Ireland's Climate Action Plan
- Strengthening regional connectivity
- Creating sustainable mobility hubs
- Working in partnership with stakeholders
- Supporting compact growth
- Embracing new technology
- Moving goods as well as people
- Driving efficiency and delivering value for money

Within the strategy there are numerous infrastructure commitments outlined. The most impactful to the Carlow Graiguecullen study area is likely to be the Outer GDA Commuter service. This service will serve the areas just outside of Dublin, where there is potential for daily commutes into the Dublin area. Areas that will be connected to Dublin via this service are Dundalk, Longford, Athlone, Portlaoise, Carlow and Gorey, which will all have access to services running into Dublin every 20-minutes in the peak hours and half hourly in the off-peak hours. This service benefits from enhanced intercity timetabling and the redeployment of rolling stock from DART+. However, improved services like this open up greater opportunities for movement between Dublin and Carlow in a more sustainable way and promote its usage to workers, residents, and visitors.

Relevance to Carlow Graiguecullen ABTA
The rail strategy demonstrates the commitments which have been made to railways across Ireland. It is important to consider the impact such upgrades may have on people travelling to/from Carlow via train. It is also important to consider whether changes to the Outer GDA Commuter service will make people more likely to travel to Dublin from Carlow for work purposes and whether this would alter where people may choose to reside or work, and especially their method of travel to work.

2.1.10 Fáilte Ireland Investment Strategy 2016-2022

Fáilte Ireland's 'Tourism Development & Innovation – A Strategy for Investment 2016-2022' was launched to provide a framework for tourism investment in Ireland and identify as well as prioritise tourism investment proposals. The strategy is based on four strategic outcomes and nine more specific outcomes that Fáilte Ireland aims to achieve with its investments. The four strategic outcomes are:

- "Increasing the number of overnights spent by overseas visitors and increasing their spend;
- Creating employment opportunities;
- Leveraging public or private sector investment into the tourism experience; and

- Stimulating international awareness and demand."

Relevance to Carlow Graiguecullen ABTA
This strategy is related to promoting tourism. It is important to Carlow's economy that the town is attractive to visitors. This is already partially possible due to the tourist attractions and the potential for Agri-tourism, however it must be capitalised upon to reap economic rewards. Ensuring that there are good external connections to Carlow as well as sound connections within the town is important to promoting both tourism and sustainable travel by tourists.

2.2 National Guidance

2.2.1 Design Manual for Urban Roads and Streets

The Design Manual for Urban Roads and Streets (DMURS) provides guidance relating to the design of urban roads and streets, placing a strong emphasis on designs that prioritise the needs of pedestrians, cyclists and public transport users and reduce the private car dominance in our urban landscapes. The Manual presents an integrated design approach, which means the design must be:

A. Influenced by the type of place in which the street is located; and

B. Balance the needs of all users.

The Manual is applicable in the design of urban roads and streets with a speed limit of 60kmh of less.

2.2.2 Traffic Management Guidelines 2019

The Traffic Management Guidelines (TMG) provide guidance on traffic planning, traffic calming and management, incorporation of speed restraint measures in new residential designs and the provision of suitably designed facilities for public transport users and for vulnerable road users. The TMG also focuses on how issues must be examined and implemented in the context of overall transportation and land use policies. The function of the TMG is to provide guidance on the appropriateness and scale of interventions in the public realm on a mode specific basis, helping to coordinate the design approach of these interventions.

Relevance to Carlow Graiguecullen ABTA
Carlow Graiguecullen ABTA proposals must follow the design manual to ensure they are safe and satisfactory, and also ensure that certain road users and quality of space are not compromised.

2.2.3 Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG 2012)

The Spatial Planning and National Roads Guidelines set out planning considerations relating to development which would affect national roads outside the 50/60 kmh speed limit zones for cities towns and villages. Key principles within the guidance document include:

- Land-use and transportation policies are highly interdependent and integrated development and implementation of planning and land-use policies is vital in minimising the need for travel;
- Proper planning is central to ensuring road safety;
- Development must be plan-led;
- Planning Authorities, the National Roads Authority and other public transport bodies must work closely together.

The guidelines recognise the function that national roads play in terms of Ireland's overall transport system and in the country's economic, social and physical development. The guidance emphasises the need to deliver development in a manner in which a satisfactory level of service is achieved for road users and to protect and maintain that level of service with any future development.

Relevance to Carlow Graiguecullen ABTA
The N80 is a key route through the study area. Any development, or changes to the transport network, must protect the function of the N80 and ensure a reasonable level of service is maintained.

2.2.4 Permeability in Existing Urban Areas: Best Practice Guide (2015)

The National Transport Authority (NTA) funds transport infrastructure which assists in facilitating a shift towards sustainable modes. Particularly, they work alongside local authorities to identify and address 'gaps' in the current network. Often such gaps "comprise situations where demand for walking and cycling in towns and cities is not being met by the transport network". It is stated that these gaps can often occur due to 'built-in' severance in which people cannot pass, for example cul-de-sacs or high walls. Therefore, NTA encourages moving towards permeable neighbourhoods so people can easily and safely pass-through areas making active modes more convenient and more attractive against the private car.

The NTA, AECOM and South Dublin County Council worked collaboratively to produce this policy guidance on how best to facilitate walking and cycling demand through built-up areas. Within the policy best practice principles for both the provision and maintenance of permeability have been provided and are summarised below:

- Link origins to destinations directly
    - People should be able to walk and cycle directly to their local neighbourhood centre as well as district centre from their own homes.
    - Children should be able to walk and cycle safely to their schools.
    - Public transport stops should also be accessible via active modes from residential areas.
- Priority for both pedestrians and cyclists
    - Time given to pedestrians in signal phasing should allow for efficient and convenient movement.
    - In urban areas, needs of pedestrian should always be the primary consideration.
    - Use of on-demand pedestrian crossings to allow for seamless permeability.
    - Similar considerations to above for cyclists.
- Improved design of links
    - It needs to be deemed what link is suitable, e.g., segregated cycleway and footpath or combined usage, for the expected levels of usage and types of users.
    - Then, the ability for clear passage, link width, surface quality, lighting as well as overlooking or passive supervision needs to be considered and provided to best suit the links users.
- Improvements to the design of junctions
    - To ensure permeability it is essential junctions do not cause severance.
    - The following principles are best practice to provide convenient movement to pedestrians and cyclists and alleviate severance, these are: avoiding wide-flared junction, only use large multi-lane roundabouts where necessary and provide full segregation for cyclists/pedestrians, side roads should be single lane entry and footpaths should be carried through minor road junctions at grade.

Relevance to Carlow Graiguecullen ABTA
Providing permeability is important to allow for those travelling on foot or by bicycle to have short, convenient, and accessible routes. Towns and spaces need to ensure that they provide for these network users and allow for safe passing points to reduce trip lengths. Therefore, future junctions and network should ensure that permeability is not comprised and that old barriers to permeability are overcome.

2.2.5 10 Minute Towns 2020

Arup was commissioned by the Southern Regional Assembly, the region in which County Carlow sits, to undertake a 10-minute town concept to help inform the Regional Action Plan. The concept of 10-minute town is to create better connected communities, and therefore Arup were tasked with understanding how neighbourhoods work presently, and what needs to be done to transform areas into 10-minute towns in order to provide a best practice guide.

Within the report, the baseline conditions for Carlow Town were discussed and are listed below.

Healthcare: It was noted that all healthcare services for Carlow Town are located predominantly in the town centre and the three hospitals within the county are located in the Northern part of the town.

Educational Facilities: Arup highlighted a trend that the primary and secondary schools in Carlow Town tend to be located in the Northern section of town, North of Tullow Street, whereas the third-level institute are located in the town centre or to the South. Additionally, it was mentioned that those who reside in the north-east of the town are slightly further distance from the school and generally the schools fall outside the 10-minute walking catchment.

Retail: As expected, many of the shops, especially chain stores and supermarkets, are located in the town centre and residential areas in the southern and north-east parts of Carlow do not have retail services located nearby.

Leisure Facilities: Indoor leisure facilities, such as theatres and museums, are located in the town centre but sports and recreation facilities, like playing fields, are distributed throughout Carlow Town.

Public Transport: Carlow railway station is to the north-east of the town centre, along St. Joseph's Road, and here the Dublin-Waterford line services can be accessed. Bus stops tend to be located on the north-south corridor through the town.

Based off this investigation, Arup produced a constraints and opportunities plan for Carlow in regard to the 10-minute town concept. These are briefly summarised below:

- Lack of direct accessibility from residential estates to main roads – opportunity to provide a connection to the North Relief Road, connection to Dublin Road from residential area which is currently fenced off and the provision of walking/cycling connections to Eire Og Road from the residential area.
- Lack of accessibility from residential area to River Burrin (North) – opportunity to provide a connection between residential streets along River Burrin Walk.
- Lack of formal pedestrian and cycling crossings – opportunity to provide formal pedestrian crossing on Dublin Road so pedestrians can access the retail precinct, provide formal pedestrian and cyclist crossing on Hanover Street which includes a formalised active modes path through Hanover Park and also to provide a formal crossing and signage to guide pedestrians to the eastern side of College Street.
- Lack of direct accessibility NE and SW of Carlow Rail Station – opportunity to provide walking and cycling connection between Green Lane and the station via Glendale Avenue, to provide walk/cycle bridge over the line between Glendale Avenue and St. Joseph's Road and also provide accessibility between St. Joseph's Road and Carlow College via north of the cricket club.

- Lack of accessibility on Feltham Road and Monacurragh – opportunity to provide a walking and cycling path along River Burrin between Feltham Road and Monacurragh and also an active mode bridge to connect to the Green Recreational Route.
- Lack of access between residential estates and other services – opportunity to provide a connection for walking and cycling between:
    - SuperValu from residential area
    - Riverside and Kennedy Avenue (near Hanover Park)
    - Presentation College and Sand Hill and Green Hills Estate
    - Browneshill Wood and Sand Hills
    - The Orchards residential estates
- Lack of connectivity south of Kilkenny Road to the town centre – opportunity to extend cycle lanes between Burger King and to the immediate south of Carraig Abhainn as well as walking and cycling access points from Southern Gardens to Kilkenny Road.
- Lack of cycling connectivity to the outskirts of Carlow – opportunity to provide walking and cycling facilities if the proposals for Southern Relief Road and Eire Og Road progress.
- Lack of local bus services within the town – investigate potential local bus routes that would connect residents and businesses, particularly where there are limited services e.g., healthcare and education.
- Lack of small retail services in parts of the area – opportunity to provide small retail facilities in areas where they are currently unavailable.
- Lack of cycle usage in the town – opportunity to improve current and future cycling facilities throughout the town, promote cycling use as many services are within 10-minute cycle and also provide secure cycle parking where there is a cluster of services and near to bus stops.

Relevance to Carlow Graiguecullen ABTA
This concept is concerned with locating people close to services and amenities. Therefore, transport routes need to ensure these connections are viable to allow people to be able to easily access things they may need and have a better quality of life.

Regional Policy

2.2.6 Regional Spatial and Economic Strategy for the Eastern and Midland Region 2019-2031

The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region 2019-2031 is relevant as this covers Laois County and Graiguecullen. The RSES sets out a framework to direct future growth of the Region over the medium to long-term. The RSES will help implement the strategic planning framework set out in NPF.

There are specific regional policy objectives included in the RSES for Graiguecullen – Carlow Town which is listed as a key town.

- RPO 4.75: A cross-boundary Joint Local Area Plan (LAP) shall be prepared for Carlow by CCC and LCC having regard to its location within the combined functional area of both local authorities. The joint LAP shall provide a coordinated planning framework to identify and deliver strategic sites and regeneration areas for the future physical, economic, and social development of Carlow/Graiguecullen to ensure it achieves targeted compact growth of a minimum of 30%. It also proposes to ensure a coordinated approach is taken to the future growth and development of the combined urban area, ensuring that it has the capacity to grow sustainably and secure investment as a key town. The joint LAP shall identify a boundary for the plan area, strategic housing and employment development areas and infrastructure investment requirements to promote greater coordination and sequential delivery of serviced

lands for development. Regard shall be given to the respective housing, retail and other local authority strategies that may be in place.

- RPO 4.76: Support the sustainable development of environmentally sensitive, low intensity amenity development associated with the Barrow Blueway subject to compliance with the Habitats and Birds Directive and Floods Directive.

Relevance to Carlow Graiguecullen ABTA
This strategy is relevant as part of Carlow Town lies within Laois. Within the RSES there are regional policy objectives aimed at the Graiguecullen – Carlow area. It is named as a key town, showing its importance to the region. There are commitments to create a joint Local Area Plan, which should shape the proposals put forward in the ABTA. Additionally, there is a desire to support sustainable development which aligns with the objectives of the Carlow Graiguecullen ABTA.

2.2.7 Regional Spatial and Economic Strategy for the Southern Region 2040

Carlow lies within the South East region of Ireland, therefore it is important to understand the commitments made in the Regional Spatial and Economic Strategy (RSES) for the Southern Region. As mentioned above, the RSES sets out a framework which exists to direct future growth in the region over the medium to long-term. The RSES is seen as a tool to assist in delivering the strategy planning framework outlined in the NPF.

Within the RSES, Carlow is listed as a key town and has a 'pivotal inter-regional role' due to its strong links with the Midlands and Greater Dublin Area. Carlow Town is considered a regional centre for education, healthcare, public services, shopping, arts, culture, leisure, and recreation for a wide surrounding area including Laois, Kildare, and Wicklow. The paragraphs below summarise both wider Regional Policy Objectives (RPO), as well as RPOs specific to Carlow. Such objectives are important to consider when planning the future of Carlow Town to ensure development aligns with regional and national priorities.

RPOs for the Southern Region which are important to consider as part of the Carlow Graiguecullen ABTA process include:

- RPO 2: Planning for Diverse Areas – recognises strategic role played in all areas to achieve regional targets. Therefore, RSES supports sustainable enterprise growth, services, physical and social infrastructure investment, and sustainable community growth.
- RPO 4: Infrastructure Investment – investment into infrastructure to align with spatial planning strategy of the RSES.
- RPO 9: Holistic Approach to Delivering Infrastructure – ensure investment and delivery of infrastructure is comprehensive, meets growth targets and prioritises delivery of growth and sustainable mobility.
- RPO 31: Sustainable Place Framework – Local Authorities provide/implement this framework to ensure the development of quality places through excellent design and integrated planning.
- RPO 53: Tourism – sustainably develop the road, public transport network and walking/cycling trails to allow for more sustainable tourism.
- RPO 91: Decarbonisation in the Transport Sector – seek initiatives that will achieve decarbonisation, such as: non-fossil fuelled cars and public transport, reduced private car trips, modal shift towards sustainable modes, development of electric vehicle infrastructure.
- RPO 130: Air Quality – improve and maintain good air quality and help prevent harmful effects on human health and the environment.
- RPO 131: Noise – promote the pro-active management of noise where it is likely to have significant adverse effects on health or the environment.
- RPO 151: Integration of Land-Use and Transport, the principles guide this objective which are relevant to the Carlow Graiguecullen ABTA are: residential development on lands accessible by public transport or active modes, large trip generators (offices/retail) focussed on central locations accessible by sustainable modes, all non-residential developments subject to maximum

parking requirements, electric vehicle charging infrastructure and following the newest Design Manual for Urban Roads and Streets.

- RPO 152: Land Planning Objectives, the principles guide this objective which are relevant to the Carlow Graiguecullen ABTA are: high-level of permeability, priority of those travelling sustainably, facilitate complementary use of private car (strike a balance of mode share), maximise number of people living within walking/cycling distance of neighbourhood centres, cycle parking appropriately designed to fit urban realm, provide filtered permeability where possible, emphasis on sustainable modes for work and education travel.
- RPO 157: Local Transport Plans (LTP) – developed by Local Authorities, based on ABTA, and should aim to maximise opportunities for transport integration, assess existing transport movements, plan for efficient and sustainable movement of people, identify transport assets which can effectively accommodate future demand, prioritise delivery of sustainable active travel infrastructure, plan for and target a modal shift, retrofit permeability for active modes, and electric vehicle infrastructure.
- RPO 159: Role of Transport in Enabling Access for All – seek investment into transport networks that are socially inclusive and provide connectivity to meet societal needs.
- RPO 160: Smart and Sustainable Mobility – the relevant sub-objectives to this ABTA include seeking investment into intelligent transport systems (including real-time information), recognising importance of public transport networks and multi-modal interchanges, supporting 'steady state' investment to improve rail, road, and bus, investing to facilitate park and ride as well as delivering sustainable and comprehensive active travel networks.
- RPO 162: Multi-Modal Travel Integration – delivering sustainable mobility and investment to provide integration between all transport modes and support usage of sustainable modes. Options to consider include bike and ride facilities, park and cycle facilities, park and car pool facilities, bike share schemes, car sharing, integrating cycling and public transport network, carriage of bicycles on trains and buses, integrated ticketing, exploring feasibility of mobility hubs and e-scooter schemes.
- RPO 163: Sustainable Mobility Targets – through various plans (LAP, LTP, and so on) ensure reduction in private vehicle usage and increase use of sustainable modes. The national target of reducing private car community to 45% needs to be met and opportunities to achieve this need to be explored. Local Authorities must set complementary measures to achieve sustainable mobility targets and place greater influence on encouraging mixed-use developments which support sustainable trip patterns.
- RPO 166: Investment in Strategic Inter Regional Multi-Modal Connectivity to Metropolitan Areas and Economic Corridors – this RPO has two sub-objectives relevant to the Carlow Graiguecullen ABTA. These are maintaining the efficiency and safety of existing national primary and secondary roads by targeted transport demand management and that facilities for sustainable transport are supported in order to strengthen quality of inter-regional connectivity.
- RPO 168: Investment in Regional and Local Roads – this objective includes the Southern Relief Road which is currently subject to appraisal.
- RPO 171: Bus – through the functions of the NTA seek to develop the bus network in the region. During the RSES the following specifics are targeted: support development of bus service network and create a relevant strategy, investment in the bus network, service improvements, network review with aim of providing improved local bus services, review of bus services between settlements, new interchange facilities, improve waiting facilities, upgrade bus fleet to low carbon and low emission and ensure buses are accessible for all.
- RPO 174: Walking and Cycling – the following sub-objectives are given for walking and cycling: delivery of cycle routes, Greenway and Blueway corridors, delivery of high-quality safe cycle route network, development of safe cycling infrastructure for all population groups, safe walking and cycle infrastructure (especially near schools), creating a safer pedestrian environmental by expanding 30kph speed limits, provide a cycle network which is coherent, continuous and safe, provide alternative cycle routes which are quiet and ensure these are well sign-posted, place walkability and accessibility a central consideration in the planning and design process and support the accessibility of walk routes for those with a disability.

- RPO 175: Improving Regional Quality of Life through Infrastructure-Led Planning – support sustainable infrastructure-led planning for the future populations and use it as a tool to tackle the legacies of deprivation.
- RPO 176: 10-Minute City and Town Concept – ensure a range of community facilities and services are accessible in short walking and cycling timeframes to allow greater connectivity between people and the services/amenities they required.
- RPO 181: Equal Access – promote disability awareness and improve equal access for all through transport infrastructure and many other means.

Additionally, there are RPOs listed specifically for Carlow town. These exist to ensure the key town of Carlow fulfils its potential and regional role.

- RPO 14: Carlow – there are sub-objectives relevant to the Carlow Graiguecullen ABTA, as listed below:
    - Support role of Carlow Town as a self-sustaining regional and inter-regional economic driver by supporting strategic investment in employment development and economic integration, achieved through: strengthening role of education and innovation, supporting town-centre led economic regeneration, improve public realm and town-centre attractiveness, improved accessibility to rail station, support delivery of Southern Relief Road, delivering new crossings of River Barrow, seeking investment in sustainable travel, strengthening the 'steady state' investment into the rail infrastructure to achieve improved frequencies and journey times and supporting development of under-used lands along River Barrow.
    - Support the preparation of the cross-boundary Joint Urban Area Plan for Carlow Town by CCC and LCC. This should aim to provide a coordinated planning framework to identify and deliver strategic sites and regeneration, foster collaboration in allocation of funds to enable cross-boundary collaboration in Carlow in delivery of strategic infrastructure, consistency of approach on land-use and agreement on population distribution, by both councils, across the Carlow Town area.

Relevance to Carlow Graiguecullen ABTA
The RSES for the Southern region is a key policy document to consider. Carlow is listed as a key town in this region due to its proximity and strong connections to other areas as well as its status as a hub for healthcare, education, public services, shopping, culture and so on. The policies listed above are relevant to consider when producing the Carlow Graiguecullen ABTA to ensure that options developed align with the regional objectives and ambitions. Additionally, there are two policies related to Carlow specifically, these are to strengthen the role of Carlow as an economic driver and also to prepare a joint urban area plan with Laois for Carlow Town. Both of these need to be accounted for when creating the Carlow Graiguecullen ABTA; firstly the joint development goals between CCC and LCC for Carlow need to be considered and supported and also the transport system needs to be able to back economic success.

2.3 Local Policy

2.3.1 Laois County Development Plan 2021-2027

The purpose of the Laois County Development Plan is to set out a framework for the sustainable spatial and physical development of County Laois, whilst considering the conservation and protection of the built and natural environment. Chapter 10 of the strategy sets out the key objectives for infrastructure over the plan period, which includes transport, with the following aim:

'To achieve a sustainable, integrated and low carbon transport system for the county and to protect, improve and extend water services and other enabling infrastructure in line with national, regional and local population and economic growth for the county.'

Policy objectives outlined within the Plan, which will impact on this ABTA, are as follows:

- TRANS 1: Maintain, improve and protect the safety, capacity and efficiency of the road network and associated junctions;

- TRANS 2: Upgrade and improve the hierarchy of Laois's road transportation infrastructure including reserving corridors for proposed routes, free of development so as not to compromise future road schemes;
- TRANS 3: Co-operate with TII in the upgrade of existing Interchanges on the National Routes;
- TRANS 4: Prevent inappropriate development of lands adjacent to the existing road network, which would adversely affect the safety, current and future capacity and function of national roads;
- TRANS 6: Discourage the proliferation of access points onto public roads, particularly in areas where national speed limit applies or where road safety is of concern;
- TRANS 11: Integrate land use policies and transportation in a manner which reduces reliance on car based travel and promotes more sustainable transport choice and co-ordinates particular land uses with their accessibility requirements;
- TRANS 12: Support sustainable travel in the tourism sector by the promotion of public transport to use and by undertaking enhances to overall accessibility thereby making the County easier for visitors to navigate;
- TRANS 13: Encourage transition towards sustainable and low carbon transport modes, through the promotion of alternative modes of transport, and 'walkable communities' together with promotion of compact urban forms close to public transport corridors to encourage more sustainable patterns of movement.

Relevance to Carlow Graiguecullen ABTA
The County Laois Development Plan sets out the key policy objectives for transport, which the Carlow Graiguecullen ABTA should align with. There is a recognition that a focus needs to be given to sustainable transport, but also the importance of the region's roads are highlighted.

2.3.2 Carlow County Development Plan 2022-2028

The Carlow County Development Plan sets out the strategy for the proper planning and sustainable development of the County over the plan period from 2022 to 2028. The approach is centred on the core principle of sustainability with a focus on regeneration and economic development, supported by vibrant, liveable, climate resilient communities. Chapter 5 of the Plan sets out the priorities for Transport.

Chapter 5: Sustainable Travel and Transportation

This section of the development plan states that a "well-functioning multi-modal transport network is essential in transitioning to more sustainable modes of transport". CCC also acknowledge the importance of promoting and facilitating more sustainable trips by enhancing the transport network to ensure the county has the capacity to support sustainable development going forward.

There are numerous sections to this chapter which discuss the current challenges, policy which influences the transportation goals outlined in the development plan and then policies committed by CCC to ensure changes and improvements to the transport network, and in particular improving its sustainability, take place. The most relevant categories and policies to the ABTA along with a small summary of the policies for each are summarised below.

LT P1: Integration of Land-Use and Transportation

- Support sustainable modes through land-use zonings
- Encourage developments within walking, cycling and public transport distance.

MS O1 and O2: Modal Shift

- Seek investment to provide sustainable transport solutions, infrastructure, and connectivity.
- Support the modal shift from private vehicles particularly for access work and education.
- Provision of bus services in Carlow Town and into rural areas of the county.

Walking and Cycling

- WC P1: Prioritise and promote active modes through quality infrastructure.
- WC P3: Throughout the county ensure there is walking and cycling connectivity between people and places to maximise active mode trips for accessing local shops, education, public transport, employment as well as other important amenities.
- WC P2: Work with Government Departments and other stakeholders to improve infrastructure provision.

Public Transport

- PT P1: Promote sustainable development by supporting the delivery of improvements to public transport to ensure they are an attractive and convenient alternative to the car.
- PT P2: Support transport agencies in the provision of new services and routes as well as increasing quality, frequency and speed of existing rail and bus services.
- PT P3: Generate additional demand for public transport through integrated land-use planning and maximising accessibility through public transport.

Road Network

- NR P1: Work with Transport Infrastructure Ireland to develop and operate the motorway and national road network in Carlow and ensure capacity, efficiency, and safety is maintained in accordance with DECLG (2012).
- NR P2: Control development which could impact traffic safety or hinder future motorway upgrading.
- RR P1: Improve capacity, safety, and function of regional road network and ensure it is planned for and managed to enable sustainable economic development in the county.
- LR P1: Ensure safety and capacity of the local road network is maintained to suit the needs of the county.
- UR P1: Ensure all urban roads and streets following ‘Design Manual for Urban Roads and Streets’ (2013/2019) manual.
- UR P2: Where appropriate seek to introduce a wider 30kph speed limit in urban environments to make a safer, calmer, and more pleasant urban environment for vulnerable road users and also foster opportunities for increased active travel.

Car Parking

- CP P1: Carefully consider number of parking spaces required to service new developments and allow for a reduction in car parking requirements for developments in suitable town centre locations.
- CP P3: Ensure all new car parking facilities are provided to an appropriate standard and serve the development.
- CP P4: Ensure applications for surface parking are accompanied by landscaping proposals.
- CP P5: Promote provision of age friendly parking arrangements and improve parking for those who have disabilities.
- CP P6: Promote development of infrastructure to accommodate a change towards private vehicles and ensure electric charging points are provided at a ratio of 1:50 spaces in all new/extended car parks.

Bicycle Parking

- BP P1: Ensure provision of appropriate bicycle parking as part of any new application in urban areas to assist modal shift to sustainable modes.

Directional, Information and Waymarking Signage

- SG P1: Provide/facilitate provision of directional signage for amenities, tourist attractions, and local attractions along active mode routes in accordance with planning and traffic regulations.

Accessibility

- AC P1: Support suitable access for those with disabilities, this includes improvements to buildings, streets, and public places.

Chapter 2: Transport and Movement

The following text comes from chapter 2 of the County Development Plan. The proposed Transport and Movement Strategy aims to support Carlow's position 'as a first-class regional town'. Therefore, the strategy focuses on developing the transport infrastructure and promoting a behavioural change in regard to travel to capture health improvements. To succeed in gaining such benefits active and low carbon travel options need to be available to residents, workers, and visitors of Carlow to reduce car dependency and create opportunities for 'community interaction through liveable, vibrant, and welcoming streets and places.' There are five key principles to this, these are:

- Realise the full potential of infrastructure (road, air, rail and water).
- Promote a high quality of life and wellbeing.
- A town perceived as an exciting and safe place to live, work, and visit.
- Increased town centre footfall.
- Deliver high quality and person-centred buildings and public realm.

Relevance to Carlow Graiguecullen ABTA
Carlow County Development Plan has a key focus of providing a sustainable transport network. The plan outlines how this should be achieved as well as how efficiency and accessibility will be provided. The proposals outlined here are very important to the Carlow Graiguecullen ABTA, it is important that the suggestions made for the transport system work alongside greater development

2.3.3 Carlow County Council Climate Change Adaptation Strategy 2019-2024

Changes in climate have diverse impacts on Ireland, such as: more intense storms and rainfall events, increased river and coastal flooding, water shortages in summer, increased risk of pests and diseases, adverse impacts on water quality as well as changes in distribution and phenology of plants and animal species. This has impacts environmentally, economically, and socially. Climate change and its impacts will continue to intensify without any adaptation, hence the creation of such strategies which outline how specific areas will tackle climate change.

Nine thematic areas are set out and high-level goals are outlined. The themes and goals which relate to transport, and which are relevant to the production of this ABTA are as follows:

- Theme 1: Local Adaptation Governance and Business Operations
    - Goal: climate change adaptation considerations are mainstreamed and integrated successfully into all functions and activities of the local authority ensuring operational protocols, procedures, and policies implement an appropriate response in addressing the diversity of impacts associated with climate change.
- Theme 2: Infrastructure and Built Environment
    - Goal: increased capacity for climate resilient structural infrastructure is centred around the effective management of climate risk, informed investment decisions and positive contribution towards a low carbon society.
- Theme 3: Land-use and Development
    - Goal: sustainable policies and measures are devised influencing positive behavioural changes, supporting climate adaptation actions and endorsing approaches for successful transition to low carbon and climate resilient society.
- Theme 6: Community Health and Wellbeing

  - Goal: empowered and cohesive communities with strong understanding of climate risks, increased resilience to impacts of climate change with capacity to champion climate action at local level.

- Theme 7: Mobility
  - Goal: sustain transport networks throughout impacts of climate change and develop more sustainable adaptation methods of mobility
- Theme 8: Economic Development
  - Goal: protect the economy of CCC and communities acknowledging the benefits which can be gained from adjusting to a 'Green Economy'.
- Theme 9: Resource Management
  - Goal: promote awareness on importance of resource management and explore actions on becoming more efficient within the workplace and community.

The guiding principles that underpin these goals are:

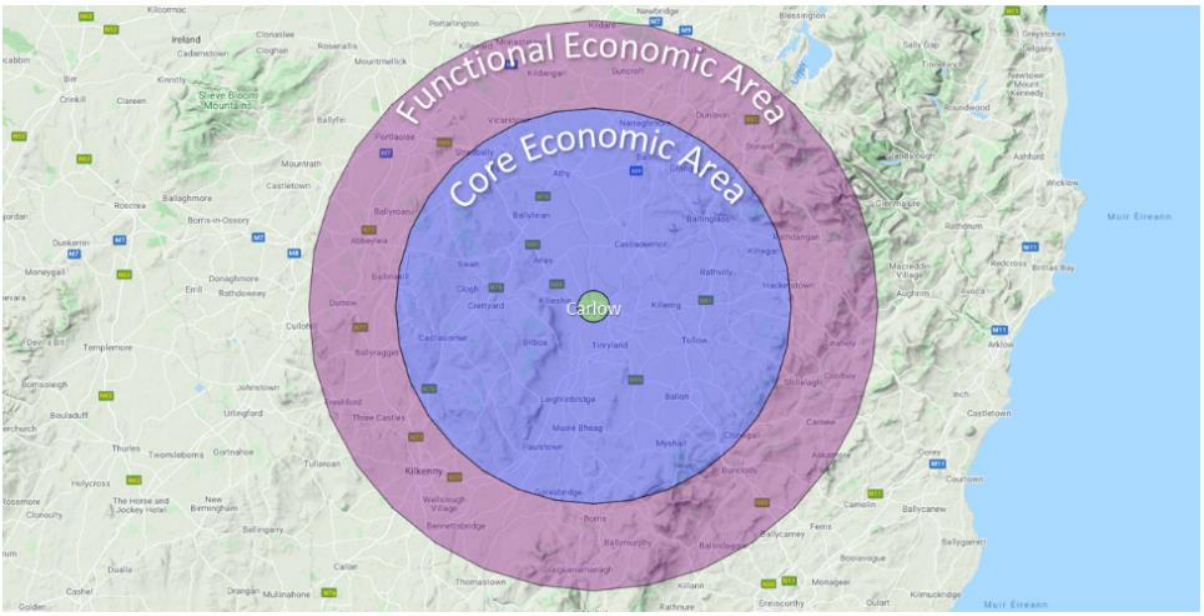
- Mainstream adaptation – climate adaptation is a core consideration and is mainstreamed in all functions and activities across the local authority. Also, ensure the local authority is well placed to reap potential economic development benefits which could emerge due to a proactive climate change adaptation stance.
- Informed decision making – effective and informed decision making which is based on reliable and robust evidence of impacts, risks, and vulnerabilities.
- Building resilience – needs of vulnerable communities are prioritised and addressed. Also, spread awareness so that there is a sustainable and robust response to climate change.
- Capitalising on opportunities – changes in climate could provide additional benefit opportunities and these need to be explored and capitalised upon.

Relevance to Carlow Graiguecullen ABTA
County Carlow is committed to achieving the same climate goals as the rest of the country. They understand that decision making, adaptation, resilience and building upon opportunities are all essential parts to gaining environmental benefits. There are further details in the sections above but naturally the transport system has a major role in cutting climate change. Therefore, it is essential that the Carlow Graiguecullen ABTA promotes methods of travel which are sustainable and can assist in achieving such goals.

2.3.4 Carlow Economic Development and Business Support Strategy 2022-2027

Within the strategy the Carlow geography has been used to define three areas, these are the County, an economic 'core' which consists of those within a 30-minute drive from Carlow Town as well as a Functional Economic Area which includes population within a 45-minute drive from the town. These areas were chosen to reflect the sphere of influence Carlow Town can have over the wider region in terms of providing employment, education, and other services. The image below (**Figure 2-2**) demonstrates the different geographic areas, with the Core Economic Area having a population of 109,000 and the Functional Economic Area having a population of 254,000.

Figure 2-2: Carlow Areas



The strategy outlines priority sectors for Carlow to provide the best opportunities for economic growth. In order to confirm what these sectors would be, a 'sector prioritisation' exercise was undertaken and classified the priority sectors into three categories, these include:

- Focus and Change – sectors considered likely to support significant economic growth. These are sectors which CCC should consider prioritising resource and effort.
- Sustain and Grow – sectors which are well established and continue to offer opportunities.
- Monitor and Intervene – sectors which may not produce sustained growth but could be important to the local economy. These should be monitored regularly to ensure opportunities to enhance any future growth is capitalised upon.

The table below summarises the sectors which were categorised.

Table 2-1: Priority Sectors

	Sector	Rationale for Strategic Priority
Focus and Step Change	Financial and Professional Services ICT Engineering Technology Tourism	• Sectors align to South East Development office as sectors of potential for the South East region. • Sectors identified as key to Carlow economy. • Each sector has a unique connection to Carlow. • Tourism is a specific area of focus as this is considered underdeveloped in the county. • Tourism offers a route to driver greater economic activity and Failte Ireland note a strong shift to outdoor leisure post-Covid, meaning Carlow could capitalise on their natural assets.
Sustain and Grow	Agri-Tourism Pharma Transportation	• Carlow has been highlighted as 'untapped' tourism potential, especially domestic short-breaks tourism. • Carlow's unique landscape and high Agricultural employment concentration, meaning Agri-tourism is a potential opportunity for growth. • Pharma has also been pointed out as an area where Carlow could build their reputation, with the current location and growth of MSD and their

	Sector	Rationale for Strategic Priority
		development of local supply chains and skills which can support the industry. • Carlow's proximity to the M9, with easy access to Dublin and other locations, allows Carlow to manifest itself as a distribution hub. • Carlow could develop itself as a net carbon zero distribution centre.
Monitor and Intervene	Retail (Town Regeneration) Green Energy 'Retrofitting'	• Retail sector traditionally market led, much of the success is being aligned with consumer confidence. • Impact of Covid has impacted confidence and the retail industry. • Regeneration of town centres will be key to the viability of the sector locally. • Analysis and consultation suggest the potential for Carlow to position itself as a leader in green energy.

Source: Carlow Economic Development & Business Strategy 2022-2027

Carlow also has to consider that the economy doesn't function in isolation and that European, National and Regional policies will all be impactful upon their economy. The strategy consultation put forward the main strengths, weaknesses, opportunities, and challenges for Carlow. These are presented below in **Table 2-2.**

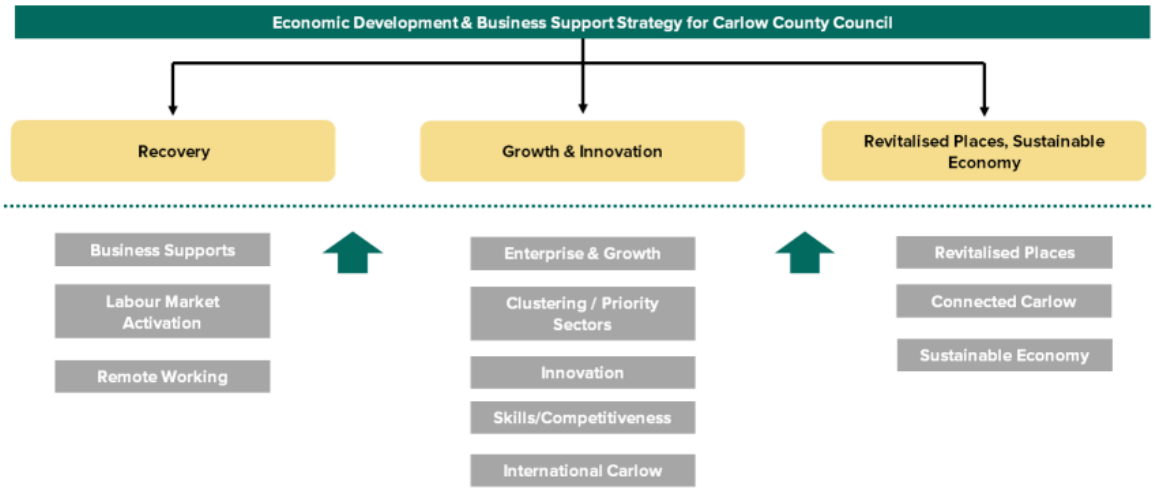
Table 2-2: SWOC Analysis for Carlow

	Comments
Strengths	• Geographic location is beneficial in Carlow, with ease of access to Dublin, Midlands and South East Region. • Development of the Technological University, here there is potential talent availability as well as R&D potential. • Quality of life is excellent, particularly for those wanting to 'settle down'. • Cost of living. • Strong transport connections – rail and road. • Strong industry clusters – financial services, tech, ICT, and engineering. • Natural beauty and tourism potential – River Barrow and Mount Leinster. • Strong business base.
Weaknesses	• Low profile in external markets. • Vacant property issue within the Town Centres. • Town Centre vitality, especially evening and retail economy. • Retention of student's post-graduation. • Difficulty in the attraction of FDI. • Lack of expansion/new space for hot desks and soft-landing type inward investment. • Linkages between indigenous firms and education sector could be stronger.
Opportunities	• Expansion of tourism. • Linking to Ireland's Ancient East brand – garden trials. • Potential development of 'remote hubs', building on Carlow's life quality excellence. • Increased potential for industry links with SETU – foster R&D and business development. • Improve outward brand of Carlow to enhance reputation and visibility to international and domestic investors and visitors. • Growth opportunities across sectors of strength and opportunity. • Improve skill profile through development of the Technological University. • Development of supply chain opportunities. • Development of distribution hub, utilising the convenience of Carlow's location to Dublin.
Challenges	• Broadband provision across the county. • Availability of 'suitably skilled' apprenticeships across the county and beyond. • Availability of suitable land and property for 'remote working hubs' limited or held by private investors. • Retention of talent. • Tourism – there is opportunities but are not well developed. • Export knowledge and key market development of knowledge of SME firms.

Source: Carlow Economic Development & Business Support Strategy 2022-2027

The vision and priority outlined for Carlow in the strategy are to "recover and grow sustainably to achieve a vibrant county, with revitalised towns and villages, which creates economic opportunities to enable people and businesses to thrive". Within the strategy, three 'pillars of focus' are outlined to help achieve the vision. The 'pillars of focus' and the relevant sub-themes to each pillar are presented below in **Figure 2-3**. This demonstrates that recovering from the Covid pandemic, whilst pursuing the revitalisation of places and new growth and innovation are essential to Carlow's vision and economic strengthening.

Figure 2-3: 'Pillars of Focus'



Within these themes there are policy actions to put achieving said visions into practice. It is especially important that the Carlow Graiguecullen ABTA and proposals for the future transport network consider these focus points and support recovery, growth, and innovation as well as revitalisation and sustainable economy of Carlow.

Relevance to Carlow Graiguecullen ABTA
This strategy is created to develop Carlow's economy. There are numerous measures and focuses which are highlighted as ways to improve the economic performance of Carlow. However, transport has a role to play. It is key that Carlow has sound reliable links to Dublin, via the M9, and also to other regions to make Carlow a potential distribution hub. However, within this there will also be a need to promote sustainability. Therefore, the transport system, whilst supporting the economic growth, needs to try and ensure it is done in a sustainable way, such as promoting sustainable travel for workers to businesses and tourists.

3. Study Area Characteristics

This section provides a review of the key demographic, employment, building use, and school location datasets within the Carlow Graiguecullen study area.

3.1 AIRO Estimate of 2021 County Carlow Population

Due to the Covid-19 pandemic, the Census which was originally due to be undertaken in April 2021 was postponed for one year, with Census night taking place on 3rd April 2022. The preliminary outcomes of the Census were released on 23rd June 2022; however, definitive outcomes will not be available until 2023.

Using the GeoDirectory address database combined with site visits, planning documentation and real estate marketing material, the AIRO project team created an evidence-informed listing of all new residential dwellings which were 'habitable' in Q3 2022 by bedroom size ranging from one bedroom to five bedroom. The team then applied an individual occupancy rate to each category of dwelling as follows:

- 1 bed (*2 persons);
- 2 bed (*2.5 persons);
- 3 bed (*3 persons);
- 4 bed (*4 persons); and,
- 5 bed (*5 persons).

The following data compares 2021 estimates to the last completed census (2016). Between the two years, the housing stock in County Carlow has increased by 6.1%, from 23,724 to 24,686 – an increase of 1412 dwellings, compared to 6% nationally. Vacancy rates have reduced by 4.9% from 1,864 to 1,722, excluding holiday homes which accounts for 275 dwellings. The additional population from the preliminary outcomes was 4,999. This results in a population estimate for County Carlow for Q2 2022 of 61,931, representing an increase of 8.8% compared to Census 2016. Comparably, County Laois, the bordering county to Carlow and also the County in which Graiguecullen sits, had a population increase of 8.2% since the 2016 Census, with the population standing at 91,657 in Q2 of 2022.

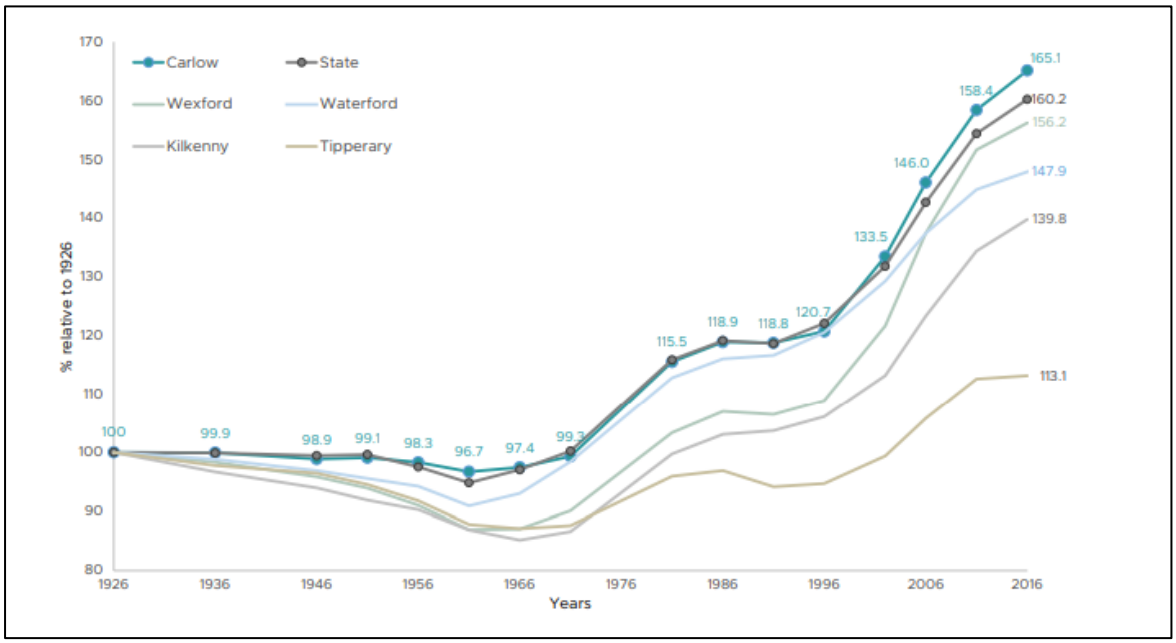
3.2 Population Change

The Central Statistics Office (CSO) stated that the population of County Carlow jumped 8.8% between 2016 and 2022 from 56,932 to 61,931 according to the preliminary results. This compares to a national increase of 7.6% demonstrating that County Carlow has had an above average population growth. The increase of nearly 5,000 was made up of a natural increase (births minus deaths) of 2,192 and an estimated net inward migration of 2,807. The population of Laois rose from 84,697 in 2016 to 91,657 in 2022, with 3,658 made up of a natural increase and 3,302 due to an estimated net inward migration. As only preliminary high-level data is currently available for the 2022 census the majority of the commentary in this section relates to the 2016 Census data.

The 2016 Census population count of 56,932 for County Carlow means that the County is the least populated relative to surrounding areas and has the third lowest population across Ireland. County Laois is reported to have a population of 84,697 in the 2016 Census, Kilkenny had a population of 99,232, Kildare had a population of 222,504 and Wicklow had a population of 142,425.

The population change for the Carlow County and the South East region between 1920 and 2020 is presented below in **Figure 3-1.**

Figure 3-1: Population Change in the South East Region between 1920 and 2020

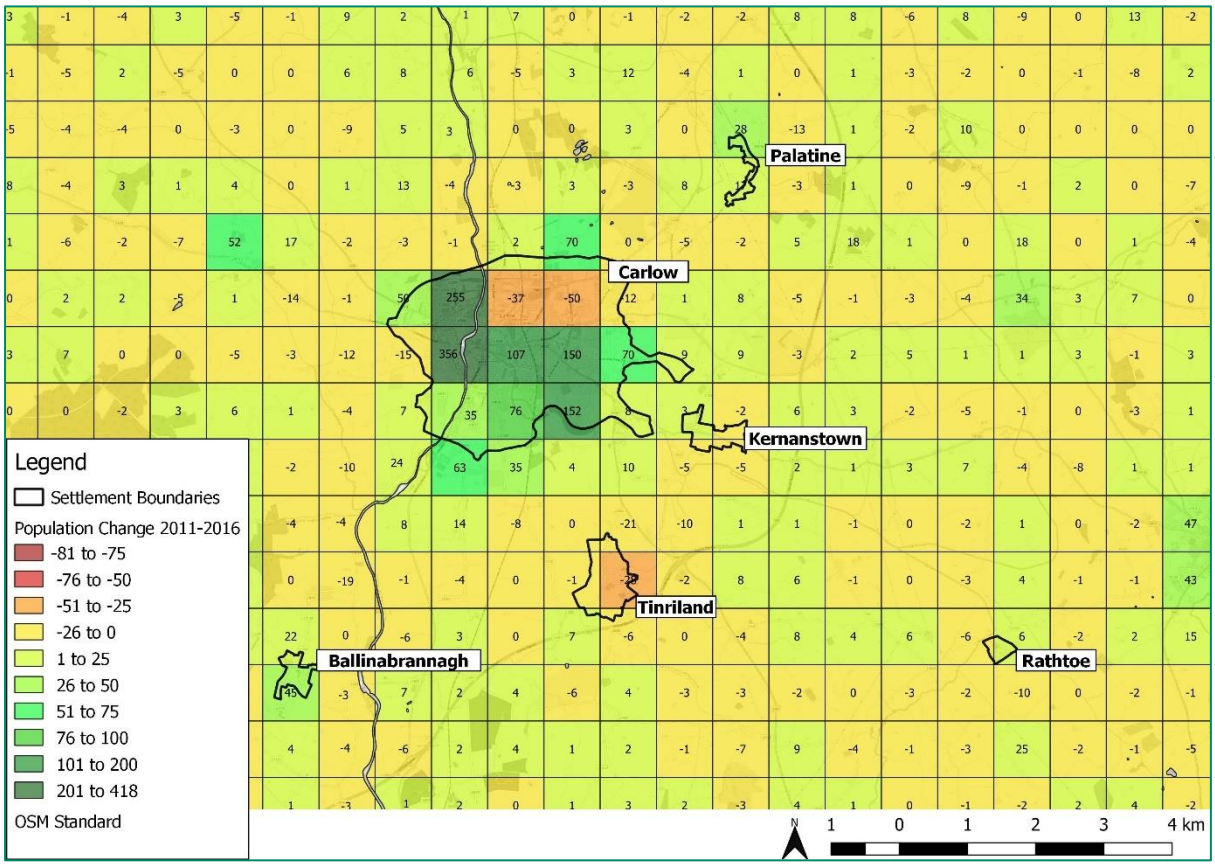


Carlow has the highest longitudinal population growth relative to other counties in the South East. However, since the mid-1990s Carlow's population growth rate has lagged behind its neighbours such as Laois, Kildare, and Wicklow. These three counties experienced unprecedented levels of population growth due to the expansion of the commuter belt around the Greater Dublin Area (GDA) – driven by the buoyant property market and improved transport connectivity.

Furthermore, the influence of the GDA is evident in Carlow's internal spatial patterns in respect of population change. Growth rates are consistently highest in those parts of Carlow that are most accessible to Dublin. This includes towns and villages in the north of the county, namely Tullow, Palatine and Rathvilly, and laterally settlements along the M9 in the west and northwest of the county such as Ballinabrannagh, Kernanstown and Leighlinbridge. The outskirts of Carlow Town have also experienced population increases, due to a process of suburbanisation, and there is evidence of a demographic recovery in the town core as well. In contrast, population levels are more stagnant in rural Carlow, and areas of decline persist in parts of the south.

Figure 3-2 shows the change in population between the 2011 census and 2016 census on square kilometre grids for the Carlow settlement and the surrounding areas. The analysis demonstrates that areas closer to large settlements, such as Carlow, have greater levels of population change. Rural areas experienced lower growth rates with many square kilometres having a very small or no population increase. Within the Carlow settlement itself, most areas experienced population increases, with the highest increase observed to the west of the River Barrow.

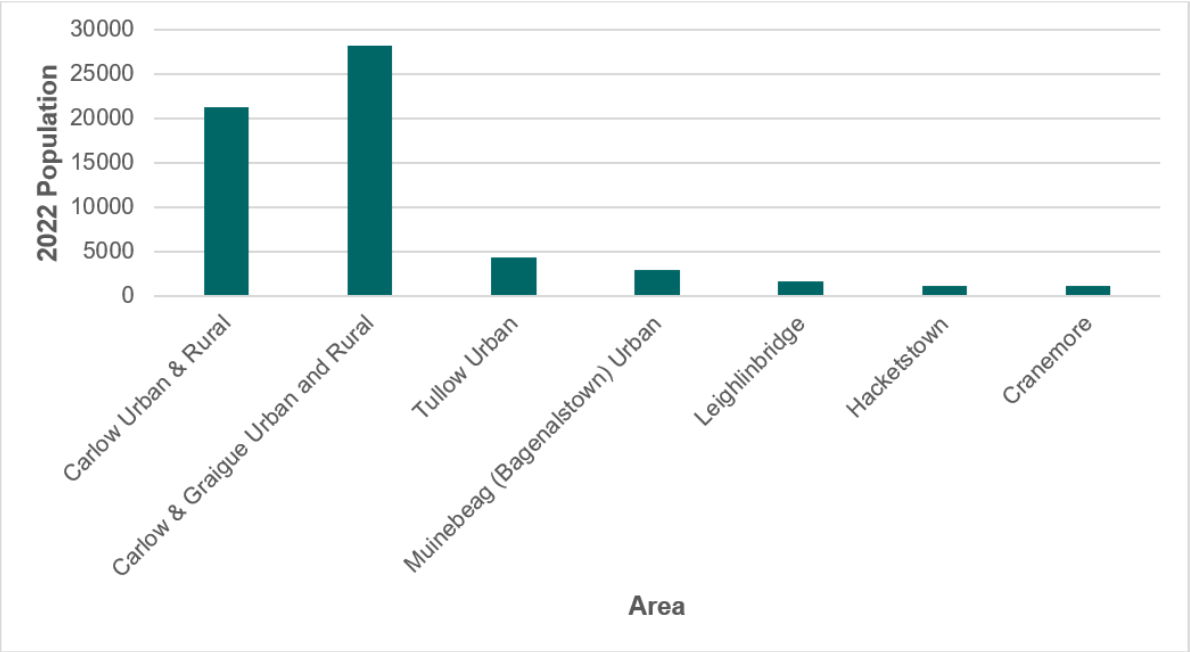
Figure 3-2: Regional Population Change on square km Grid (2011 – 2016)



Source: Census 2011 and Census 2016

The following figure sets out the population distribution across County Carlow based on 2022 population data. Note that due to the data being provided by electoral division (ED) some EDs have been grouped to best represent Carlow Town and the ABTA study area. The other EDs shown in the graph are those within the County Carlow area with a population above 1200. This demonstrates that in comparison to the county, Carlow Town has a very large population. The population for Carlow Urban and Carlow Urban/Rural is 21,246; making up 34% of the total County Carlow population. The next most densely populated ED is Tullow Urban with a population of 4,405 totalling only 7% of the County Carlow population. This data shows how populated Carlow Town is and how essential it is to provide a sound transport network to provide reasonable connections for residents and allow the town to thrive.

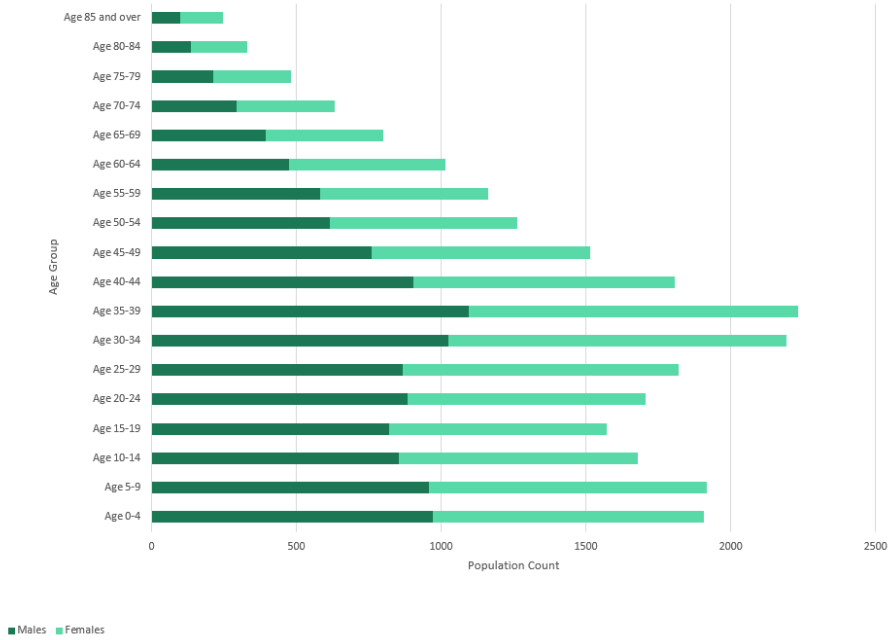
Figure 3-3: Population Distribution County Carlow



Source: CSO

Figure 3-4 shows the population pyramid for the Carlow settlement, as this is the closest available dataset to represent the ABTA study area, based on 2016 Census data. The population distribution between genders is almost evenly distributed with almost equal split between males and females, with only 392 more females than males (pink illustrates females, blue illustrates males). The Carlow settlement also has a distinctively younger population relative to the rest of the country. Just under half (47.7%) of its population is aged 34 or below, with a particular concentration of 25–34-year-olds (13.2%) according to the 2016 census. Overall, the working age population (those aged 15-64) accounts for 64.9% of the total population.

Figure 3-4: Carlow Settlement Population Pyramid



Source: CSO

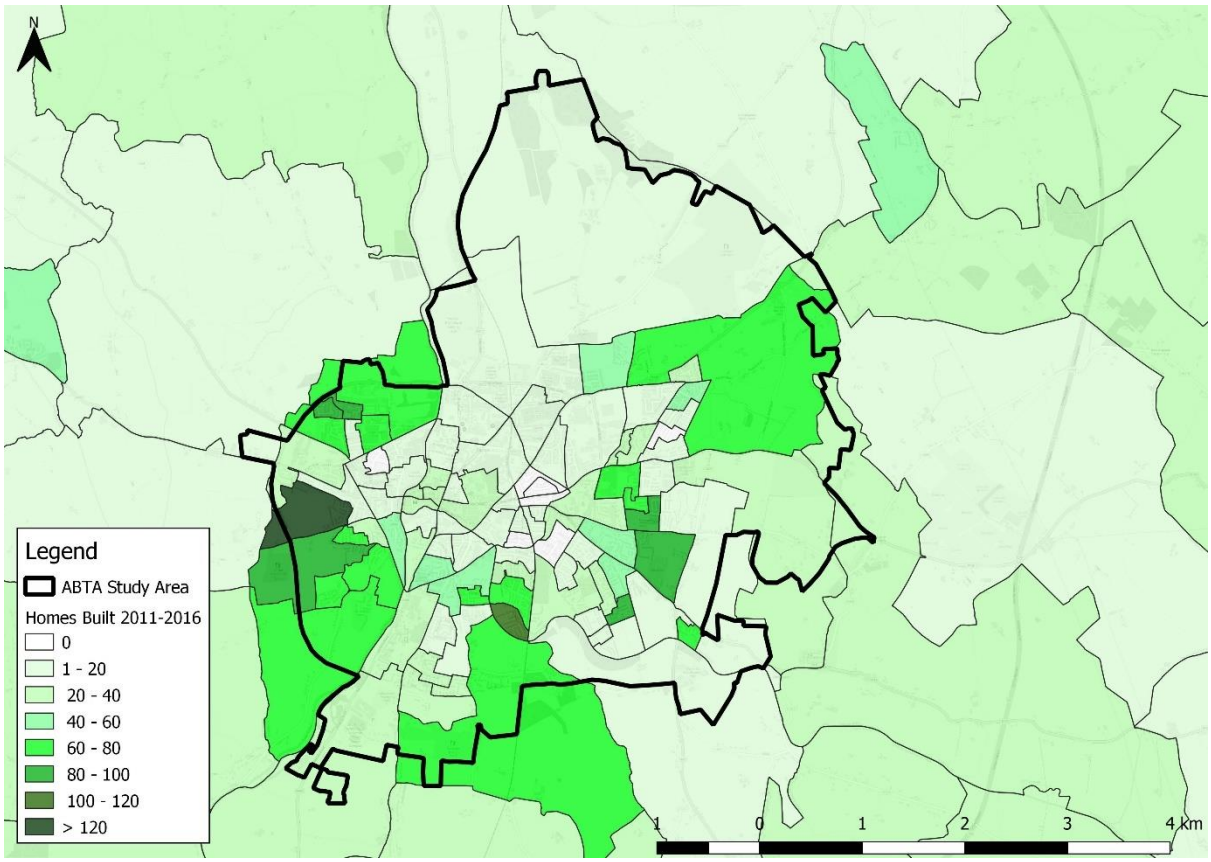
Demographic patterns and trends are closely related to economic factors, in particular the availability of, and ease of access to, employment. It is clear that Carlow is a significant employment base in the County, although other small towns, most notably Tullow, do host a considerable number of jobs. Therefore, population rises, and employment forecasts will produce increased travel demand in the town, and this must be accommodated for through the transport network provision. However, it is essential to promote sustainable travel, through various means, to prevent further car dependency. Additionally, it must be noted that evidence has demonstrated people are commuting to the Dublin area for work, so it is important that sustainable linkages between the Carlow Graiguecullen study area and external destinations are also supported.

3.3 Residential Construction

Figure 3-5 displays houses built between 2001 and 2016. The map is colour coded based on the number of homes built in different areas of Carlow, with lightest demonstrating fewer homes built between 2001 and 2016 and darker showing more homes built. Note that areas which have no colour indicate no homes were built within these areas between 2001 and 2016.

The map demonstrates that the majority of new home provision, between 2001 and 2016, was further towards the edges of the Carlow Graiguecullen study area and away from the core town centre. This supports the fact that urban sprawl as well as suburbanisation has taken place. The area with the greatest number of homes built in this time is situated in Graiguecullen to the west of Carlow Town centre as well as one small area to the south of Carlow Town centre near Mill Stream. Contrastingly, much of the area in the Northern section experienced only slight increased housing provision. The map highlights that many new homes are further away from key amenities or workplace zones, which are predominantly situated in the core centre, and suggests people will have to travel further distances. This may make active modes a less practical or desirable option and could increase the likelihood of car trips. Therefore, it is important that new homes provided remain in close proximity to employment opportunities in order to prevent further intensification of the suburbanisation and car dependency and an inability or unwillingness to use more sustainable travel options does not continue.

Figure 3-5: Number of Houses Constructed During 2001-2016 (Census, 2016)

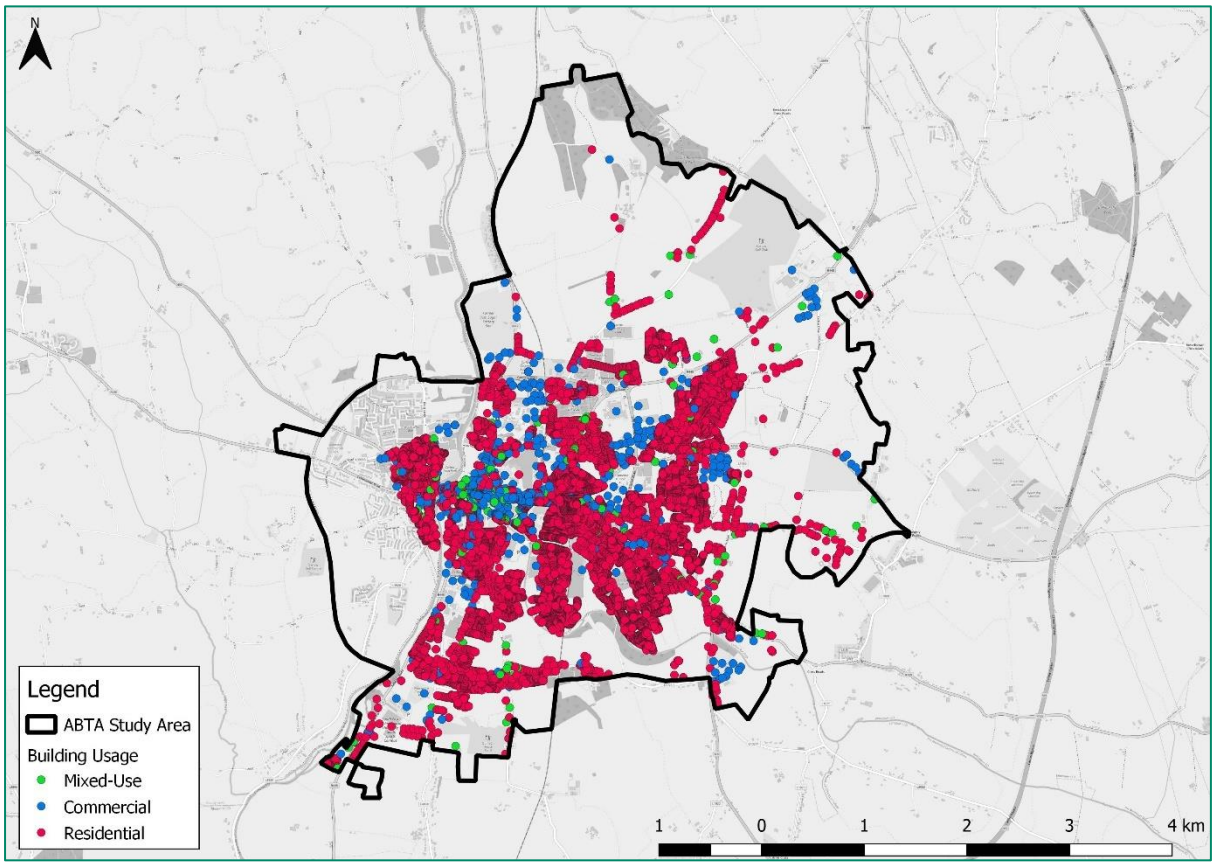


Source: CSO small area statistics (Census 2016)

3.4 Land Use Composition

Figure 3-6 provides an overview of the split between commercial and residential buildings in County Carlow, limited to the Carlow Graiguecullen study area, using the GeoDirectory dataset. The figure demonstrates that the majority of buildings in the study area are classified as residential, with 83% of buildings falling into this classification. The majority of these residential buildings are situated to the south and east of the town. Whereas, in the central urban core, for example streets such as Kennedy Avenue and Tullow Street, most of the buildings are classified as commercial. Overall, 7% of the buildings in the area are considered commercial. In addition to this there are mixed use buildings which host both residential and commercial facilities. These are present along Burrin Street, in the town centre, as well as outside the immediate town centre and particularly along radial routes. Mixed use buildings accounts for 10% of the buildings. The data demonstrates there is a large volume of residential homes within walking and cycling distance of commercial or mixed-use premises – this shows the potential to capture a modal-shift and increase sustainable travel if infrastructure improvements are provided.

Figure 3-6: Residential and Commercial Buildings in Carlow Graiguecullen



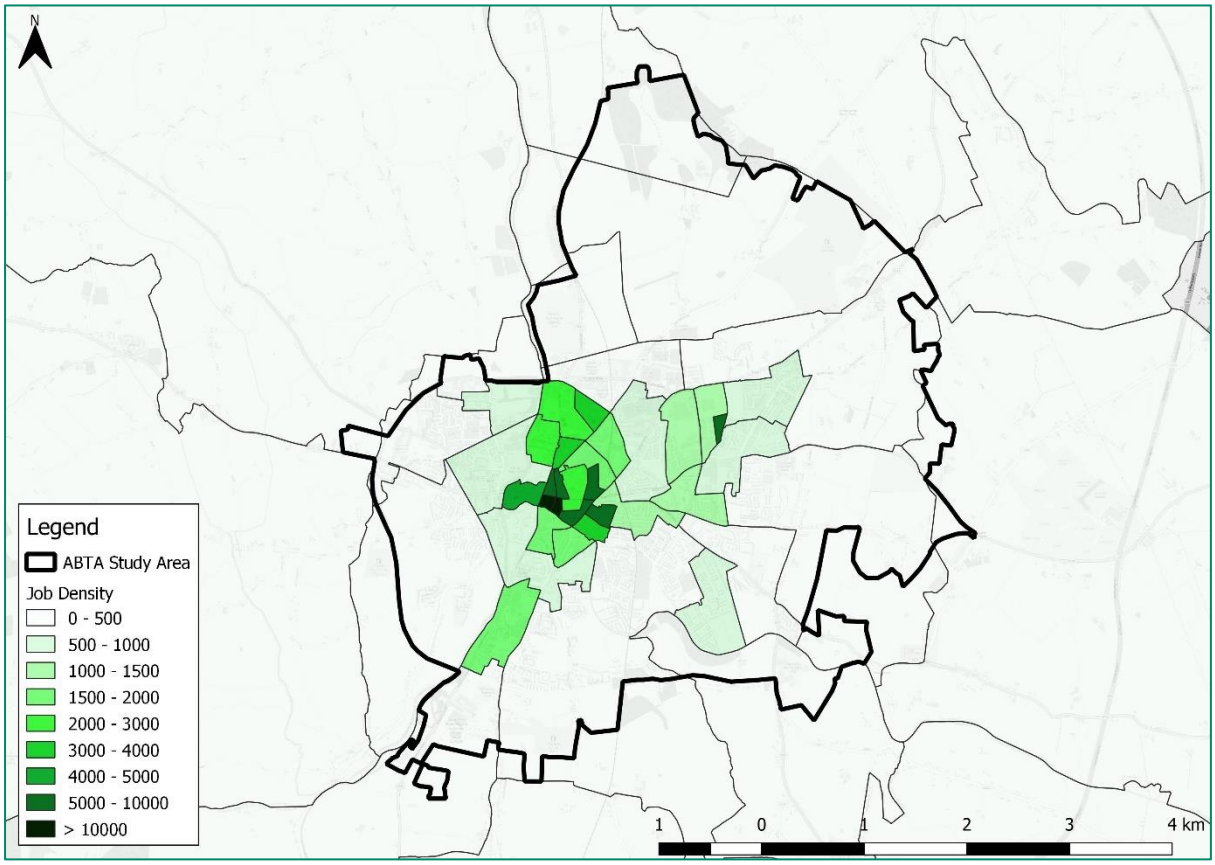
Source: GeoDirectory

3.5 Job Density

Figure 3-7 shows the density of jobs in Carlow based on CSO Workplace Zones in 2016. The image demonstrates that the highest densities per workplace zone are found in Carlow Town centre. This is as expected due to many employers been situated in this area. There is retail, hospitality, offices, educational facilities, the courthouse, hospitals and so on which will all offer various employment opportunities. Outside of the town centre, towards the edge of Carlow Town and the study area, the job densities reduce, which is not uncommon. However, there are out-of-town areas which do still retain relatively high job densities, and this is shown on the map. For example, to the east of Carlow Town centre, near the N80, there are many business parks explaining why job densities remain higher than other typical suburban areas. In particular, there is one workplace zone which has a job density of between 5000 and 10000. In addition to this area, the workplace zone in which SETU sits also shows to have a high job density and this supports the fact that SETU is a major employer in the area. Generally, the map is a helpful tool to infer where many of those who are employed within the study

area are likely to work and show where trip demand will be highest. This is important to ensure infrastructure provisions connect people to key places.

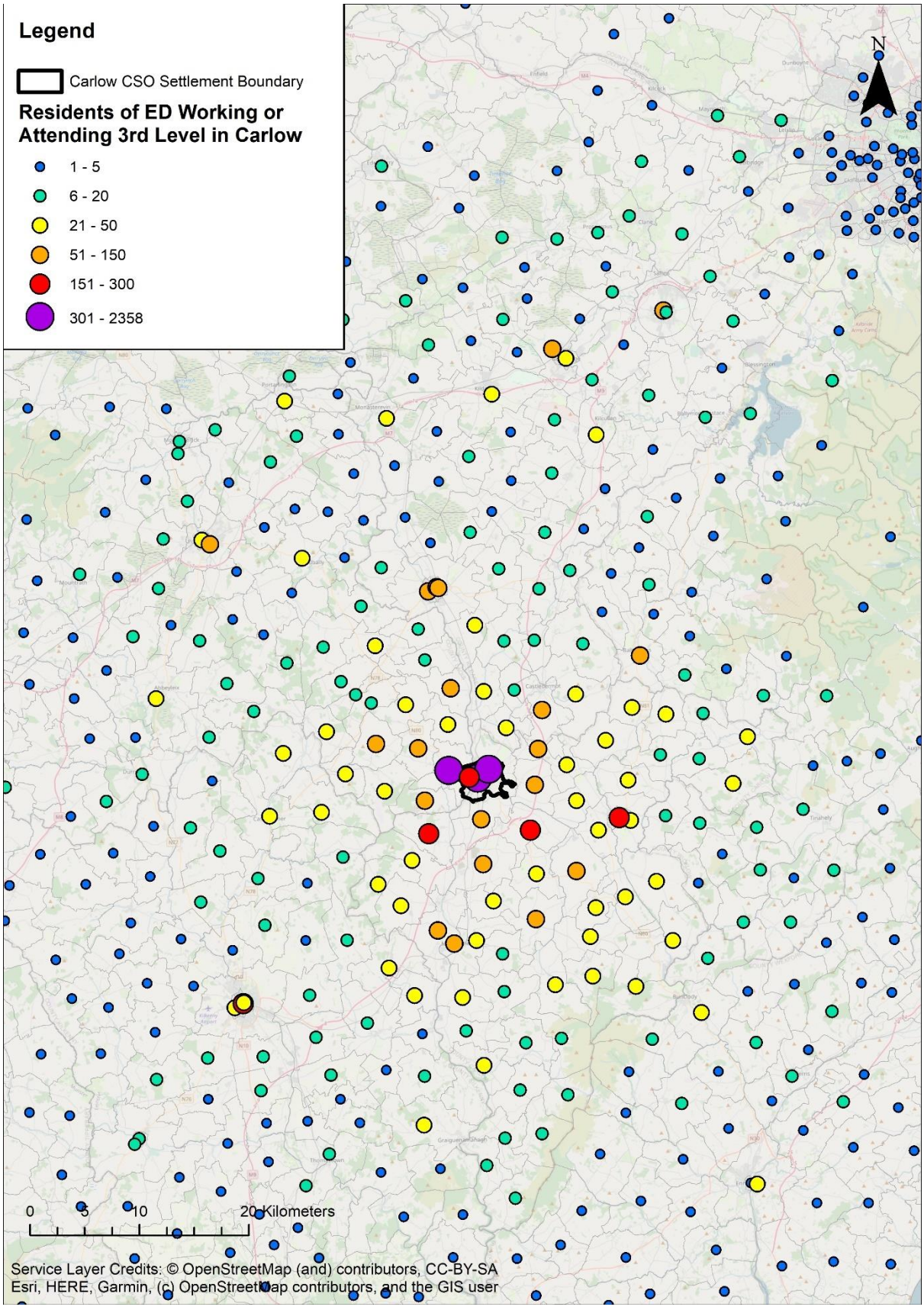
Figure 3-7: Job Density in Carlow Graiguecullen



Source: CSO Workplace Zones (2016)

Figure 3-8 shows the origins for those working in or attending a 3rd-level institution in the Carlow settlement, from any national origin, based on POWSCAR (2016). The map highlights that the origins of these trips are spread over a wide geographical area, however, as expected the majority of large origin creators are areas which lie closer to Carlow. With the exception of Graigue Rural and the areas within the Carlow CSO settlement boundary there are four areas producing between 151-300 trips, these are the Clogrenan, Kellistown, Tullow, and Kilkenny. This demonstrates there is some demand for people travelling into Carlow for work or further study. Again, this is supported by the varying origins of trips with these purposes. The high number of electoral divisions, albeit only producing between 1-5 trips, in or near Dublin show there is a potential link between Carlow and Dublin for work or study purposes and perhaps connections between these areas, and other regional major towns, need to be enhanced.

Figure 3-8: POWSCAR 2016 – Origins for Those Working or Attending a 3rd-Level in Carlow

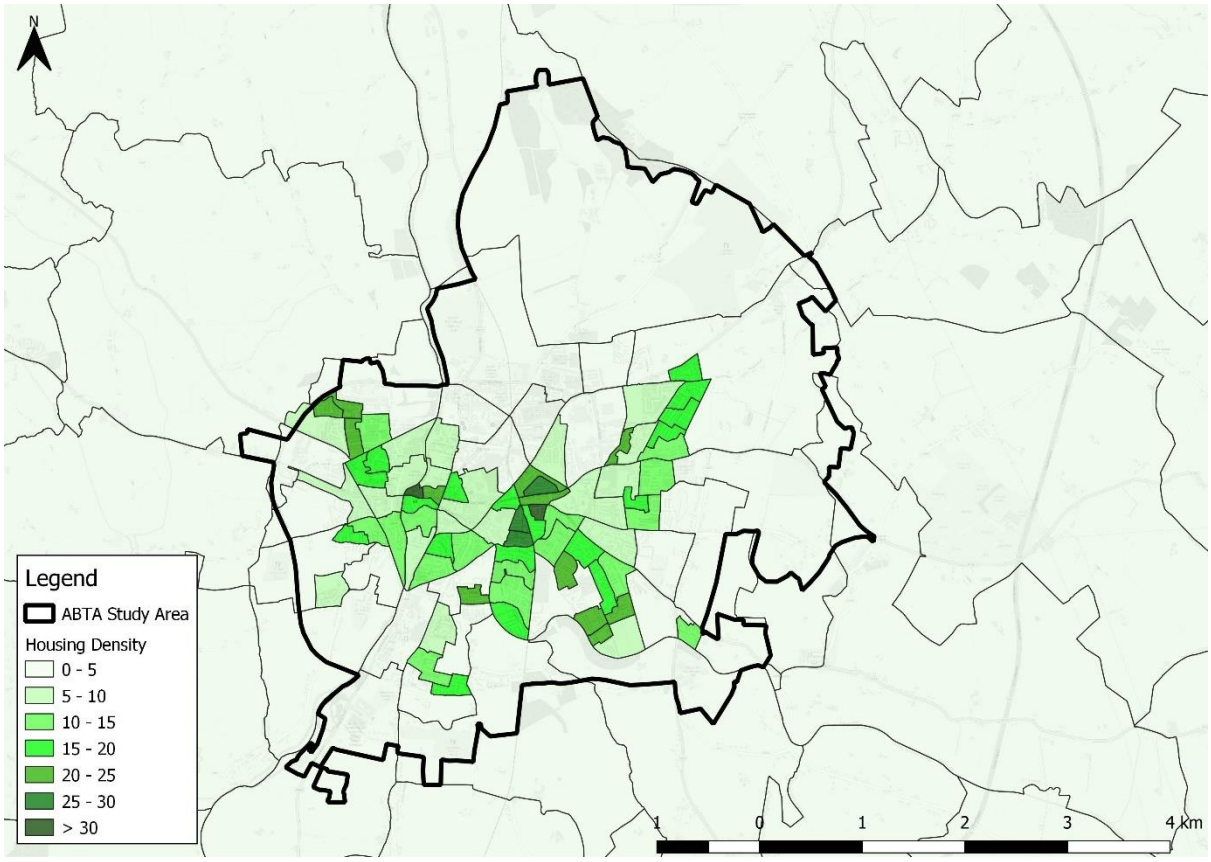


3.6 Housing Density

Figure 3-9 shows the housing density in the study area according to the number of residential units per hectare. The map highlights residential densities are lowest to the north of Carlow Town, near to the N80 as well as in certain pockets to the south of the town centre and more rural sections of Laois. The data indicates that some of these settlements have residential densities as low as 0.1 homes per hectare. Low residential densities do create implications when providing local public transport as routes with low patronage can potentially be not economically viable. Therefore, smart ways to serve such areas, for example by including low density areas on a route which has other major trip producers (employers and residential estates), to provide inclusive opportunities and prevent isolation and car dependency, are important. Additionally, in the case of the lower densities by the N80, it seems feasible a bus service may be an option along the N80 to provide good connections to employment opportunities.

Opposingly, highest housing densities are found within the immediate areas surrounding Carlow Town centre, especially in the area to the right of River Barrow and north of Bridge Street, and pockets to both the east and west of the town. These are areas which are likely to generate a lot of demand for trips, therefore, if high-quality infrastructure can be provided here then a large number of modal-shifts towards sustainable transport may be captured. However, it must be noted that infrastructure and promotion must combine to create a transport network which is attractive, reliable, and affordable otherwise increased usage is unlikely.

Figure 3-9: Census Small Areas (2016) – Housing Density (Ha)



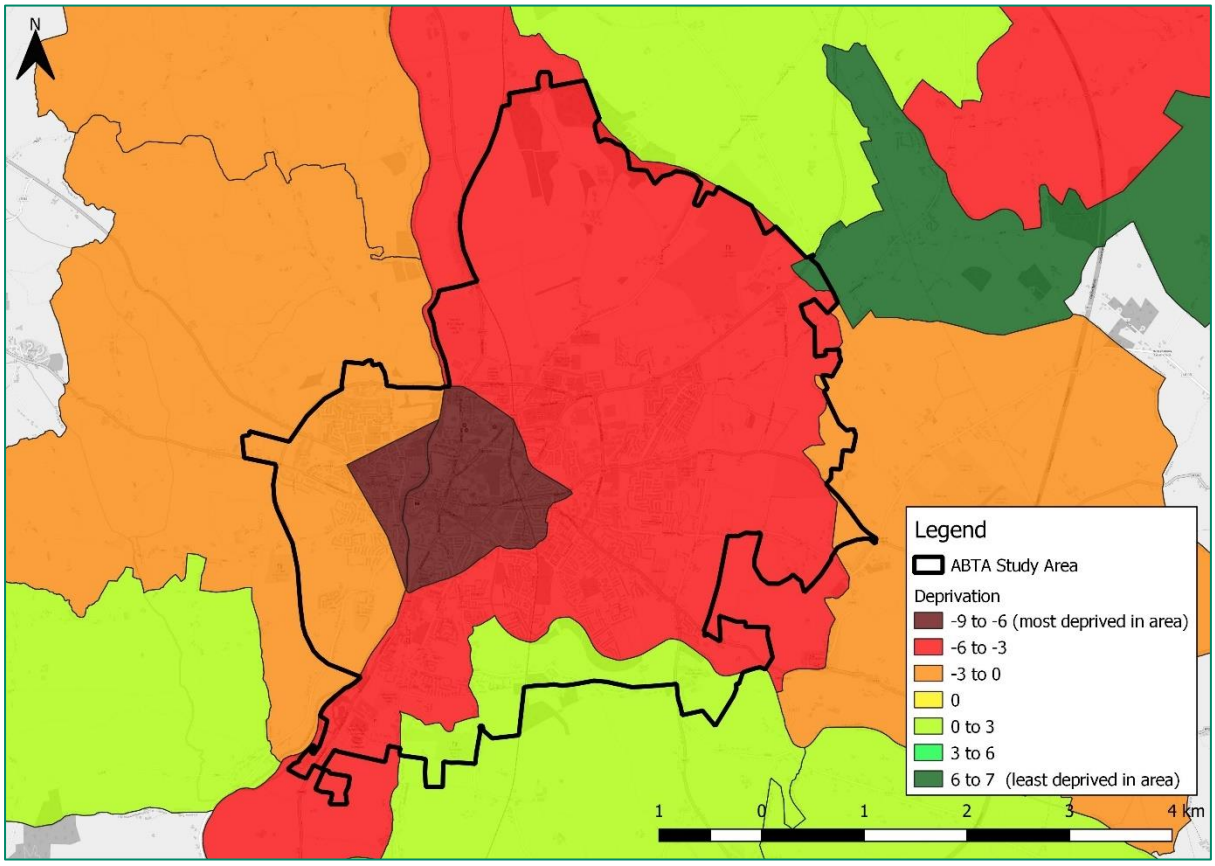
3.7 Deprivation Index

The Pobal HP Deprivation Index (2016) is a series of maps measuring the relative affluence or disadvantage of a particular geographical area. It is developed based on small-area statistics that relate to between 80 and 100 households on average, showing the extent to which, every neighbourhood, suburb and village is affluent or deprived. Deprivation has demonstrated strong correlations with a range of health and social outcome measures and in many countries, outcomes are worst in the most deprived areas.

At the county level the 2016 Pobal HP Deprivation Index for Carlow is -3.66, which is considered marginally below average, and is slightly worse that the 2011 and 2006 classifications of -3.41 and -2.81 respectively.

Figure 3-10 below shows the 2016 Pobal HP Deprivation Index at Electoral Division level. The map shows that Carlow Town centre core suffers from high levels of deprivation; these levels are the worst seen throughout the ABTA study area. Beyond these areas, somewhat alleviated levels of deprivation can be seen. For example, in Carlow Urban/Rural deprivation is between -6 and -3 and Graiguecullen Rural deprivation ranges from -3 to 0. Areas to the north east and south of the ABTA study area appear to have lower deprivation and are considered marginally above average. It is important to provide good connections for those in more deprived areas, so they have greater opportunities to access high quality jobs and education.

Figure 3-10: Carlow Graiguecullen Deprivation Indices



3.8 Schools and Education Facilities

There are 10 primary schools and 5 secondary schools considered in the Carlow Graiguecullen ABTA. In total there are 3005 children who study are primary schools within the study area and 3348 children studying at secondary schools in the study area. In addition to this, there is SETU which is the third-level institute in Carlow, situated along Kilkenny Road, which hosts around 11,000 students.

Table 3-1 provides a list of the schools in Carlow Town and the number of pupils who attend each school, with **Figure 3-11** showing the location of each school.

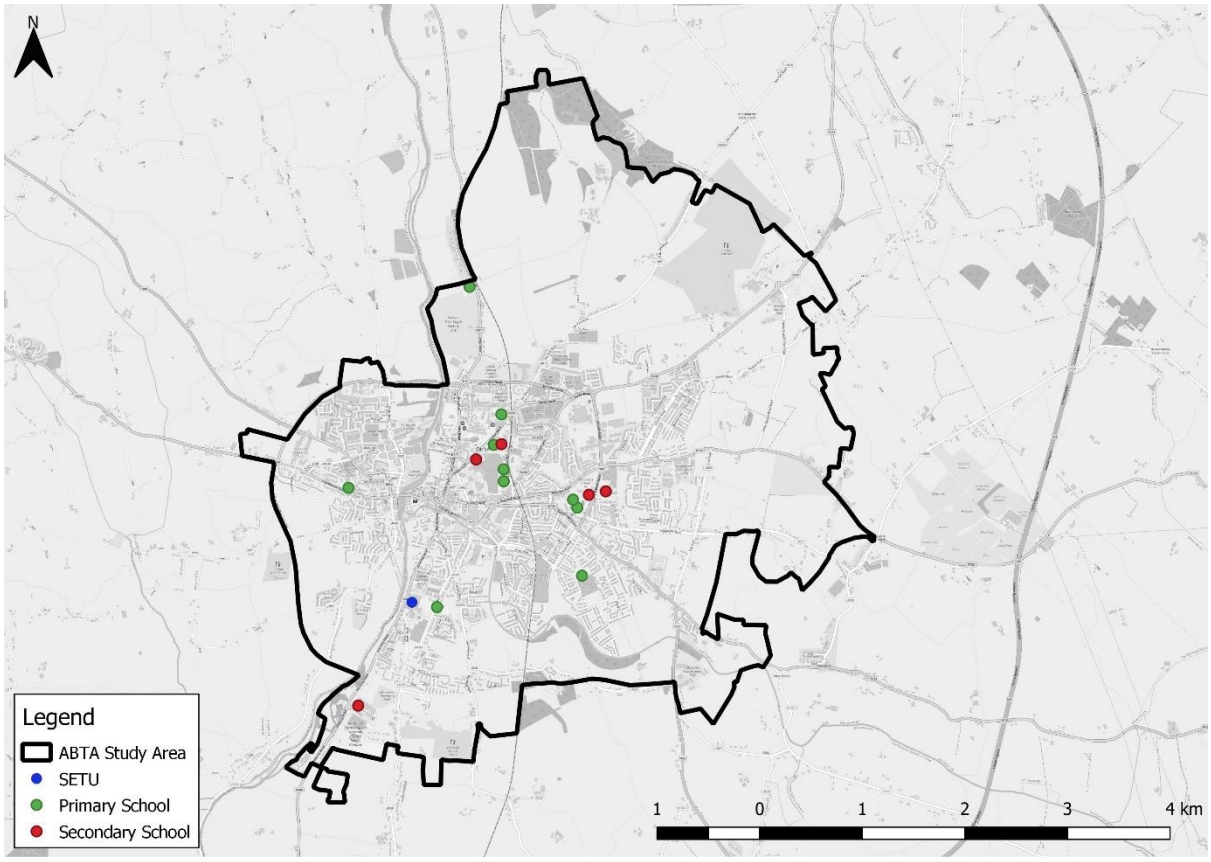
Table 3-1: Overview of Schools and Pupils in Carlow Graiguecullen Study Area (2021)

School Level	Official Name	Male Pupils	Female Pupils	Total Pupils
Primary	S.N. Naomh Fhiach	288	262	550
Primary	Scoil Naisiunta Ceatharlach	61	66	127
Primary	St. Josephs National School	115	3	118
Primary	Scoil Mhuire Gan Smal		367	367

Primary	St Laserians National School Special Sc	102	51	153
Primary	Bishop Foley Memorial School	213		213
Primary	Gaelscoil Eoghan Ui Thuairisc	244	222	466
Primary	Holy Family Girls National School		312	312
Primary	Holy Family Boys National School	286		286
Primary	Carlow Educate Together National School	220	193	413
Total		**1529**	**1476**	**3005**
Secondary	St. Leo's College		944	944
Secondary	Gaelcholáiste Cheatharlach	162	197	359
Secondary	Presentation College	395	408	803
Secondary	St Mary's Academy CBS	449		449
Secondary	Tyndall College	410	383	793
Total		**1416**	**1932**	**3348**
Higher Education	South East Technological University			**11000**

Most of the schools are within walkable or cycling distance from nearby residential areas, with the exception of Carlow Educate Together in the north and the SETU campus along with Tyndall College to the southwest. Four of the primary schools are in close proximity to Carlow rail station, one is situated in Graiguecullen, one near SETU along Green Road, one in a residential area to the southeast and a further two in Askea. In terms of secondary school establishments, there are two nearby to the railway station, two to the east of Carlow Town Centre, and then Tyndall College located south of Carlow. The SETU campus is located south of Carlow Town and is approximately a 15-minute walk. The 10-minute town policy report, completed by Arup, mentioned those who reside in the northeast section of Carlow are a further distance from the schools and therefore they fall outside the typical 10-minute walking catchment.

Figure 3-11: Carlow Graiguecullen School Locations



As mentioned in the demographics, Carlow settlement has a relatively young population compared to the national average, and the large student body will produce a high volume of education related trips, in order to access the learning centres. This provides an incentive to invest in more sustainable travel infrastructure, particularly along routes to educational facilities, to boost the usage of such modes. In the long run this can help contribute to a cleaner environment as well as a healthier more vibrant population.

3.9 PESTLE Analysis

Global trends and emerging themes will have an impact on the direction of Carlow's economy. To identify these global thematic trends, an in-depth Political, Economic, Social, Technological, Environmental & Legal (PESTEL) Analysis was undertaken.

Political

Any changes in political leadership would potentially impact on policies related to public health, housing, transport and so on. This may then directly affect local authorities' abilities to deliver key services. The impact of COVID-19 has also led to significant borrowing by the ex-chequer. This is debt that will have to be serviced over time and this could potentially lead to further impacts, such as increased business tax to generate additional funds – and this could have a great impact on Carlow and Graiguecullen where the majority of businesses are SMEs.

Economic

Ireland is internationally recognised among the top 25 of 190 economies to do business with. This reputation boosts Carlow Town's success in attracting inward investment from multi-national businesses and further strengthens the foundation for economic success. 50% of planned growth in Carlow is expected to occur in regional centres, towns, villages, and rural areas. Ireland 2040 provides the development framework with Carlow will work within to ensure transformational growth like that witnessed in the bigger cities like Dublin.

The Irish GDP contracted by 6.5% due to the reduce output from the retail, leisure, hospitality, and construction sectors during the COVID-19 safeguarding measures. High inflation and labour market

shortages continue to be a threat to economic stability. However, the recovery is underway and employment opportunities to continue to prove plentiful. There are skill shortages in certain sectors, like construction, engineering, and technology which are all significant job sources in the study area and therefore could be an issue in the foreseeable future. Although, as Carlow has an above national average proportion of the workforce with a technical qualification or apprenticeship, the supply of labour relative to demand should be evenly matched and assist in the post-pandemic recovery. It is likely that key employment sectors in Carlow, like construction and manufacturing, will be affected by the National Development Plan and Housing for All strategy.

Tourism remains an untapped potential resource for Carlow and Graiguecullen. Gains in this industry can be harnessed through utilising the Tourism Strategy and Action Plan 2020-2025. The aims to increase the County's tourism profile and market Carlow Graiguecullen as a holiday destination for both short-distance and long-distance trips. Agriculture is another large sector, especially when compared to the rest of the country, in Carlow 7.3% of the population is engaged within the industry compared to the national average of 4.4%. This industry is a major contributor to the Agri-food business economy in Carlow and aligns itself with the reformed EU CAP. Agri-tourism provides another avenue to generate more income for the area and provide opportunities of diversification of the local economy.

Project Carlow 2040 recognises the County's role in the region as a major economic hub. This goes hand in hand with ensuring the town is vibrant and full of vitality to reap benefits from the evening economy given the large student body relative to its size.

Social

Population projections from CSO have indicated that the proportion of those aged 65 years and over will continue to increase significantly in the coming years. Across Ireland, it is forecasted that 1.6 million people with be aged 65 or over by 2051, this is compared to around 630,000 in 2016 when the Census was undertaken. This means that in Ireland by 2051 roughly 20% of the population will be 65 or older compared to only 10% of the population now. Such a large proportion of older people can create significant fiscal implications for public policy and health services.

Furthermore, Carlow settlement has a younger population than many other areas across Ireland and the dependency ratio of the area is above the Irish average. Therefore, planning needs to focus on providing for the needs of the young population as they approach adulthood. The provision of high-quality education and a range of good job opportunities needs to be a priority in both Carlow and Graiguecullen.

The pandemic presented new opportunities for remote working. However, in the post-pandemic period the desire for remote working and/or a hybrid working style (part remote and part office based) has remained a popular option. However, businesses and towns need to ensure they can support and suit this new working style by providing appropriate remote working infrastructure. In particular, there is an opportunity for those who work in Dublin to live in Carlow, if suitable infrastructure is provided, where they could receive a higher life quality and experience a reduced living costs but still remain employed in the high-skilled and high-paid job they have in Dublin.

Technological

Technological advances and automation do pose a threat for jobs in certain industries. However, it is assumed that this would be matched with the creation of more jobs in sectors where skills cannot be readily automated, such as health and research and development. These markets are major employers in the study area. Furthermore, the 'innovate to zero' revolution is also becoming much more important, with continuous efforts to strive for zero emissions, zero accidents, zero data breaches, and so on. This is massively important in Ireland and across Europe and Carlow Graiguecullen will have a role to play, no matter how small. Therefore, it is important that Carlow Town can make committed contributions to such targets by measures such as providing a high-quality segregated active mode network, reducing car dependence, and providing improved internet connections as well as technology for current and future businesses in the area. If such gains can be captured in Carlow and Graiguecullen, it will bring about large benefits to assist with national goals and also improve the town for businesses and residents.

Legal

Ireland's legal systems regulatory aim is the freedom to do business. From a legal perspective, the most relevant aspects relate to changes to the planning legislation in order to support growth. Ireland 2040 notes that reforms of planning legislation in 2010 introduced a new approach to justifying land use zoning objectives in local authority plans. This ensures that sufficient land is provided for future development, but not so much that development becomes difficult to coordinate or undermines the need to regenerate existing but under occupied and run-down urban areas.

Environmental

Environmental challenges, which are arising due to climate change, are evident across Ireland. CCC have developed the Carlow Climate Change Adaptation Strategy 2019-2024 to address such challenges. Nationally, the Climate Action and Low Carbon Development (Amendment) Act was signed into law in July 2021. This works on the basis of providing carbon budgets which heavily influence the strategies of local areas, economic sectors, and businesses as they try and cut emissions. The national climate plans set the main target of carbon neutrality by 2050 and a subsidiary target of a 51% reduction in greenhouse gas emissions by 2030 relative to 2018 emission levels. To work towards these targets, Carlow, Kilkenny, and Wexford created the 3 Counties Energy Agency (3cea) which acts as an energy and emissions data observatory. The 3cea published an Energy Transition Strategy 2020-2030 which set out the aims for the three counties to be users of clean energy, energy efficient, and sustainable during the plan period. Additionally, the Government Climate Action Fund can be expected to further support CCC in its efforts to advance its sustainability and environmental improvements.

4. Existing Travel Demand

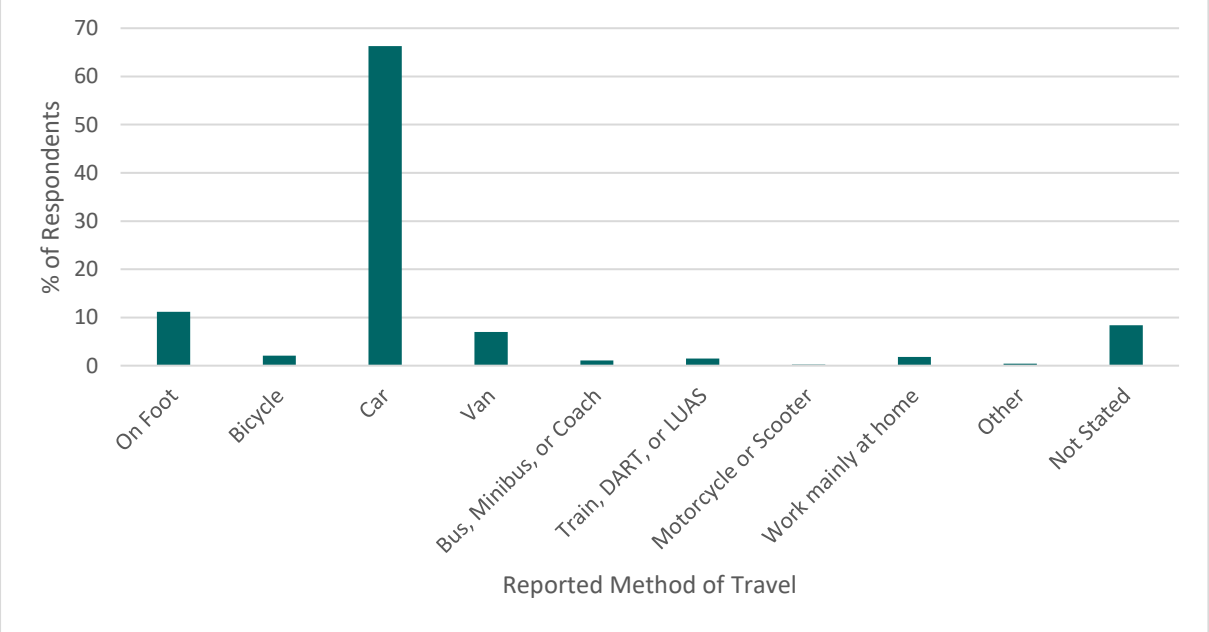
This section provides an overview of travel demand within the study area. The analysis looks at mode of transport, as well as where people are travelling to/from in the study area.

4.1 Modal Split Analysis

4.1.1 Work Trips

Figure 4-1 shows the modal split for travelling to work for Carlow settlement residents. The figure highlights that around 66% of residents travel to work by car, as either a driver or passenger. Furthermore, 7% of residents travel to work via van, resulting in a total of 73% of the population travelling to work in a private vehicle. This shows the significant car usage and car dependency in Carlow, which in turn assisted in producing some of the objectives of this ABTA; to encourage and promote modal shift to enable both environmental and physical health / mental wellbeing improvements to be captured. In terms of active mode transport, 11% of residents travel to work on foot and a further 2% travel to work on their bicycle, demonstrating the low usage of active modes, in particular cycling, for accessing the workplace. This highlights that there are barriers to active mode use as a means of travelling to work; possibly due to the lack of convenient safe routes or the option is seen as unattractive. Bus and rail services in Carlow are also not commonly used for commuting, with only 1.1% and 1.5% using the bus services and rail services respectively. Similarly, to active modes, this demonstrates that these services are not seen as a viable option for commuting trips highlighting the need for both improvements to infrastructure and increased promotion of the mode. Increasing the use of public transport and active mode travel, whilst decreasing private vehicle usage, is essential to hit wider national and regional ambitions. It should be noted that the data is from 2016, the work from home percentage may have changed alongside some of the travel patterns. However, it is likely that the pandemic restrictions have made car usage even more predominant.

Figure 4-1: Mode of Travel to Work for Carlow Town



Source: Census (2016)

Table 4-1 compares the modal split for travel to work in Carlow and neighbouring counties. The percentage of residents commuting on foot is slightly higher than the average for the neighbouring counties, and the percentage cycling is aligned with the average. This demonstrates that although walking and cycling trips are low for commuting in County Carlow, the trend is similar across other counties. The usage of public transport, both rail and bus services, in County Carlow for commuting is one of the lowest across the neighbouring counties. This highlights that the public transport provision in Carlow requires improvement to capture a modal shift and make these modes more feasible and attractive. Again, in County Carlow, car dependency is high, but this is not unusual when compared to

the other counties. This ABTA will seek to shift modal choices for travel to work to sustainable modes such as walking, cycling, bus, and rail.

Table 4-1: County Comparison of Mode of Travel to Work

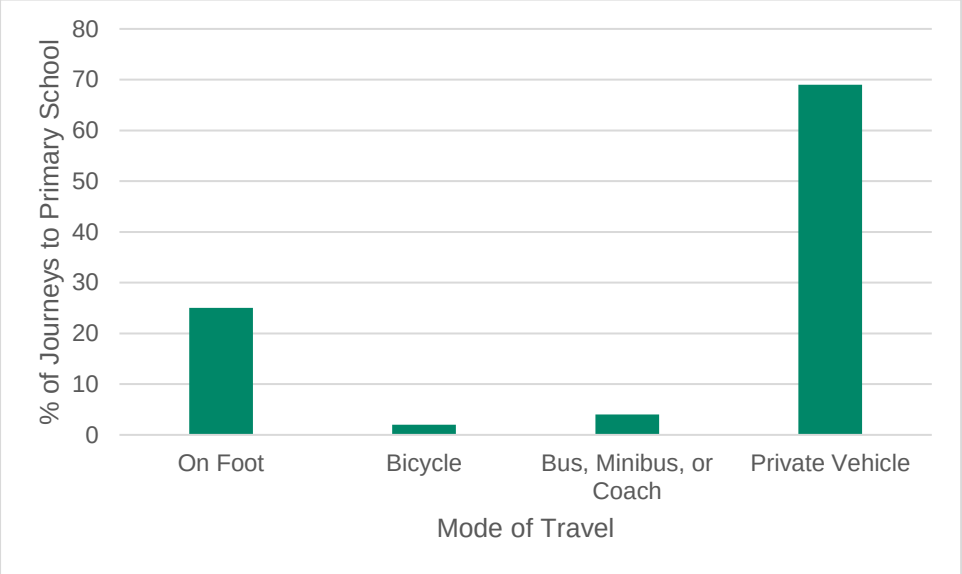
County / Area	On Foot	Bicycle	Private Vehicle	Bus	Rail
Carlow	7.5%	1.1%	76.9%	0.9%	1.0%
Kildare	6.0%	1.3%	75.0%	4.8%	5.1%
Kilkenny	7.9%	1.4%	77.2%	0.9%	0.5%
Laois	5.7%	0.8%	77.3%	1.4%	2.6%
Wexford	7.5%	0.8%	77.8%	1.3%	0.3%
Wicklow	6.6%	1.0%	71.9%	4.1%	5.8%

Source: Census 2016

4.1.2 Education Trips

Figure 4-2 shows the modal split for travel to primary school in the Carlow settlement. This is based on the POWSCAR analysis, informed by Census 2016 data. The data demonstrates that the main mode of transport to primary school is the private vehicle, with nearly 70% of students using this mode. The next most commonly used mode of travel for accessing primary school is on foot, however, in comparison the mode share for this is roughly 25%. Both cycling and the use of bus, minibus, or coach to access primary education is very limited.

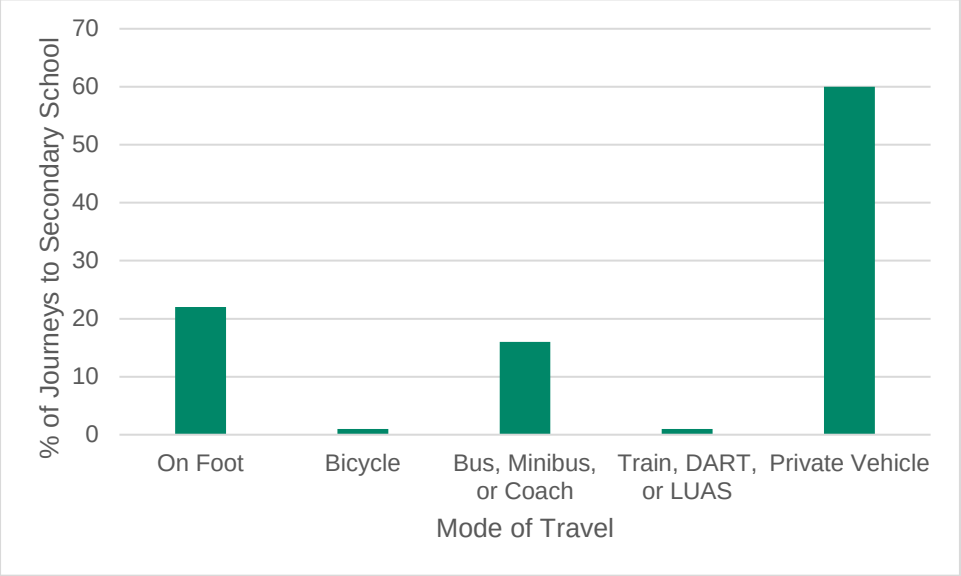
Figure 4-2: Mode of Travel to Primary School in Carlow



Source: Census (2016)

The figure below (Figure 4-3) shows the mode of travel used to access secondary schools in the Carlow settlement. Again, this is informed by the POWSCAR analysis based upon the Census 2016 data. Similar to primary school, the use of the private vehicle to access secondary school facilities is the majority option, however, the percentage of modal share falls to 60%. Walking is still the second most common option, with just over 20% of the modal share. Unlike primary school travel, the data demonstrates that for travelling to secondary school the use of bus, minibus, or coach has a larger modal share at over 15%. There is a very limited use of the train for accessing secondary school, up slightly from no reported use for accessing primary school. Cycling usage remains low.

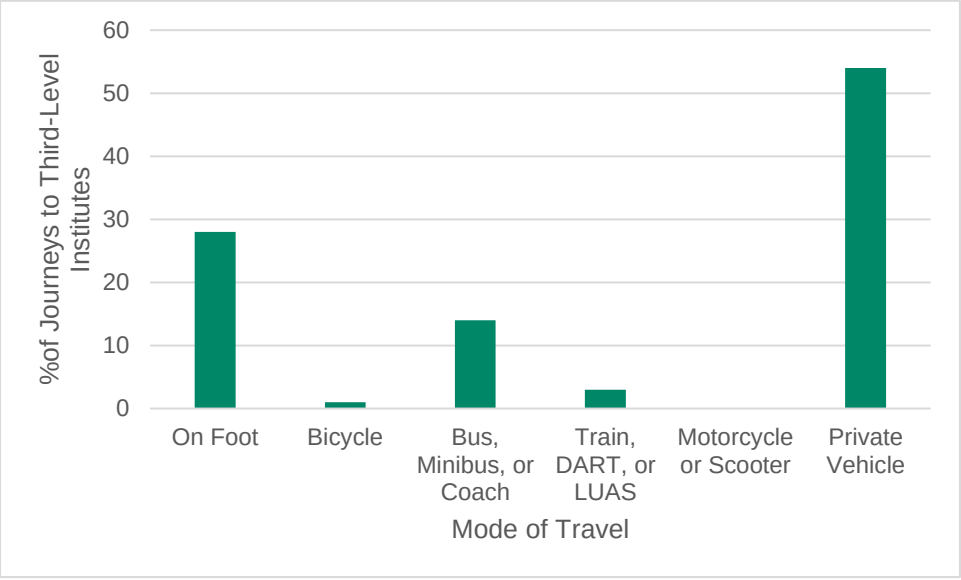
Figure 4-3: Mode of Travel to Secondary School Carlow



Source: Census (2016)

The figure below (Figure 4-4) shows the mode of travel used to access third-level institutions in the Carlow settlement. Similar to above, this is informed by the POWSCAR analysis based upon the Census 2016 data. In comparison to primary and secondary data shown above, the modal split is different from third-level institutes, and this is likely due to the very different nature of the typical education day. The most commonly used mode for accessing third-level institutes in Carlow is by private vehicle, at over 50%, however, in the case of third-level institutions more students are listed as drivers than passengers in a greater breakdown of the data. The use of walking makes up pushing 30% of the modal share, meaning this mode is used more to access third-level institutes than primary or secondary education. The use of public transport is still low, the percentage of modal share taken up by bus, minibus, or coach is similar to that of secondary school. Although, the use of train is slightly higher, and this is most likely caused by people travelling greater distances to access the third-level institute.

Figure 4-4: Mode of Travel to Third-Level Institution in Carlow



Source: Census (2016)

Table 4-2 shows the means of travel to education for the population of County Carlow as well as the neighbouring counties. County Carlow has the second highest percentage of the population who travel to their place of education on foot, with 24.1% utilising this mode, with only Kildare experiencing a higher percentage. However, cycling usage for travelling to school or college is much lower, albeit it is aligned with the percentages seen across the neighbouring counties. This strengthens the argument that

barriers exist that limit the potential usage of this mode for educational trips. The use of the private vehicle is still the majority option for accessing education, but the percentage of residents using this mode to access education is much lower than those using the mode to access the workplace. This shows work is needed to reduce the car dependency to bring about social and environmental benefits. Furthermore, bus usage for accessing school and college is the lowest in County Carlow compared to neighbouring counties. This shows that improvements to infrastructure, as well as promotion of services, are essential to increase the usage of this sustainable mode. Rail usage is limited, although this is expected due to the short length of education trips, unless people are travelling for third-level education.

Table 4-2: County Comparison of Mode of Travel to School or College

County / Area	On Foot	Bicycle	Private Vehicle	Bus	Rail
Carlow	24.1%	1.0%	56.6%	13.2%	0.7%
Kildare	26.9%	2.0%	48.0%	17.4%	2.3%
Kilkenny	17.6%	1.0%	57.2%	20.5%	0.5%
Laois	15.3%	1..0%	59.6%	18.4%	1.3%
Wexford	15.8%	0.6%	59.5%	20.4%	0.3%
Wicklow	21.4%	1.0%	52.8%	17.2%	4.0%

Source: Census 2016

4.2 Origin-Destination Analysis

The Place of Work, School, or College - Census of Anonymised Records (POWSCAR, 2016) dataset was used to assess the origin and destinations of trips to and from the Carlow CSO settlement, which is used to represent the Carlow Graiguecullen study area.

4.2.1 Trips from Carlow

This section provides information on the destination of trips made by residents of the Carlow settlement.

4.2.1.1 Work and Third Level Education Trip Destinations

Table 4-3 shows the destination of work and third-level education trips[1] by residents of Carlow based on the POWSCAR (2016) dataset. This table shows that nearly half of work/college trips are internal to Carlow (44.2%) and this shows the potential that a substantial number of local trips could be catered for by walking and cycling modes, with the correct infrastructure provision. Nearly 10% of residents (pre-covid) worked from home, with this numbers expected to be higher in the 2022 Census results due to the long-term impacts of the pandemic on remote working habits. There is a relatively low volume trips to nearby towns and other settlements, for example only 611 (7%) of people make the trip to Dublin.

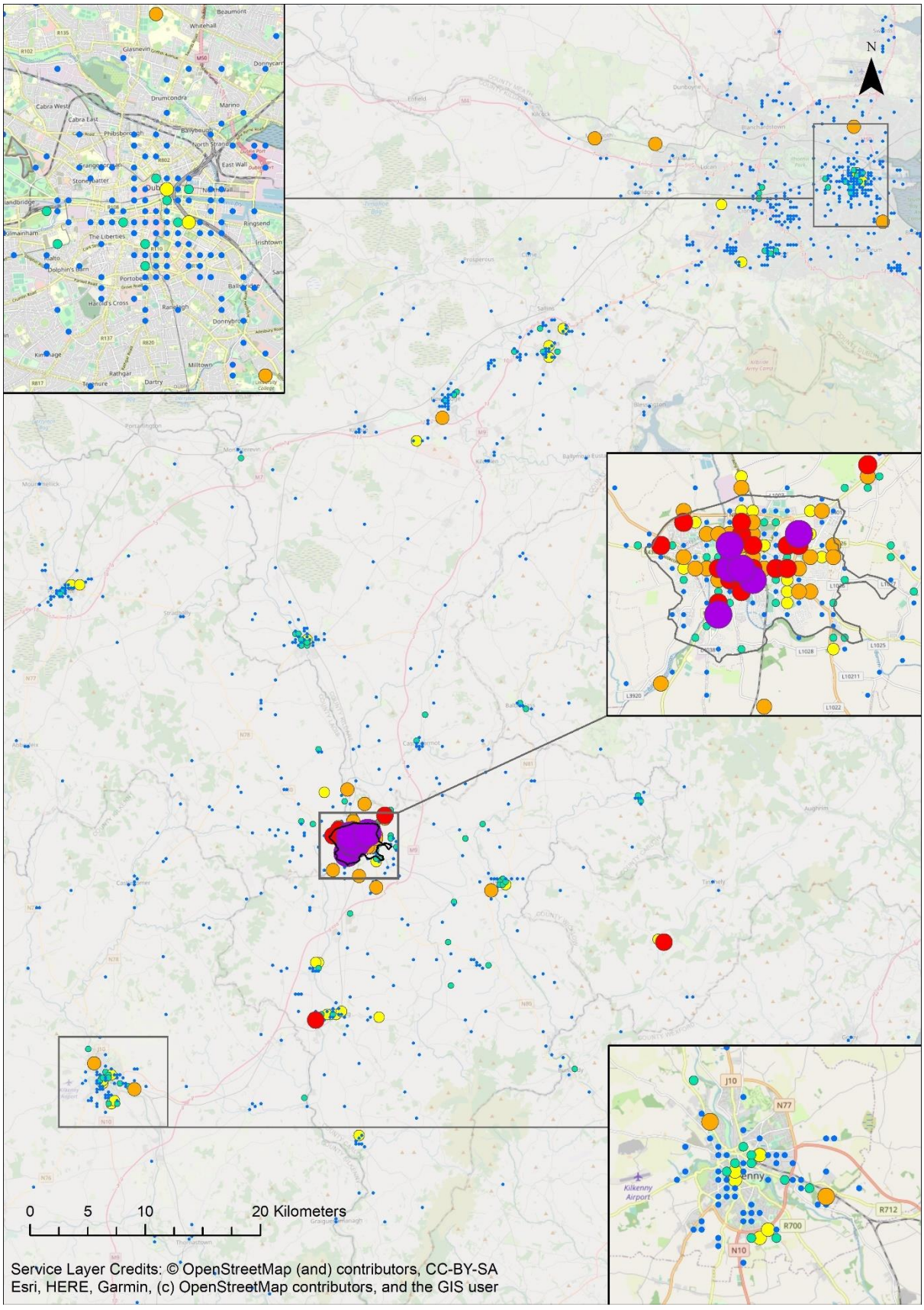
[1] Work and 3rd level trips have been combined because they involve similar independent, often long distance, travel by adults. In contrast with this, school travel is often shorter distance and escorted by a parent or involves the use of dedicated school buses rather than general public transport.

Table 4-3: POWSCAR Destination of Work and 3rd Level College Trips by Carlow Residents

Destination of Work and Third Level Trips (POWSCAR Town)	Number of Trips	Percent of all Work and Third Level Trips from Carlow
Carlow Co Carlow	3779	44.2%
Work From Home	723	8.4%
Carlow Rural	575	6.7%
Dublin city and suburbs	412	4.8%
Carlow Co. Laois	290	3.4%
Kilkenny	237	2.8%
Dublin city and suburbs	199	2.3%
Home School	197	2.3%
Kildare Rural	191	2.2%
Muinebeag (Bagenalstown)	184	2.2%
Laois Rural	122	1.4%
Wicklow Rural	121	1.4%
Athy	115	1.3%
Tullow	112	1.3%
Dun-Laoghaire Rathdown	110	1.3%
Naas	105	1.2%
Kilkenny Rural	104	1.2%
Portlaoise	94	1.1%
Newbridge	76	0.9%
Other Kildare Settlements	151	1.8%
Other Carlow Settlements	135	1.6%
Other Waterford Settlements	73	0.9%
Other Settlements	328	3.8%
Total	**8558**	

Figure 4-5 shows the destination of work and college trips by Carlow residents spatially. This demonstrates the themes explained in the table in geographic form, showing a large cluster in Carlow town and smaller clusters in Kilkenny, Naas, Newbridge and Portlaoise. It also highlights the dispersed trip destinations to the Dublin suburbs which will be more challenging to reach by public transport and likely contribute to car dependency. It may be the case in the future that different public transport upgrades which could make these locations more accessible to residents from Carlow.

Figure 4-5: POWSCAR Destination of Work and 3rd Level College Trips by Carlow Residents



4.2.1.2 Primary and Secondary Level Education Trip Destinations

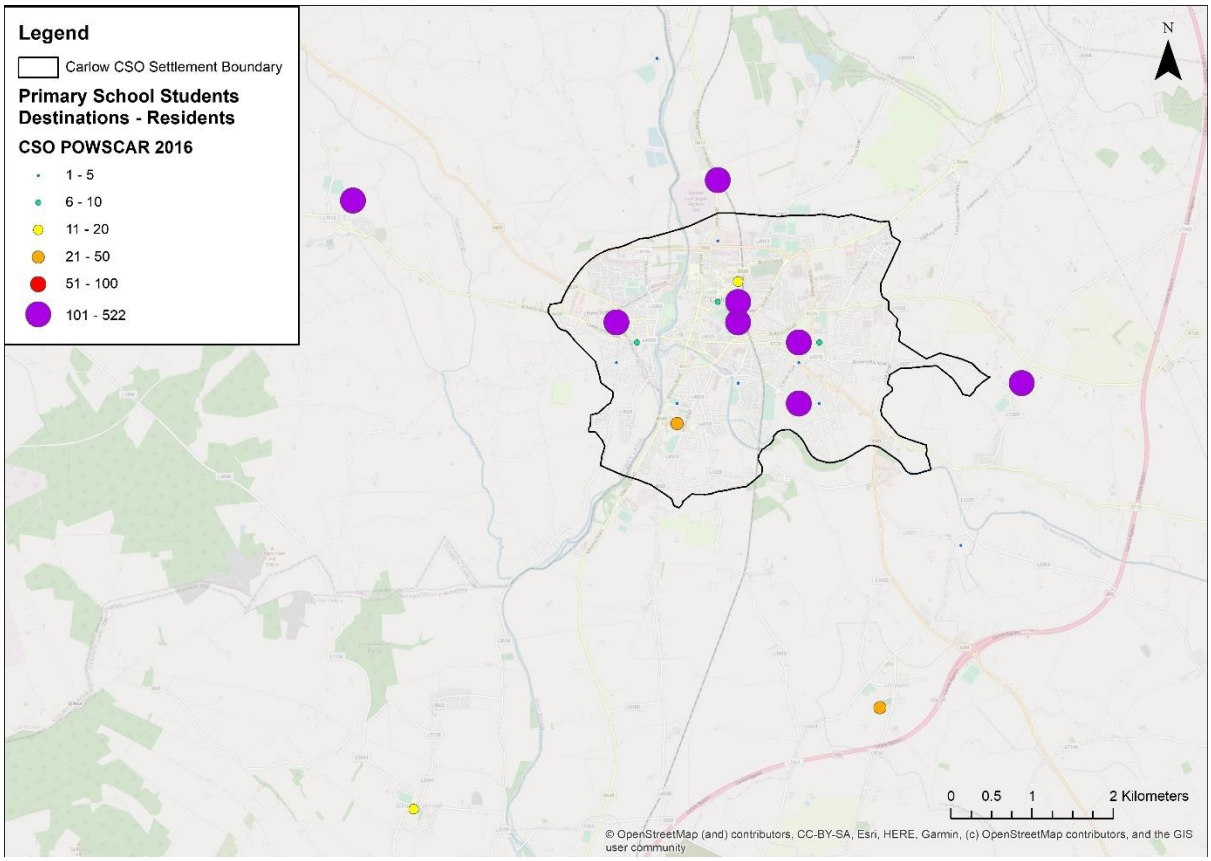
The data highlights that the majority of children residing in Carlow are also attending primary school in the area. 60.6% of the Carlow CSO primary school trips have a destination of Carlow, County Carlow. Following on from this, 15.2% and 13.6% of primary school trips originating in Carlow CSO are destined for Carlow, County Laois and Carlow Rural respectively. This demonstrates that trip distances, especially for those in Carlow, County Carlow and Carlow, County Laois, are likely to be within a reasonable walking or cycling distance. Therefore, if the correct infrastructure was provided, and more sustainable transport options became a viable option, then a modal shift for primary school travel could be captured. If a modal shift occurred, it would greatly reduce the usage of private vehicle to access schools in the study area which would generate a range of benefits. This includes alleviating congestion, and its adverse impacts, and improving physical and mental health if more physical activity is undertaken on the journey to school. It could be more challenging to convert trips for those travelling to Rural Carlow or further afield, who due to a potential lack of demand for connections may remain reliant on private vehicle. **Table 4-4** shows the destination of primary school trips by Carlow residents, as informed by POWSCAR 2016 data.

Table 4-4: POWSCAR Destination of Primary School Trips by Carlow Residents

Destination of Primary School Trips (POWSCAR Town)	Number of Trips	Percent of all Destination of Primary School Trips from Carlow
Carlow Co Carlow	1466	60.6%
Carlow Co. Laois	368	15.2%
Carlow Rural	329	13.6%
Laois Rural	140	5.8%
Tinriland	40	1.7%
Ballinabrannagh	15	0.6%
Leighlinbridge	10	0.4%
Castledermot	10	0.4%
Mobile worker	6	0.2%
Athy	6	0.2%
Other Carlow Settlements	15	0.6%
Other Settlements	13	0.5%
Total	**2418**	

The following image shows the destination of primary school trips by Carlow residents and is the geographical demonstration of the data in the table above. The figure demonstrates that many of the main destinations are within or just outside the Carlow Town area. Therefore, if sufficient alternative infrastructure is provided, there is potential to capture a modal shift and increased sustainable travel.

Figure 4-6: POWSCAR Destination of Primary School Trips by Carlow Residents



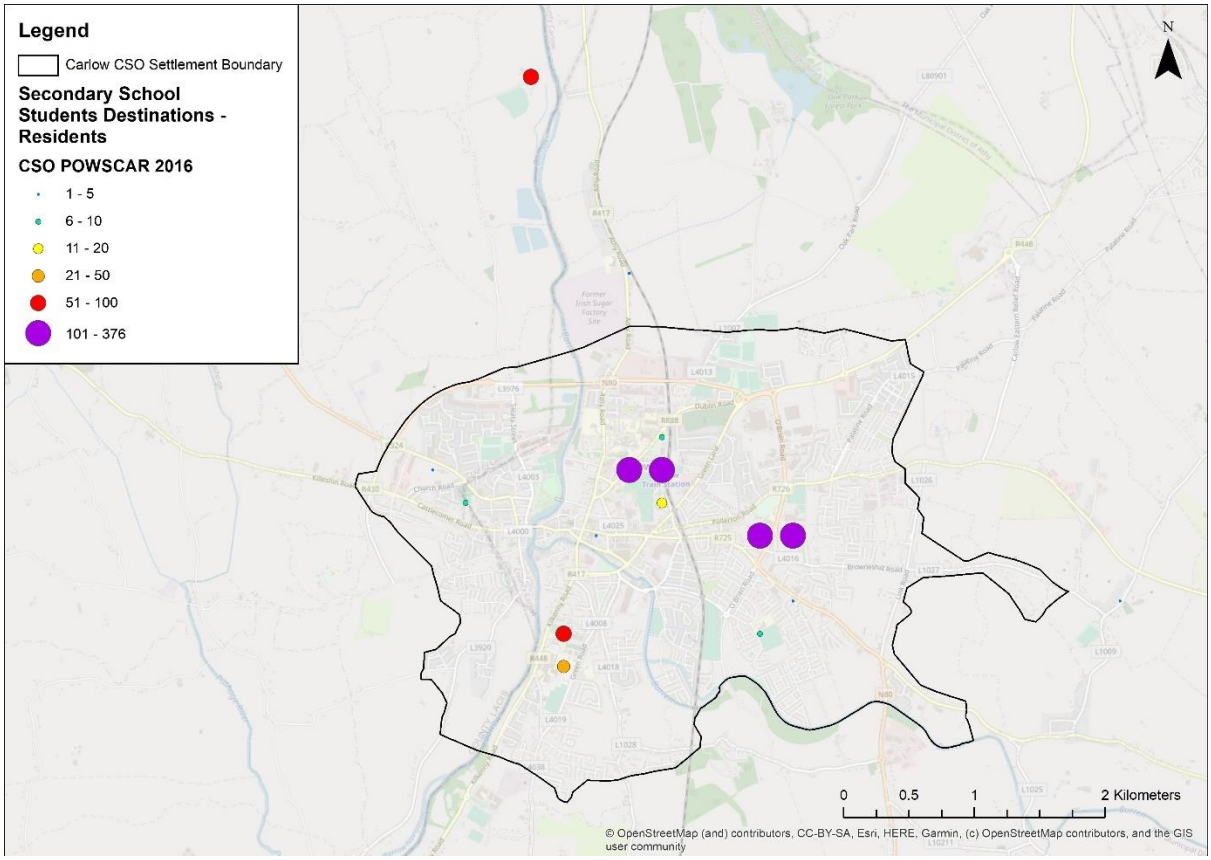
The below table (**Table 4-5**) presents the destination of secondary school trips completed by Carlow residents, based on POWSCAR 2016 data. In this data, 90% of Carlow residents attend a school that is located in Carlow, County Carlow. The next most common destination for Carlow residents to travel to secondary school was Laois Rural, however, only 3.9% of trips travelled to this area. All other areas accounted for 2% or below of trip destinations for secondary school trips. This supports the fact that many Carlow residents attend secondary school in the area local to them and their travel could be converted to sustainable trips.

Table 4-5: POWSCAR Destination of Secondary School Trips by Carlow Residents

Destination of Secondary School Trips (POWSCAR Town)	Number of Trips	Percent of all Work and Third Level Trips from Carlow
Carlow Co Carlow	1282	90.0%
Laois Rural	56	3.9%
Muinebeag (Bagenalstown)	14	1.0%
Kilkenny	13	0.9%
Mobile worker	8	0.6%
Castledermot	8	0.6%
Carlow Co. Laois	7	0.5%
Leighlinbridge	6	0.4%
Other Carlow Settlement	7	0.5%
Other Settlements	24	1.7%
Total	**1425**	

Figure 4-7 shows the destination of secondary school trips by Carlow residents in mapped form. As the data from the table suggested, the majority of Carlow residents are travelling to a secondary school destination within the Carlow Town area. This furthers the point that a modal shift could be successful if the correct infrastructure was provided. There is one destination shown on the map fall outside the Carlow Town area, however, this only receives 51-100 trips and is not too remote from Carlow.

Figure 4-7: POWSCAR Destination of Secondary School Trips by Carlow Residents



4.2.2 Trips to Carlow

This section provides a summary of the origin of trips to Carlow by people who work or study in the town based on the POWSCAR (2016) dataset.

4.2.2.1 Origin of Work Trips

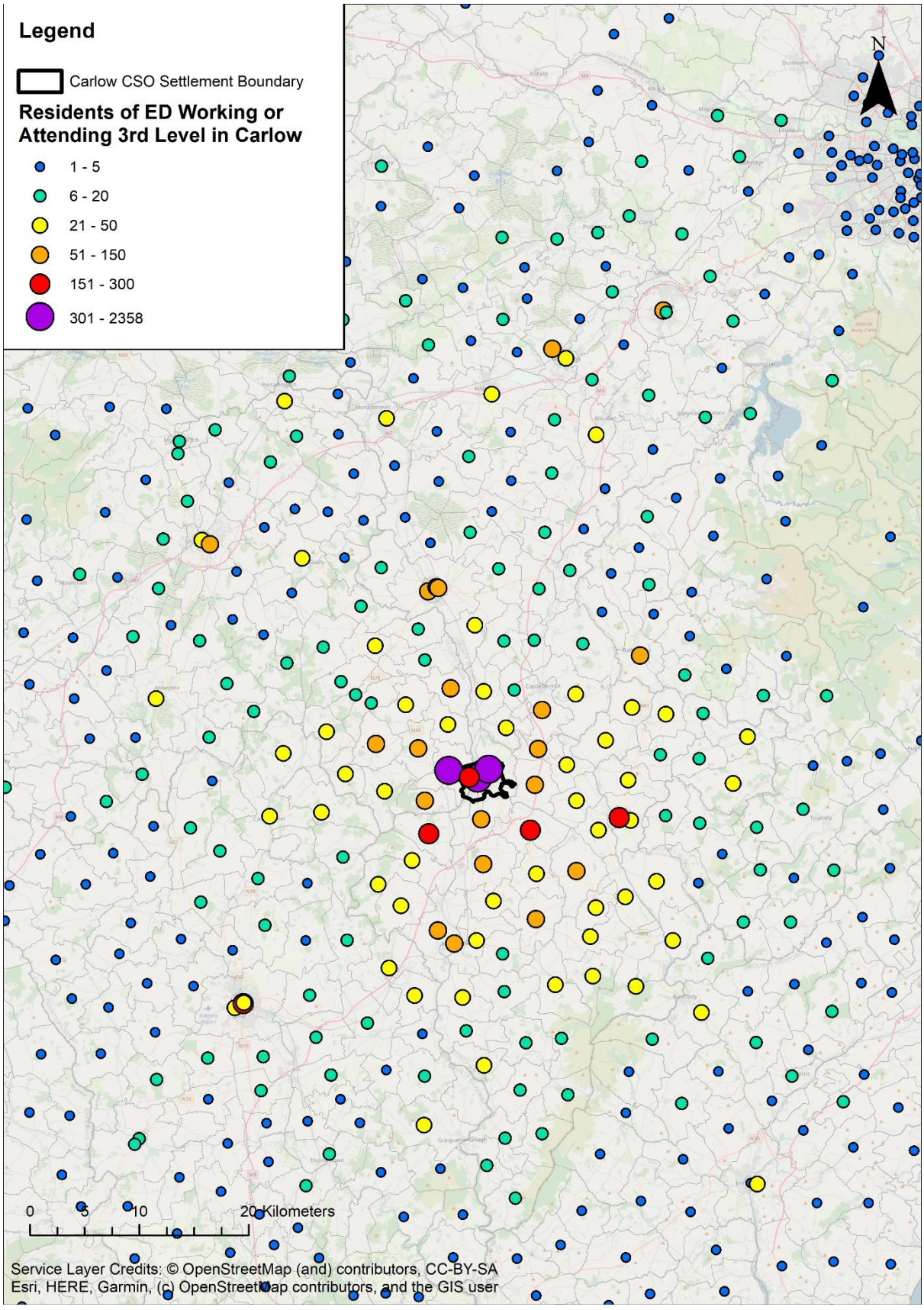
Table 4-6 shows the origin of trips to Carlow CSO Settlement in order to access work. This shows that around 30% of work trips originate within Carlow, County Carlow and these internal trips will have the greatest potential for modal shift to active travel due to shorter trip distances. Notably, less than 1% of trips originate in Dublin City and Suburbs so it is demonstrated that the town is not attracting longer distance work commutes along a radial corridor. However, this could be caused by currently poor public transport connections along that route. The table also highlights the important role of Carlow in providing employment for people from Carlow, County Laois, Laois Rural, Kildare Rural, Kilkenny Rural and Wexford Rural; showing the potential for improved public transport links with these areas to reduce car dependency whilst supporting Carlow's economy and labour pool. A proportion of this demand is likely to be travel to SETU for students who live outside of Carlow.

Table 4-6: POWSCAR (2016) - Origin of Work and 3rd Level Trips to Carlow CSO Settlement

Origin of Work and Third Level Trips (POWSCAR Town)	Number of Trips	Percent of all Work and Third Level Trips to Carlow
Carlow Co Carlow	3326	30.3%
Carlow	1533	14.0%
Carlow Co. Laois	743	6.8%
Laois Rural	712	6.5%
Kildare Rural	447	4.1%
Kilkenny Rural	355	3.2%
Wexford Rural	256	2.3%
Kilkenny	253	2.3%
Athy	213	1.9%
Tullow	209	1.9%
Wicklow Rural	193	1.8%
Portlaoise (formerly Maryborough)	143	1.3%
Muinebeag (Bagenalstown)	113	1.0%
Droichead Nua (Newbridge)	101	0.9%
Naas	97	0.9%
Ballinabrannagh	83	0.8%
Castledermot	75	0.7%
Leighlinbridge	74	0.7%
Tinriland	65	0.6%
Dublin City and Suburbs	57	0.5%
Ballon	56	0.5%
Palatine	56	0.5%
Offaly Rural	54	0.5%
Other Counties	1726	15.7%
Total	**10984**	

Figure 4-8 shows the Electoral Divisions where people start their journey when travelling to Carlow for work, based on data from POWSCAR (2016). This shows a similar theme to the table, with relatively high trip numbers from local towns and the rural hinterland with few longer distance trips from dispersed locations across County Dublin.

Figure 4-8: POWSCAR (2016) - Origin of Work and 3rd Level Trips to Carlow CSO Settlement



4.2.2.2 Origin of School Trips

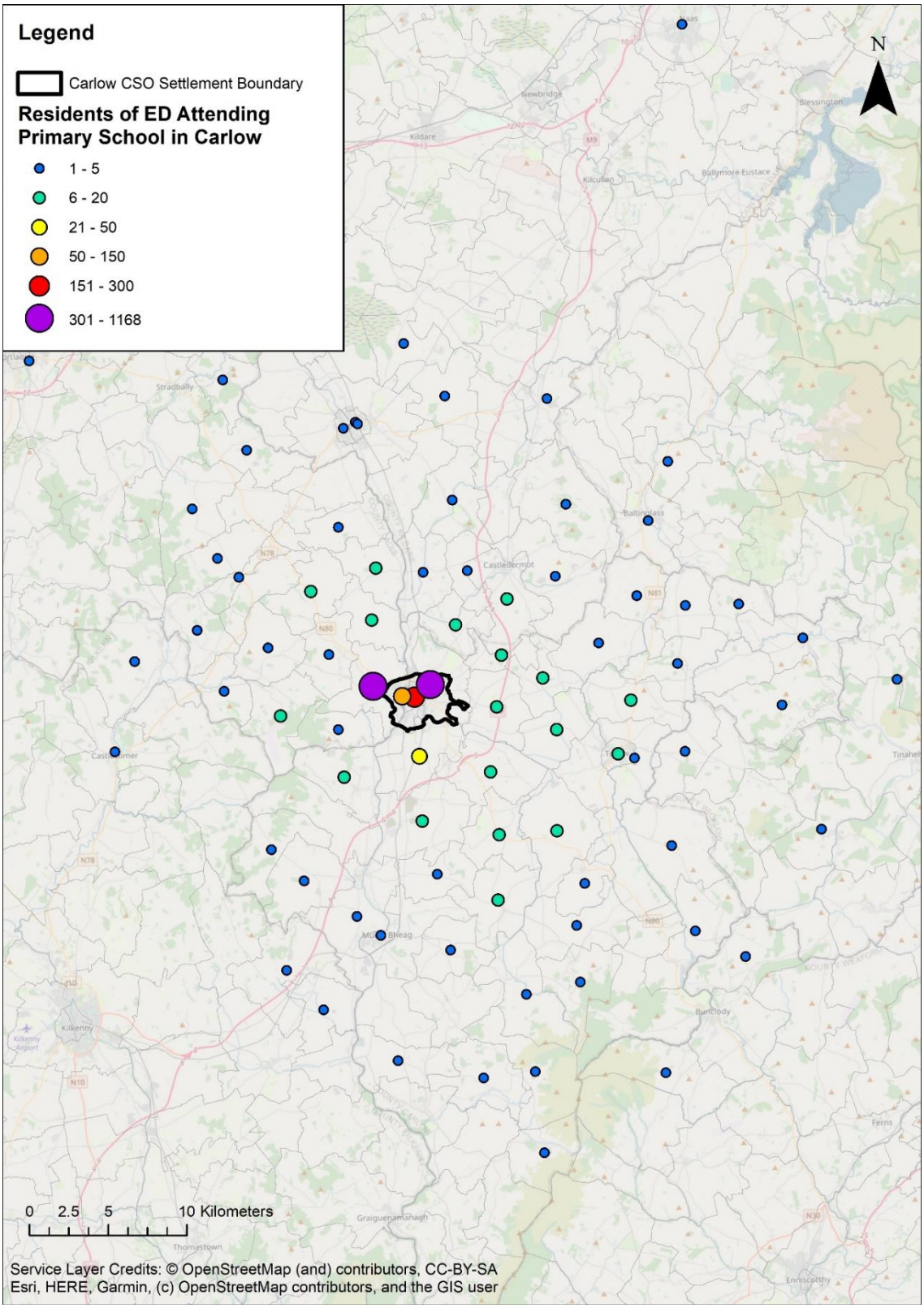
Table 4-7 presents the origin of primary school trips to the Carlow CSO settlement, based on POWSCAR 2016 data. Over 65% of trips travelling to primary school in the Carlow CSO settlement originate in the Carlow, County Carlow area – accounting for 1448 in total. Following this, Carlow County Laois is the origin for 17.4% of primary school trips and Carlow Rural is the origin for 7.2% of trips. This demonstrates that the majority of children travelling into the Carlow CSO settlement for primary school are originating in the very local area. This presents an opportunity to convert such trips to active modes or public transport for slightly longer distance local trips. With the exception of Kildare Rural and Carlow Other, less than 1% of primary school trips are originating from other neighbouring areas.

Table 4-7: POWSCAR (2016) - Origin of Primary School Trips to Carlow CSO Settlement

Origin of Primary School Trips (POWSCAR Town)	Number of Trips	Percent of all Work and Third Level Trips to Carlow
Carlow Co Carlow	1448	65.3%
Carlow Co. Laois	386	17.4%
Carlow Rural	159	7.2%
Laois Rural	71	3.2%
Kildare Rural	30	1.4%
Tullow	20	0.9%
Palatine	17	0.8%
Ballon	9	0.4%
Rathtoe	9	0.4%
Ballinabrannagh	7	0.3%
Wicklow Rural	6	0.3%
Other Carlow	26	1.2%
Other Kildare	8	0.4%
Other Counties	20	0.9%
Total	**2216**	

Figure 4-9 follows on from the above table, demonstrating the same data geographically. As suggested above, the majority of primary school trips to the Carlow CSO settlement also originate in the area. With the exception of one area in Laois, located in close proximity to Carlow CSO settlement, all other areas are producing 20 or less trips to primary schools within the Carlow settlement. Again, this provides further support for the concept of converting such trips to more sustainable modes.

Figure 4-9: POWSCAR (2016) - Origin of Primary School Trips to Carlow CSO Settlement



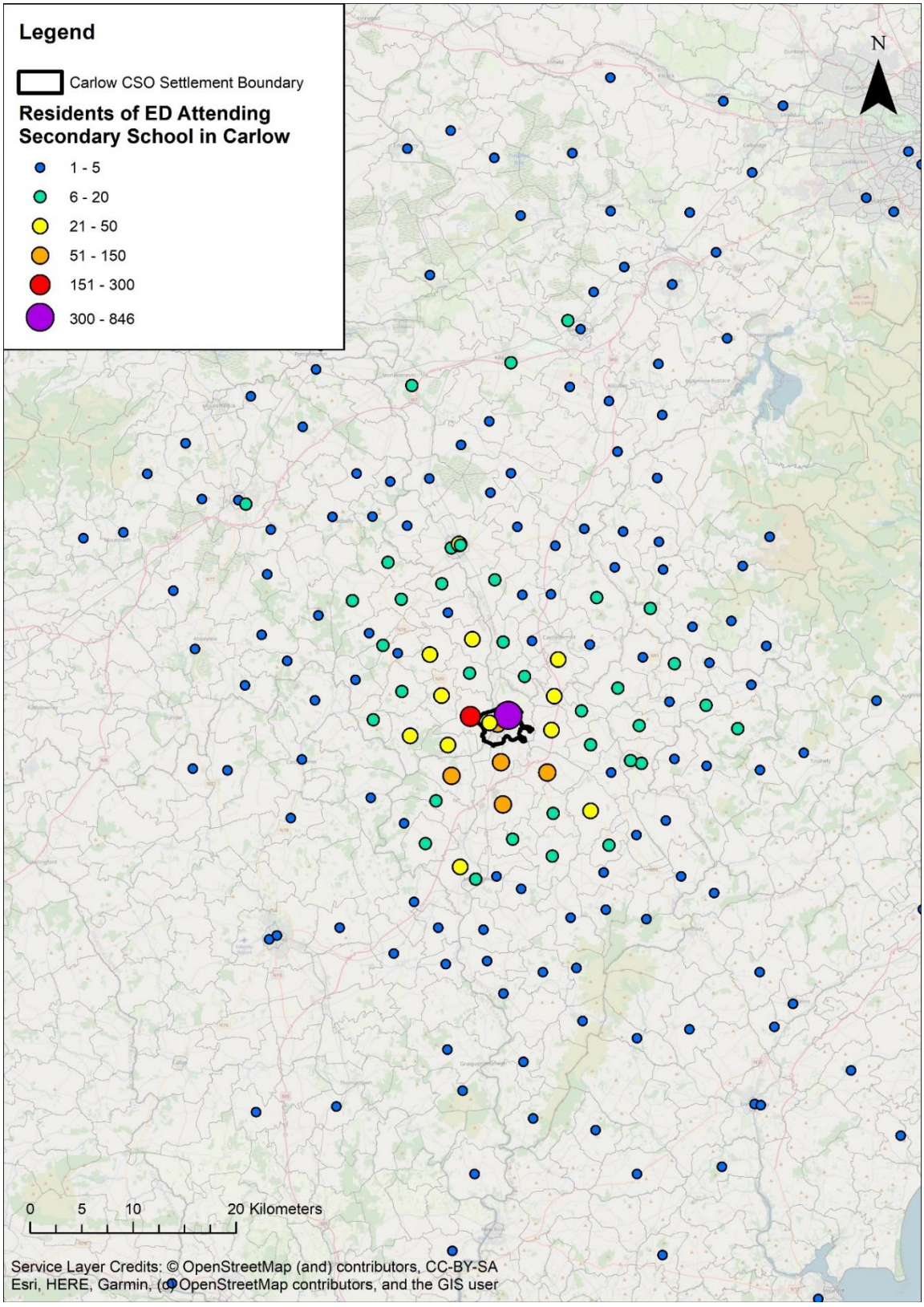
The following table (**Table 4-8**) presents the POWSCAR 2016 data showing the origin of secondary school trips into the Carlow CSO settlement. The trend for where secondary school trips, travelling to the Carlow CSO settlement, originate from is somewhat different to primary school and this is likely due to fewer, but larger, secondary schools meaning often people travel further. Again, Carlow, County Carlow is the largest origin point for those travelling to secondary school in the Carlow CSO settlement area, accounting for nearly 40% of trips. Other areas which are a common origin point for secondary school trips to Carlow CSO settlement include Carlow Rural (16.9%), Laois Rural (10.8%), and Carlow, County Laois (9.7%). Due to the more widespread origin points for these trips, converting them all to active travel could prove difficult, but where demand exists it is important to provide either public transport or multi-modal options that can assist in driving increased sustainable travel.

Table 4-8: POWSCAR (2016) - Origin of Secondary School Trips to Carlow CSO Settlement

Origin of Secondary School Trips (POWSCAR Town)	Number of Trips	Percent of all Work and Third Level Trips to Carlow
Carlow Co Carlow	1033	39.2%
Carlow Rural	445	16.9%
Laois Rural	284	10.8%
Carlow Co. Laois	256	9.7%
Kildare Rural	116	4.4%
Athy	52	2.0%
Ballinabrannagh	38	1.4%
Tinriland	34	1.3%
Wicklow Rural	28	1.1%
Tullow	25	0.9%
Kilkenny Rural	21	0.8%
Palatine	20	0.8%
Rathtoe	19	0.7%
Ballon	18	0.7%
Wexford Rural	16	0.6%
Castledermot	14	0.5%
Baltinglass	14	0.5%
Leighlinbridge	11	0.4%
Droichead Nua (Newbridge)	10	0.4%
Portlaoise (formerly Maryborough)	10	0.4%
Kernanstown	9	0.3%
Kildare	9	0.3%
Ballylinan	9	0.3%
Muinebeag (Bagenalstown)	8	0.3%
Rathvilly	7	0.3%
Other Kildare	29	1.1%
Other Laois	17	0.6%
Other Wicklow	11	0.4%
Other Carlow	11	0.4%
Other Wexford	11	0.4%
Other Kilkenny	8	0.3%
Other Cavan	6	0.2%
Other Counties	37	1.4%
Total	**2636**	

The figure below (**Figure 4-10**) presents the data shown in the previous table on a map. Unlike primary school trips, the origin points for secondary school trips are much more widespread with numerous places outside the Carlow CSO settlement area producing up to 150 secondary school trips. This data supports the notion that public transport provision or multi-modal options are going to be an important consideration in providing more sustainable travel to secondary schools in Carlow.

Figure 4-10: POWSCAR (2016) - Origin of Secondary School Trips to Carlow CSO Settlement



5. Transport Infrastructure and Services

The transport network within the study area is summarised in this chapter of the report. This summary considers all modes of transport, with gaps in network provision identified. Problems on the transport network are also identified.

5.1 Active Modes

Walking and cycling play an important role in minimising environmental impacts, while also contributing to improved wellbeing and quality of life. Increasing the uptake of these sustainable modes of travel is dependent on the convenience of walking or cycling as an option which directly relates to the level of connectivity, road safety and the quality of facilities provided. Project Carlow 2040; “A Vision for Regeneration” contains a detailed walking and cycling strategy for Carlow Town which provides for a number of new pedestrian routes within Carlow, linking residential areas to key attractions, with a focus on removing severance and improving connectivity together with improved pedestrian infrastructure (e.g., footpaths, safe crossings, junction upgrades etc).

5.1.1 Strava Data

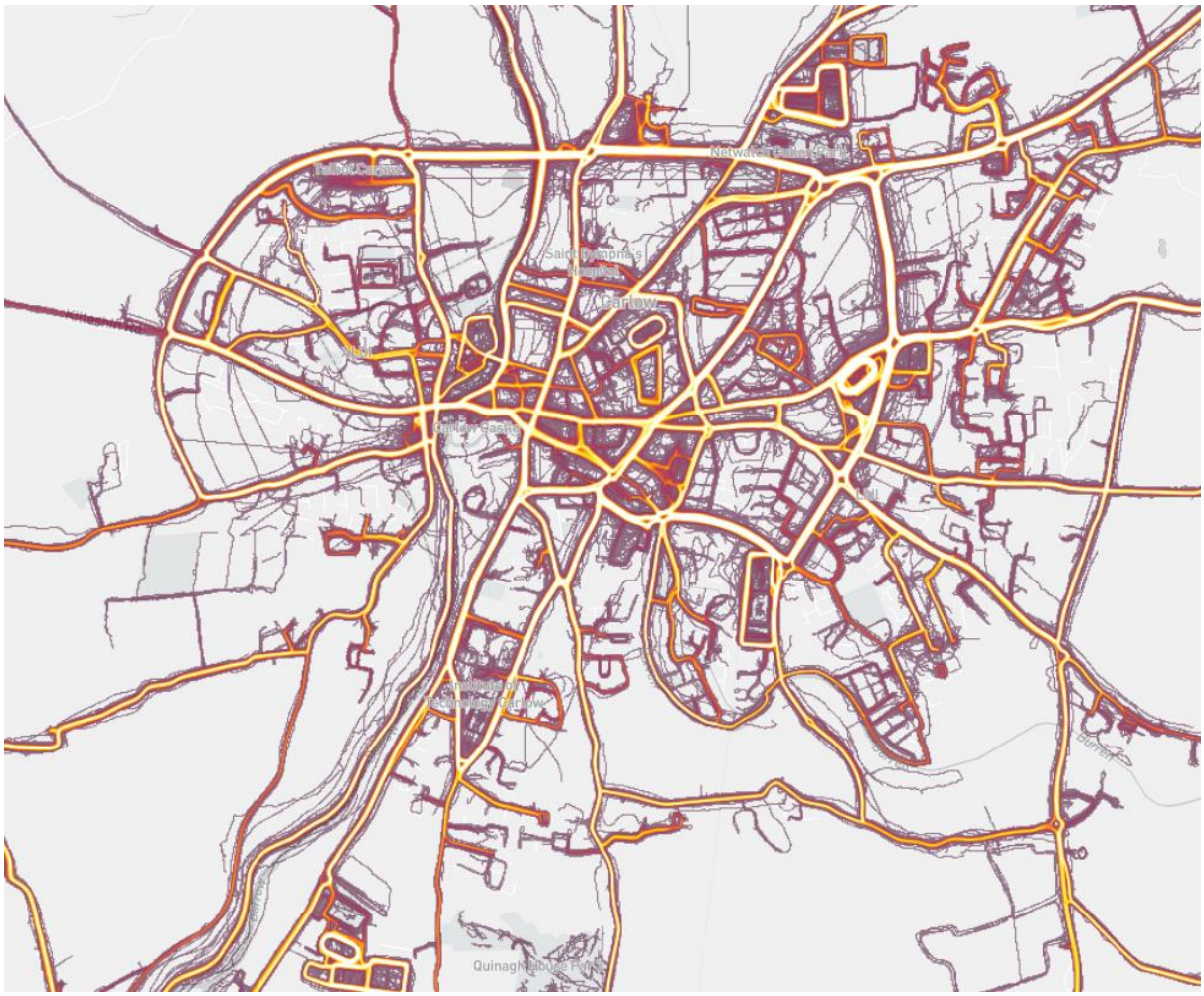
5.1.1.1 Walking and Running Trips

Strava measures walking, running, and cycling trips primarily for recreational, exercise or social trips. The figures in this section present a summary of the total cycling, walking and running trips which took place on each link. The Strava data is just a sample of the total walking and cycling trips which will have taken place in the study area, but the data is a valuable tool to provide understanding which routes are popular for active modes.

Evidence from the 2016 Census has shown that 11.2% and 35.5% of the Carlow settlement population are travelling on foot to work and school respectively. Walking as a mode, especially in terms of accessing education accounts for over a third of trips, however the usage of this mode could be further enhanced, especially for short-distance trips, to ensure that social and environmental benefits can be captured.

Figure 5-1 below presents the walking and running (on foot) trips undertaken in Carlow Graiguecullen area by utilising Strava data. The heatmaps produced by Strava are based on aggregated public activities over the last year. The data works by tracking Strava users walks, runs, and rides and once aggregated this provides insights into route trends. The figure shows that the N80, to the north and east of Carlow Town, is commonly used for walking or running. This could be to strategically access places, such as business parks or residential areas, as well as for exercises purposes as the road is flat and easy to walk. In addition, the regional routes and key towns links are commonly used for running or walking, which is likely to be so people can access shops, services, employment, or education. Furthermore, there are spots, such as local fields and football pitches, where walking or running is higher, which indicates places people use for recreation and helps inform key attractors by active modes for the option identification process. Providing enhanced connectivity and facilities will continue to encourage physical activity to benefits residents’ physical health and mental wellbeing.

Figure 5-1: Strava Walking and Running Trips

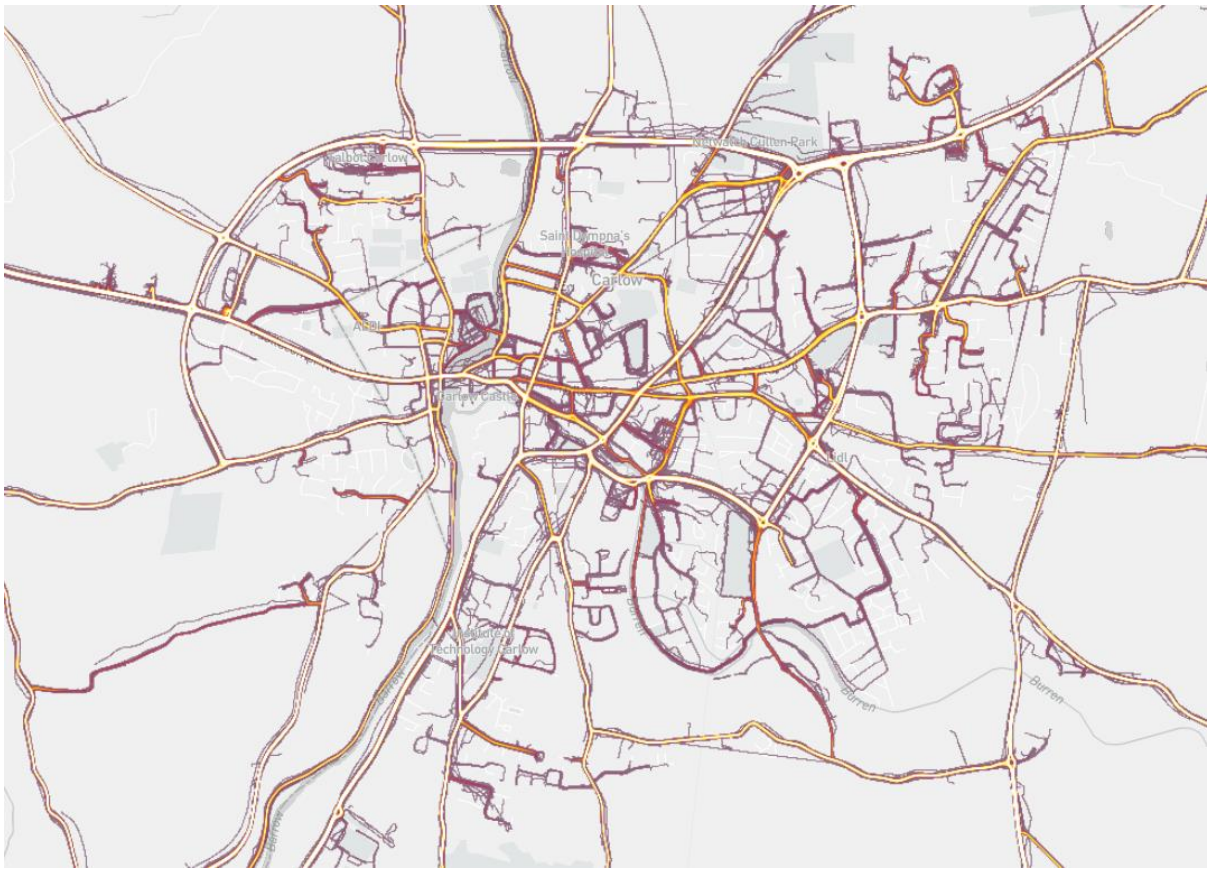


5.1.1.2 Cycling Trips

2016 Census data has shown that only 2.1% of the Carlow settlement population cycle to work, and similarly only 2% cycle to education. This is significantly below the State target of 10% of commuting trips being completed by bicycle. There has been some investment in cycling infrastructure in recent years, with the provision of cycle lanes along the N80 and some of the regional roads. However, further work needs to be done to improve the current infrastructure provision and address existing network gaps. Increasing the attractiveness and willingness to cycle is essential for people to undertake a modal shift. Safety is an extremely important part of increasing people's willingness to cycle, and this is especially important for children potentially using the network to access their place of education. The cycling strategy states there is a focus on creating safe, continuous segregated cycle routes which link residential communities to employment, education, the town centre, and recreation/leisure facilities.

Figure 5-2 shows the cycling trips in the Carlow Graiguecullen area based on Strava data. The Strava heatmap for cycling contains less 'heated' areas than shown in the on-foot figure above. This supports the observations from other data sources that there is less cycling than walking and running. Again, much of the cycling is focussed along the N80 where there are key attractors and cycle infrastructure is provided. Additionally, there is higher levels of cycling along the roads in the south of Carlow Town and along the R448 (Kilkenny Road), which passes SETU. This highlights that both routes are frequently used, indicating that cycle infrastructure would be well-used on these routes, and also that introduced infrastructure is being utilised. Again, there are areas where there are lower levels of cycling, but the more definitive trends can guide infrastructure provision and future provisions.

Figure 5-2: Strava Cycling Trips

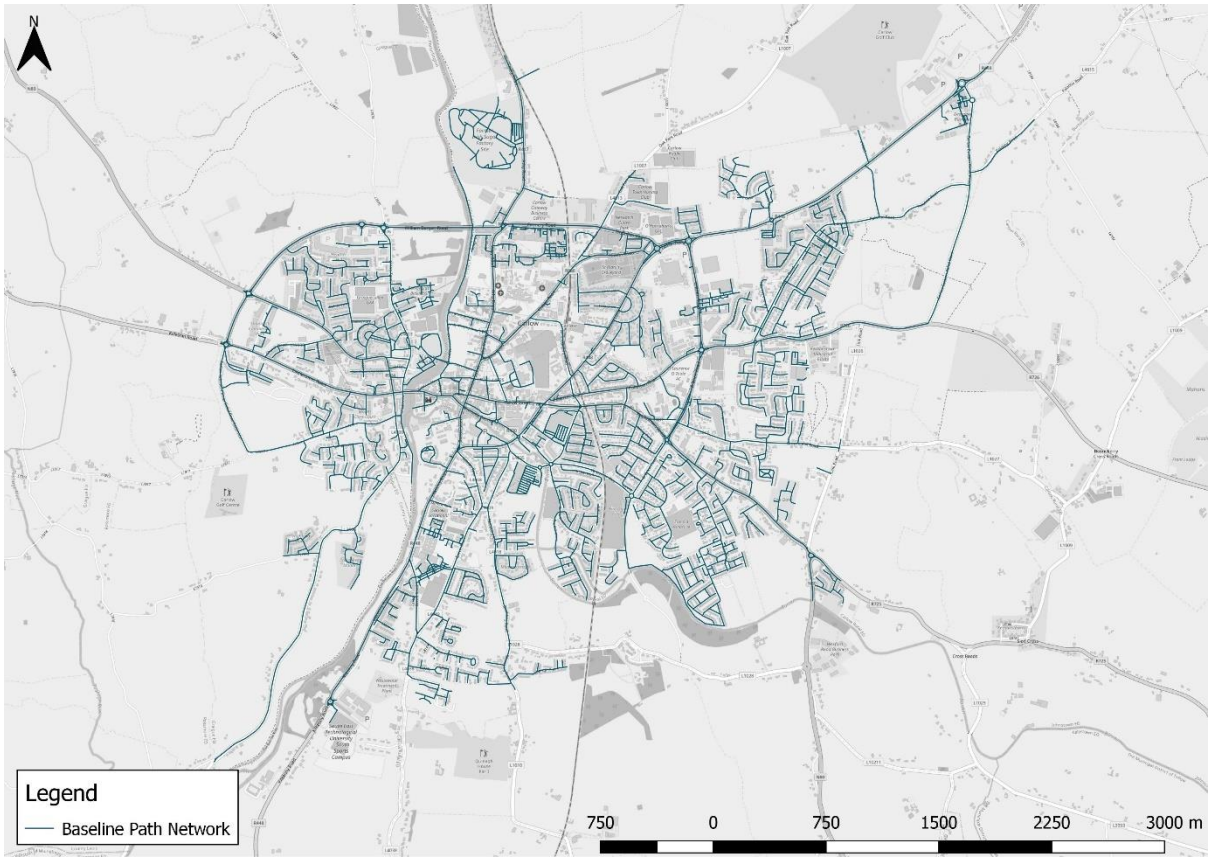


5.1.2 Permeability Assessment

Permeability allows for different land uses and spaces within the town to be connected, usually via an interconnected network of walking and cycle routes. In spite of ongoing demographic changes, particularly in promoting town centre living, Carlow Town is still affected by the legacy of suburbanisation and the hollowing out of the town centre. This explains the limited connectivity between residential and service areas.

In order to assess permeability and walking catchments in the Carlow Graiguecullen area, a path network has been developed. The advantage of this path network is that it can accurately assess pedestrian movements, rather than simply representing walking distances on the road network.

Figure 5-3: Baseline Path Network



5.1.2.1 Key Permeability Barriers

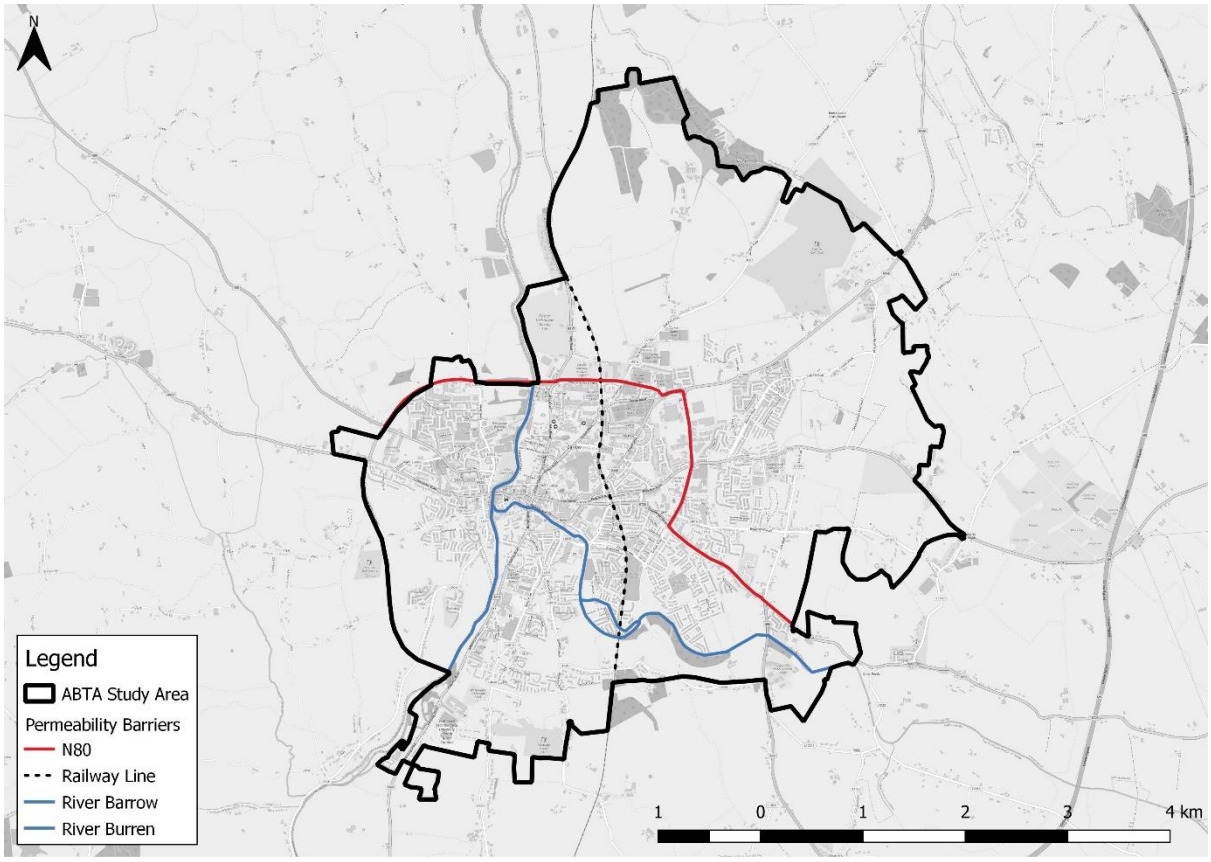
The study area has multiple linear barriers which spatially separate the study area, as shown in **Figure 5-4**. The main barriers include: the Dublin-Waterford railway, which runs through the middle of the study area, the N80 major road which is in the north and east of the study area and finally the River Barrow and River Burren which are situated to the west and south of Carlow town centre. Although these corridors do have crossing points, they do constrain permeability and improving access across them will be a critical part of the town expansion. The following few bullet points summarise the permeability issues related to each key barrier:

- Dublin-Waterford Railway Line – there are six crossing points along this route within the study area. These are all situated along roads, and although severance is not extreme, the presence of the railway line will prevent people from having free movement between certain areas. All routes, as mentioned, are along the road network, with many lacking high qualities active mode infrastructure, which could act as a further barrier to using this mode.
- N80 – there are points to cross the N80, particularly at roundabout junctions but such junctions are primarily set up to prioritise the traffic rather than active mode users. Therefore, crossing may be unsafe or inconvenient to those on foot or with a bicycle.
- River Barrow – there are three crossing points within the study area. Two of these are road bridges with a footpath, whereas the third is an active mode crossing through the park; however, this is only available during the day. This means that people wanting to cross the river are constrained leading to congestion for vehicles and longer trips. Due to only one vehicular crossing point in the town centre, if any collisions occur, the local road network around the town centre becomes gridlocked, or results in long diversion routes via the N80.
- River Burren – there are three crossing points within the study area, all immediately south of the town centre providing direct access between the southern residential areas, SETU and the town centre. All three of these crossing points are road bridges with footpaths; with two, Hanover Street and Paupish Bridge, benefiting from segregated cycle facilities.

A desktop analysis has revealed areas which may lack permeability and thus prevent sound accessibility and/or active mode trips. A key large residential area which may struggle with permeability is the homes situated between Cuirt Chnoc an Toradh and Leighlin Road, as well as north of Bridge Street in Graiguecullen. The housing areas to the east of Carlow Town centre, in particular those between the N80 and Link Road also suffer from poor permeability. Walk distances from some of the homes in these areas to access a main road are quite long and convoluted and are likely to prevent sustainable travel. However, there are other areas suffering with poor connections, due to the lack of active mode infrastructure or bus services, resulting in residents being forced to use private vehicles for trips.

There are plans to improve permeability through the SETU campus and across the River Barrow, however, sometimes permeability is difficult to deliver due to safety and anti-social behaviour concerns.

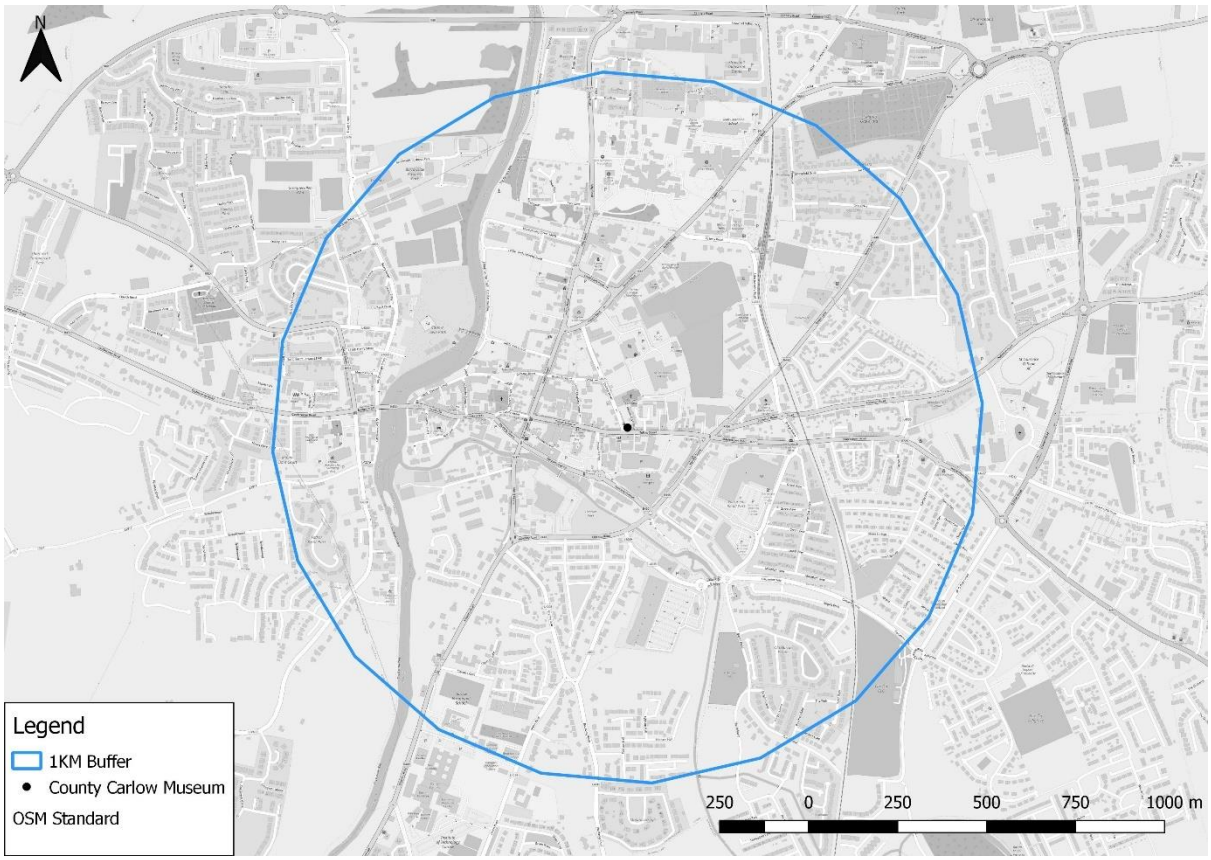
Figure 5-4: Key Permeability Barriers



5.1.2.2 Town Centre Catchment

Carlow County Museum, situated along the principal shopping street (Tullow Road) is a reasonable central landmark, and therefore this has been used to measure the 1km buffer catchment of the town centre. **Figure 5-5** presents the 1km buffer to the town centre based on the centre point of the Carlow County Museum. Existing access to this location is relatively good when compared to the 1km circular buffer, highlighting what is within a short walking distance of the town centre. The figure demonstrates that St. Dympna's Hospital, the local hospitals, five local primary schools, two secondary schools as well as other key important services, all fall within this catchment. Comparing the building use data, from GeoDirectory, to this 1km buffer shows that many residential buildings, particularly in the east and south, are within an acceptable walking distance of Carlow Town Centre. Movements from Laois, and east of the railway line are more constrained due to the permeability barriers.

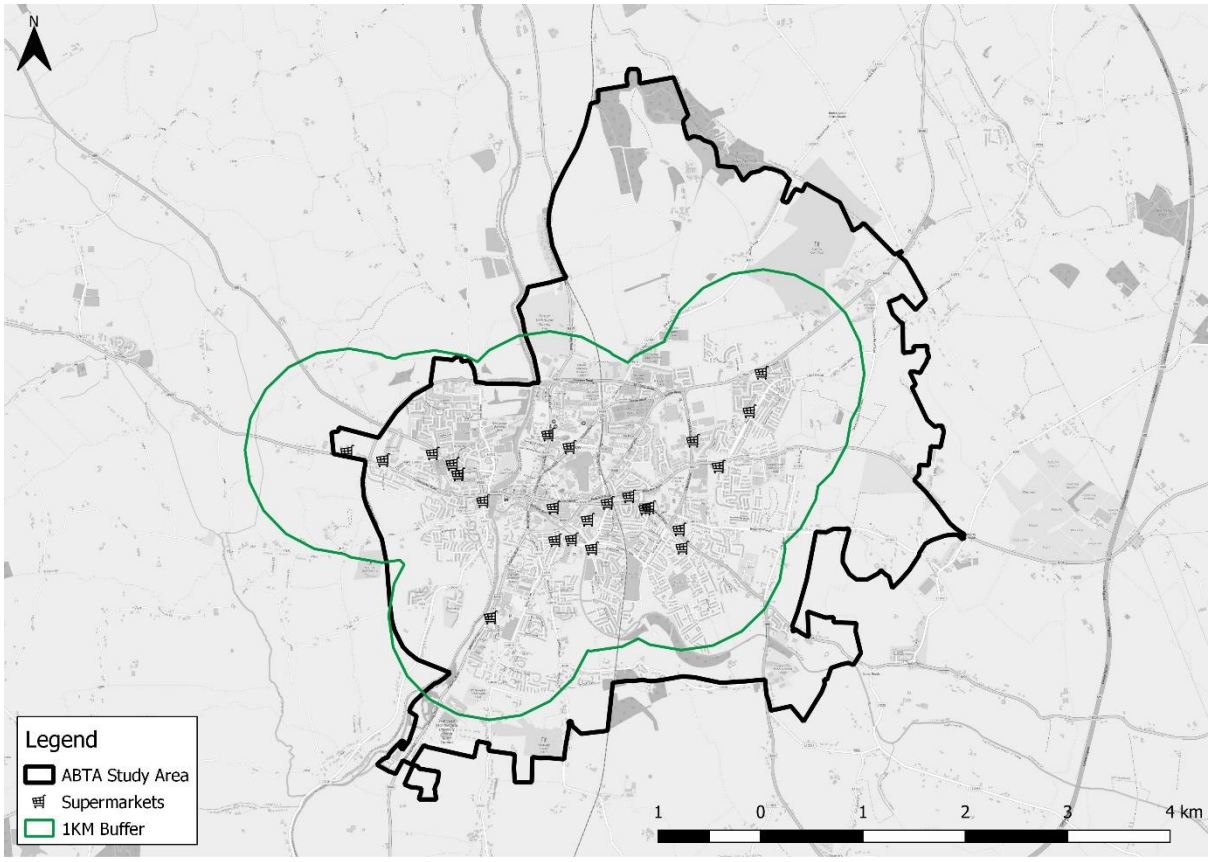
Figure 5-5: 1km Walking Distance to the Town Centre



5.1.2.3 Supermarket Catchment

There are many supermarkets within the Carlow Graiguecullen study area. This includes an Aldi situated in Graiguecullen, a Tesco superstore and Aldi very close to the centre of Carlow Town as well as a Lidl and Iceland along the N80. **Figure 5-6** below shows a 1km buffer around these supermarkets, to show accessibility to these stores on foot. Analysis has identified that all built-up residential areas within the study area fall within 1km of a supermarket, and therefore should be accessible via active modes. However, the possibility of these trips undergoing a modal shift is also dependent on other factors, such as where people prefer to shop and whether they can feasibly use active modes when completing their shopping trips.

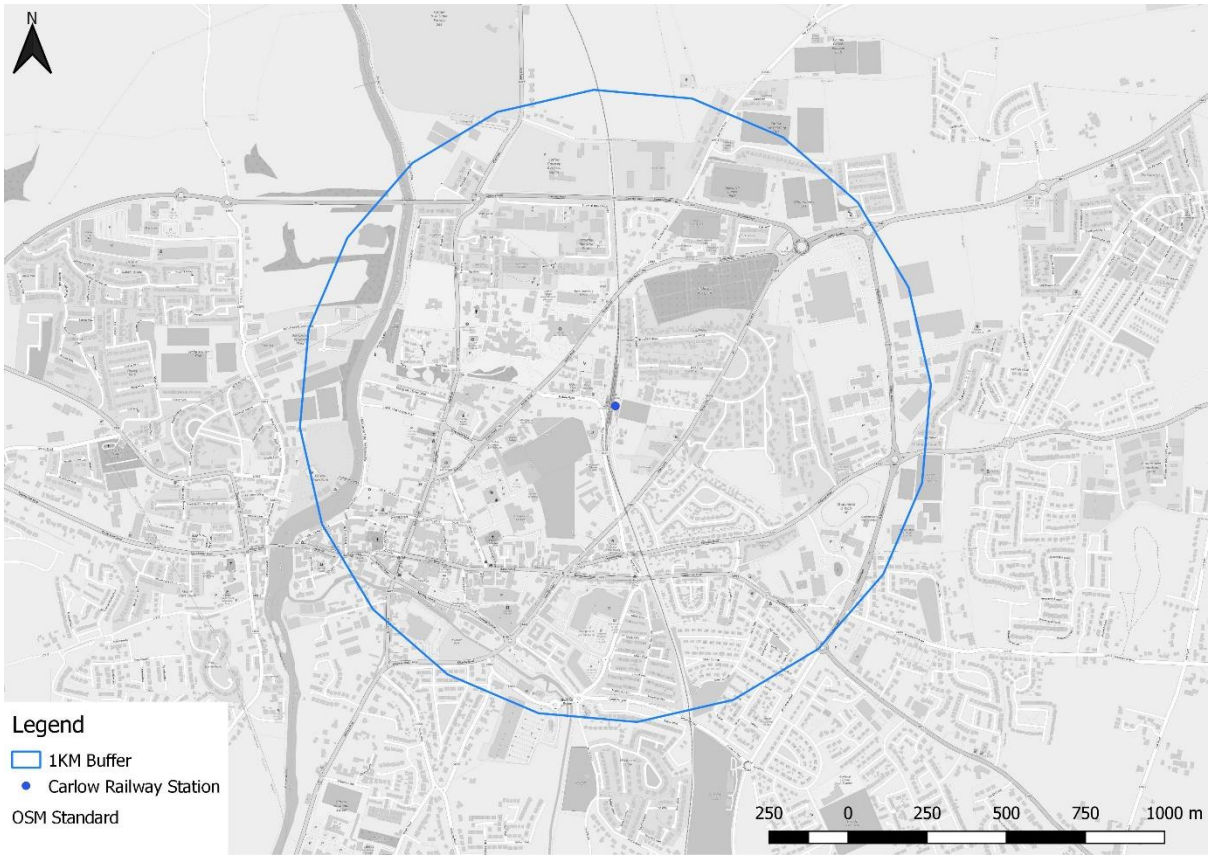
Figure 5-6: 1km Walking Distance to the Local Supermarkets



5.1.2.4 Train Station Catchment

There is one railway station within the study area, this is Carlow Town rail station and is around 1km from the core town centre. **Figure 5-7** below shows the 1km buffer around the rail station. It shows that the rail station is easily accessible on foot from the core of Carlow Town centre but is not as accessible from suburban residential areas. This is highlighted by the fact that only 27% of the residential buildings within Carlow Town fall within the 1km distance of the rail station. This means that on foot trips to here may be unfeasible and unattractive, which when coupled with potentially unreliable public transport routes and cheap readily available parking at the station, means that many people rely on their cars to access the station. It is essential that transport hubs like the rail station are connected by sustainable modes to prevent car reliance. Overall, the main areas containing commercial and mixed-use buildings are within the 1km railway station catchment, meaning access to employment areas in Carlow, if travelling from other areas, are feasible on foot.

Figure 5-7: 1km Walking Distance to the Rail Station



5.1.2.5 Bus Stop Catchment

The catchment distance used for bus stops is 500m, rather than 1km, based on the Sustainable Residential Development in Urban Areas (2009) guidelines. **Figure 5-8** below shows that there are five bus stops within the Carlow Town study area, meaning the distribution is quite sparse and it is not guaranteed that all of the bus stops below serve each route. Carlow Coach Park is situated very close to the core centre and serves the majority of the routes within and external to Carlow. The map demonstrates that Carlow Town centre sits well within the 500m of buffer of bus stops, meaning catching the bus from and to Carlow Town centre is viable. However, the mapping has also revealed that many residential areas (in particular to the east and south of Carlow Town as well as in Graiguecullen) and some other employment spots, like the business parks, are not close to a bus stop and aren't accessible on foot reasonably. This is likely to discourage people from using the bus to complete trips which may be possible with an enhanced bus network.

Figure 5-8: 500m Walking Distance to the Bus Stops

5.1.2.6 Primary Schools Catchment

There is a high density of primary schools within the Carlow Town study area. **Figure 5-9** below shows a 1km buffer surrounding these primary schools to determine which areas are within a reasonable walking distance. The majority of the residential buildings in Carlow Town, except for a small area to the very northeast and ad-hoc pockets to the east, all are within a 1km walk of a primary school. This demonstrates that active modes, in particular walking, is a feasible option for travelling to and from school, which would support sustainability goals as well as improve children's health. Although it must be noted that some educational facilities will cater for special educational needs pupils, and therefore travel patterns for these individuals may be more specialised. This means that active travel may not be a feasible option for many students attending this school so ensuring sound road connections are also particularly important. However, it must be noted that this catchment does not guarantee that a child will have a place at the school closest to their home and may in reality have to travel further. Also, it is paramount that safety and convenience of routes is prioritised for education trips otherwise a modal shift is unlikely to occur.

Figure 5-9: 1km Walking Distance to the Primary Schools

5.1.2.7 Secondary School Catchment

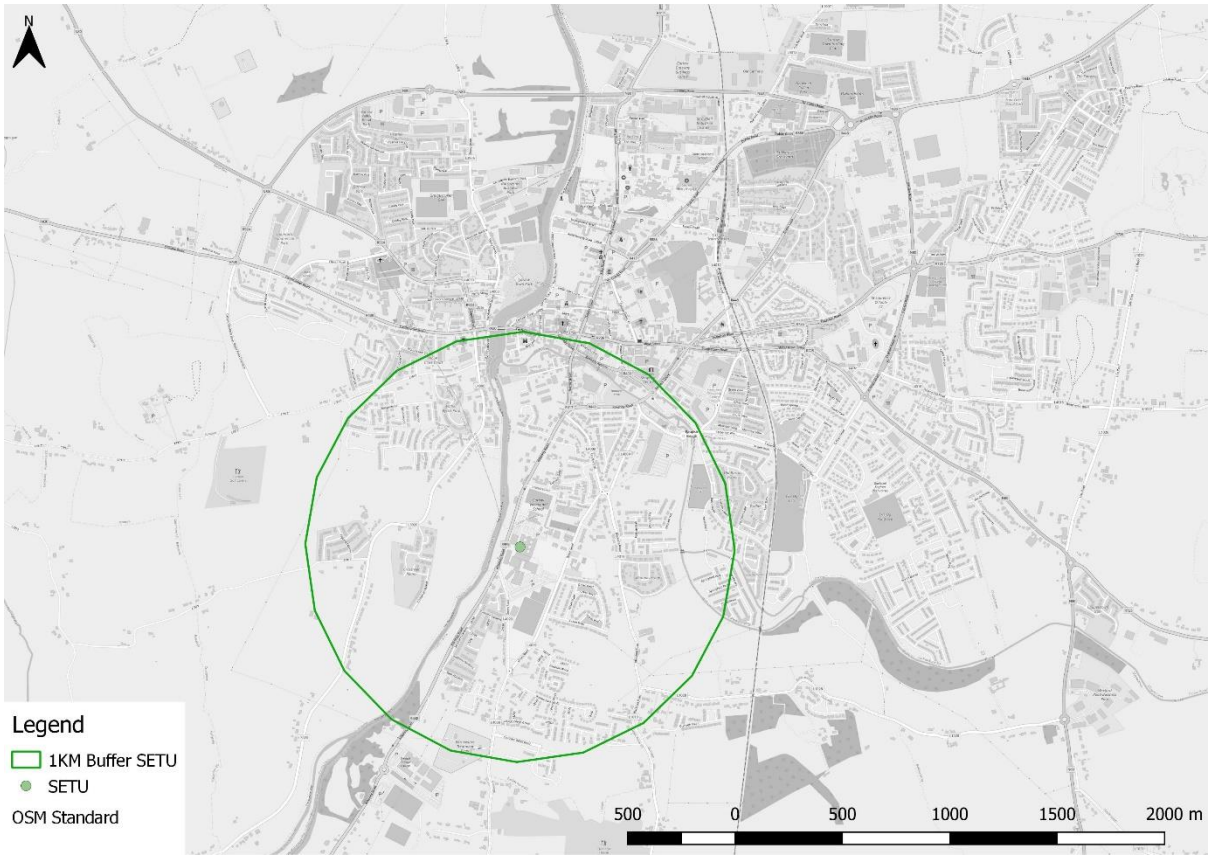
There are a four secondary schools within Carlow Town as well as Tyndall College which lies along Kilkenny Road. **Figure 5-10** shows that the patterns of residential homes falling into the 1km catchment area for secondary schools is similar to those discussed above. Again, homes to the far northeast of Carlow Town and pockets to the east are not within the 1km catchment area. However, additional to this many residential buildings in the south are not within this 1km buffer, meaning that trips from these areas are much less likely to be completed by foot. However, unlike primary schools, it may be much more feasible for children attending these schools to cycle or use public transport to access their school, as they are more independent. Therefore, other sustainable options could be very viable if the correct infrastructure and promotion is provided. Furthermore, the trips to Tyndall College are very likely to be completed using the car, due to few residential areas falling within the 1km walking buffer. Many students attending this school travel from Graiguecullen and are forced to travel to the school via Carlow Town Centre, creating longer trip distances and generating increased pressure on the traffic network in the town. This shows the importance of providing good connections to Tyndall College by road and active travel.

Figure 5-10: 1km Walking Distance to the Secondary Schools

5.1.2.8 University Catchment

The SETU Carlow campus is located to the southwest of the town and is approximately a 15-minute walk from the Carlow County Museum (the centre point selected for mapping purposes). Therefore, this shows good accessibility to the campus from the town centre. Due to the campus lying further outside the town centre, naturally less residential buildings fall within the 1km walking buffer, as shown in **Figure 5-11**. Homes to the southeast of the town centre are within the 1km buffer but the rest fall outside. Students who attend this university may live on, or very close to, campus or in the town centre; they may be able to travel further distances using other sustainable modes. However, like the other educational facilities, it is essential that this campus is served by solid sustainable transport modes to ensure a modal shift is achieved.

Figure 5-11: 1km Walking Distance to SETU



5.1.2.9 Permeability Statistics

The study area encompasses 8,115 residential addresses, 946 commercial addresses and 644 addresses which are categorised within the GeoDirectory database as 'mixed use'. **Table 5-1** provides an overview of the walking catchment for key locations throughout Carlow Town. It provides a count of the number of residential, commercial, and mixed addresses which fall within the catchment of each key amenity. The table also provides a breakdown of the percentage of total addresses in the study area which are within walking distance of each location.

The table highlights that primary schools have the highest percentage of buildings within the 1km catchment. The analysis shows that 93% of Carlow Town buildings are within 1km of a school. This demonstrates that the schools are accessible via sustainable modes either as an end destination or a diversion to facilitate drop off / pick up around other travel patterns. However, children may be allocated a school further away from home and this may prevent on foot trips. Furthermore, 82% of buildings in Carlow Town are within 1km of a supermarket, this demonstrates that in simple terms people could access the supermarket on foot – however, this will be impacted by individuals personal shopping styles, i.e., whether they undertake bulk shopping which may require a vehicle to transport. Opposingly, bus stops, the railway station, and SETU have the least number of nearby buildings falling in the relevant catchments. This is less of an issue for SETU, as it is served by bus routes, is easily accessed from the town, and students may live nearby. But for public transport accessibility it is a more pressing issue as individuals need to be able to easily access public transport services in order to see them as a viable option of travel and be encouraged to use them over the private vehicles. Moreover, only 43% of homes fall within the 1km distance of Carlow Town Centre, meaning people may turn to their car to access the amenities situated in town as demonstrated by the high levels of car use currently. This trend needs to be prevented, through good cycling and public transport links, to reduce the car reliance and usage.

Table 5-1: GeoDirectory Statistics for Building Coverage of Key Services

	Existing Path Network Catchment (Address Points)				% Total Study Area Buildings			
	Residential	Commercial	Mixed Use	Total	Residential	Commercial	Mixed Use	Total
All Buildings	8115	946	644	9705				
Bus Stops – 500m	2132	608	457	3197	26%	64%	71%	33%
Train Station – 1km	2225	703	519	3447	27%	74%	81%	36%
Primary Schools – 1km	7200	897	597	8694	89%	95%	93%	90%
Secondary Schools – 1km	5370	894	581	6845	66%	95%	90%	71%
SETU – 1km	2010	458	456	2924	25%	48%	71%	30%
Town Centre – 1km	3472	680	559	4711	43%	72%	87%	49%
Supermarkets – 1km	6561	822	587	7970	81%	87%	91%	82%

5.1.3 Accessibility to Opportunities and Services (ATOS) Assessment

To supplement the walking catchment analysis described in Section 5.1.2, walking accessibility was also examined using the ATOS tool. This section first introduces the tool and the methodology used for this analysis before presenting the results of the analysis for each type of service.

ATOS (Accessibility to Opportunities and Services) is a tool maintained by the NTA to investigate accessibility to a range of different services and opportunities by active modes including Employment, Primary Education, Post Primary Education, GPs, Food Shopping and Open Spaces. The tool is based on a methodology originally developed by Transport for London (TfL), but some minor adjustments have been made by the NTA to make it more suitable for use outside of large metropolitan areas in Ireland.

The baseline path network shown previously was used for the baseline ATOS assessments. Similar to the standard permeability assessments, the ATOS assessment will be repeated using the proposed future path network following the development of the walking / permeability strategy in order to assess how proposed changes improve accessibility to services from different parts of the study area.

The locations of schools and supermarkets used in the ATOS assessments were the same as those identified for the 1km walking catchment analysis described in the previous section. GP services were identified by the NTA using GeoDirectory (NACE Q86.21); while the locations chosen for the Open Space assessment were also identified by the NTA and were based on the previous Development Plan. The Census Workplace Zones file produced by the CSO provides information on employment.

The spatially defined origin for the application of ATOS is based on a 100m grid. For most service types (excluding employment), the tool calculates the average journey time from the centroid of each grid square (origin) to the nearest (x number of) services within the specified travel time cut-off from the origin. If the specified number of services to be reached is greater than 1, the travel time is the average of the travel times from the origin to the nearest (x number of) services. Scoring for each origin (grid square) is calculated based on how the average travel time for the square compares to the overall average across all squares which are within the cut off time of at least one service, as shown in **Table 5-2**.

When the NTA designed the tool, they decided that although the parameters allow the user to specify that two or more destinations should be located, if a particular origin grid square is within range of at least one service but fewer than the specified number, it is not excluded from the calculations completely. Instead, a negative weighting is applied to the origin's calculated travel times prior to the final comparison with the over-all average and standard deviation. For example, if the selection criteria

are ‘nearest two schools’, but only one school is located within the cut-off time, the deficit is considered to be 50 percent and a corresponding negative weighting of 1.5 is applied to the travel time for that origin grid square.

Table 5-2: ATOS Score Ranges (All Destination Types Excluding Employment)

ATOS Score	Score Range	Map Colour
A	More than one standard deviation below the average	
B	Below the average, but not by more than one standard deviation	
C	Average or above, but not by more than one standard deviation	
D	Between one and two standard deviations above the average	
E	More than two standard deviations above the average	
NULL	More than specified maximum travel time	

The ATOS scoring for access to employment (number of accessible jobs) follows a different methodology to the methodology used for other types of destinations. The main dataset used to assess access to employment is the Workplace Zones (WPZ) file produced by the CSO. This is made up of polygons which contain information on the number of jobs within each WPZ. This allows for the job density of each WPZ to be calculated (Total Jobs/WPZ area in metres). A Network Service Area is then calculated for each origin grid square. For each WPZ accessible from the origin’s service area, the WPZ Accessible Jobs is: Accessible WPZ Area (metres) x WPZ Employment Density. Individual WPZ accessible jobs results are then aggregated to get an overall jobs result for each origin grid quare. The average accessible jobs and standard deviation of accessible jobs across all origin grid squares is calculated. Scoring for each origin (grid square) is then calculated based on **Table 5-3**. Note that this is inverse to the scoring used for other types of destinations, because in this case a higher value is better – i.e., more accessible jobs.

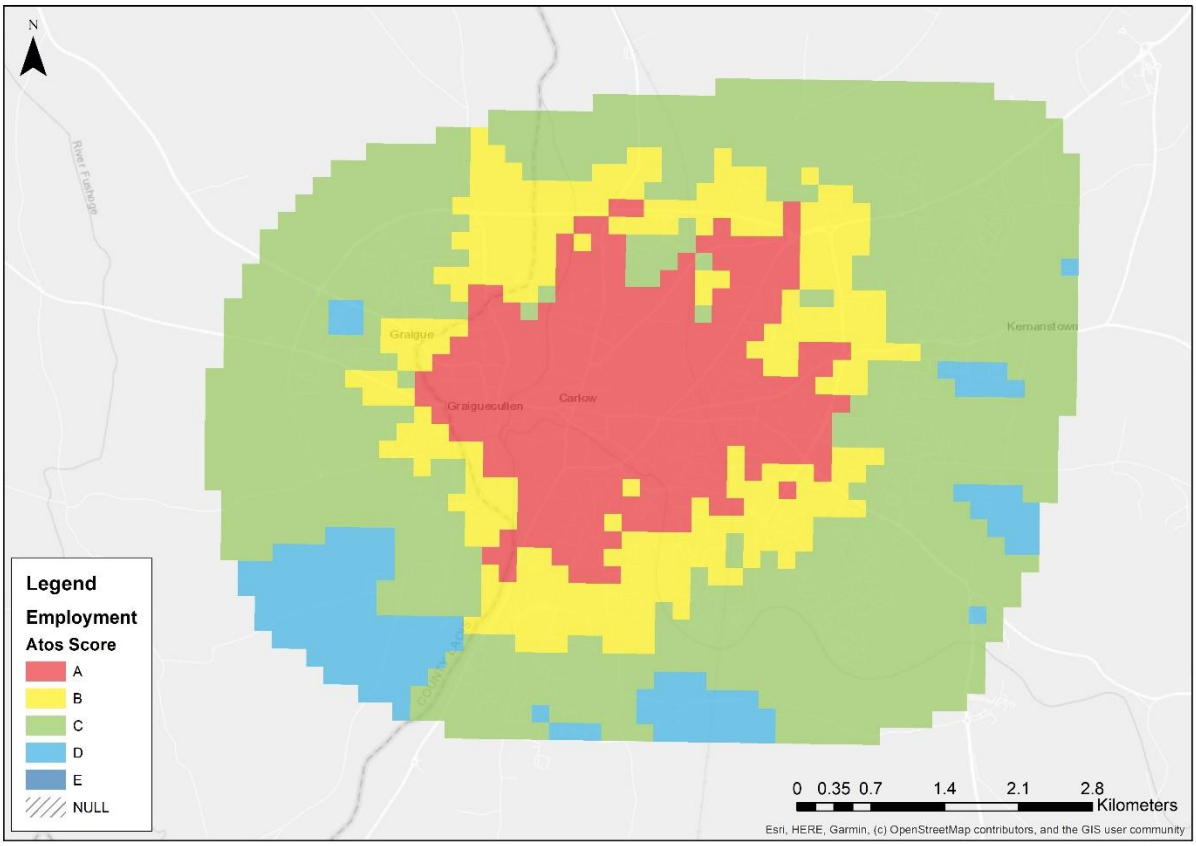
Table 5-3: ATOS Score Ranges (Number of accessible jobs)

ATOS Score	Score Range	Map Colour
A	More than one standard deviation above the average	
B	Above the average, but not by more than one standard deviation	
C	Average or below, but not by more than one standard deviation	
D	Between one and two standard deviations below the average	
E	More than two standard deviations below the average	

5.1.3.1 ATOS Assessment – Employment

Figure 5-12 shows the results of the ATOS analysis for walking accessibility to employment. As would be expected, areas closer to, and with direct routes to, the town centre, SETU, and out-of-town retail and business parks (where key employment sites are located) score well for walking accessibility to employment. Areas further out of the town centre, towards the suburban and rural areas of the ABTA study area, are shown to have lower employment accessibility through walking, however, in most cases this is still above average just not to the same degree. Overall, this demonstrates a good accessibility to employment through walking and demonstrates the potential of encouraging increased active travel, and a modal-shift, for commuting trips.

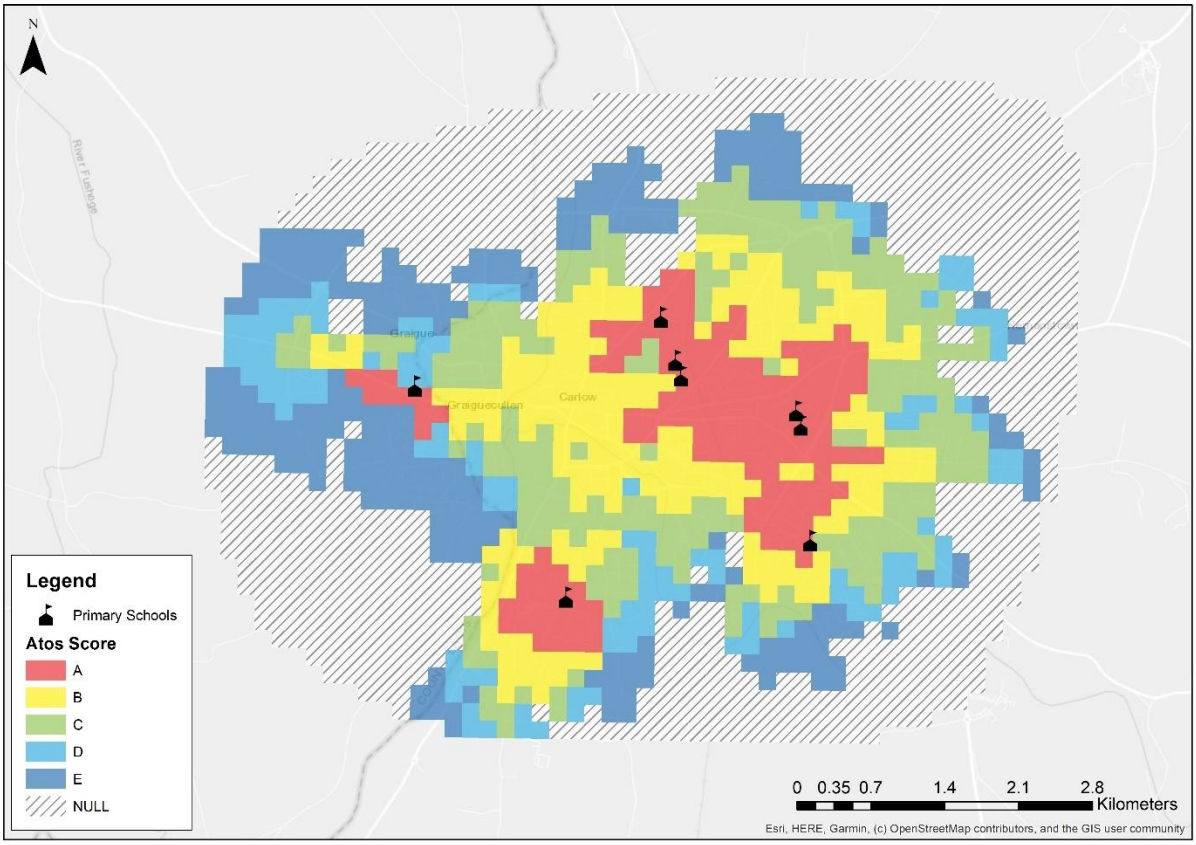
Figure 5-12: ATOS Analysis of Walking Accessibility to Employment



5.1.3.2 ATOS Assessment – Primary Schools

Figure 5-13 shows the results of the ATOS analysis for walking accessibility to primary schools in the Carlow Graiguecullen ABTA study area. The tool was set to search for the two nearest primary schools to each grid square (within a twenty-minute walking distance). Approximately 34% of the grid squares contained with the Carlow Graiguecullen ABTA study area have two primary schools within a twenty-minute walk. If the criteria were lowered to one school within a twenty-minute walk, then nearly 60% of the grid squares within the study area would be within a twenty-minute walk of a primary school. Many of these grid squares are located very close to the primary schools within the study area. In most cases the areas within poorer accessibility to primary schools are located further away from the primary schools themselves and are closer to the outskirts of Carlow and the study area.

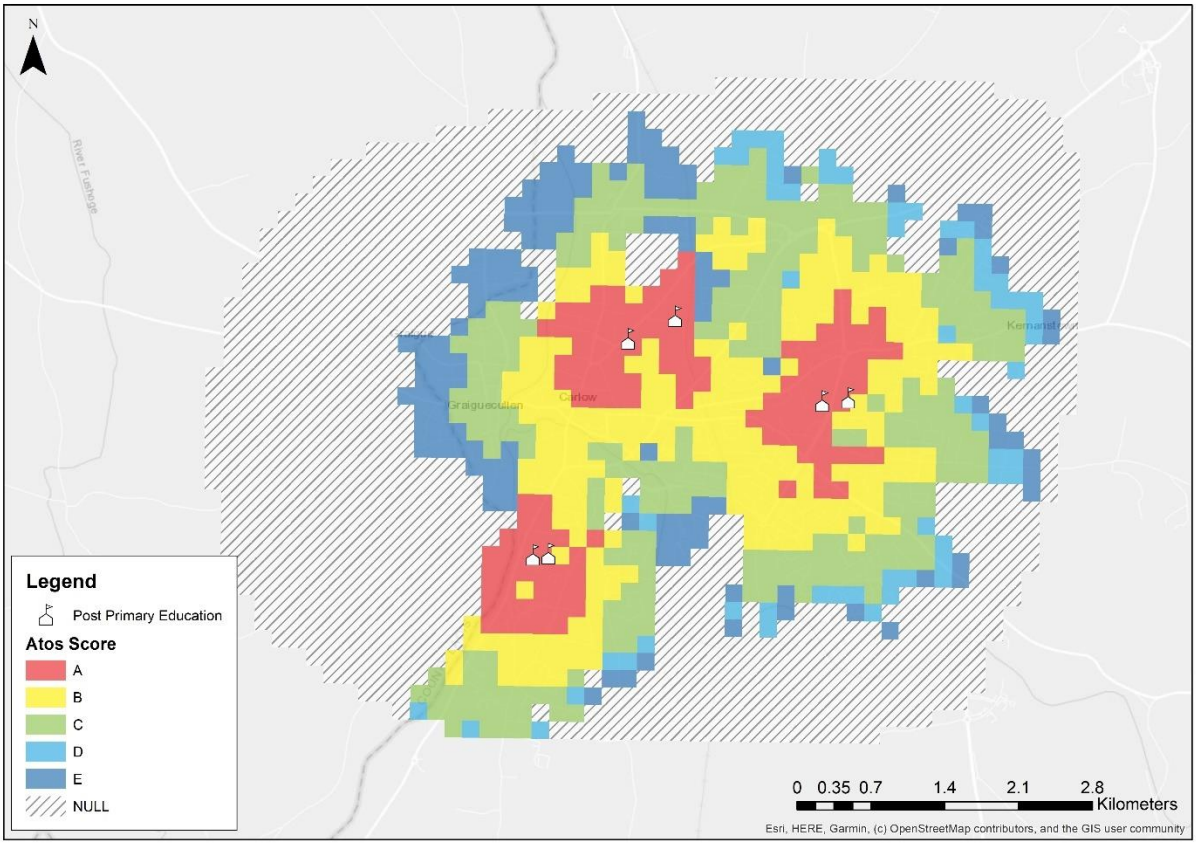
Figure 5-13: ATOS Analysis of Walking Accessibility to Primary School



5.1.3.3 ATOS Assessment – Post-Primary Education

Figure 5-14 shows the results of the ATOS analysis for walking accessibility to post-primary education. The tool again was set to search for the two nearest post-primary education to each grid square (within a twenty-minute walking distance). Approximately 42% of all grid squares have access to two post-primary education sites within a twenty-minute walk. This is likely due to the location of post-primary education within the study area, which are located just outside the town centre, along the N80 and near Kilkenny Road. Overall, the data shows that many who live in the area could access post-primary education on foot and could use walking more frequently for travel. However, a large proportion of the population (nearly half) have no post-primary education within a twenty-minute walk, therefore, without permeability improvements to shorten trip distances then a modal-shift towards walking is unlikely to occur. Similar to the primary analysis above, the areas with lower walking accessibility to post-primary education are located further out of the town centre and closer to the study area edges.

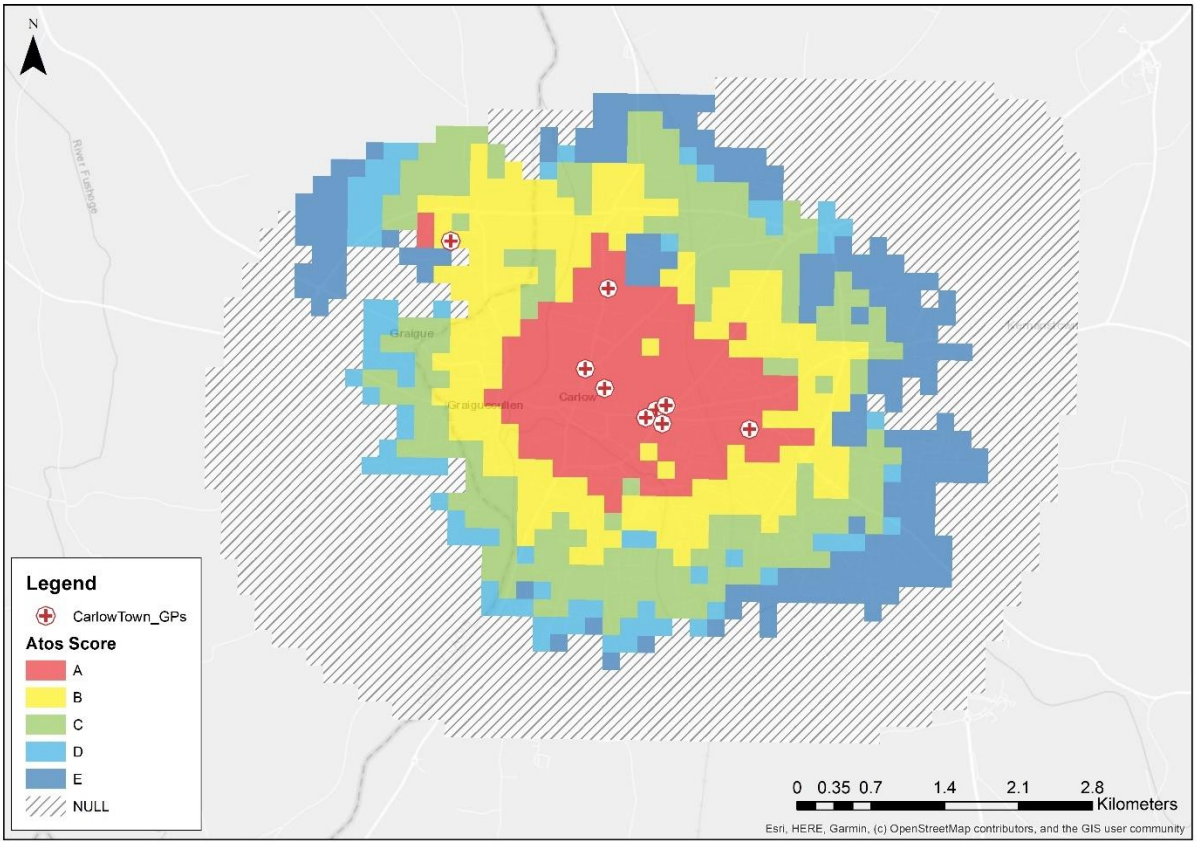
Figure 5-14: ATOS Analysis of Walking Accessibility to Post-Primary Education



5.1.3.4 ATOS Assessment – GP Services

Figure 5-15 shows the results of the ATOS analysis for walking accessibility to GP services in the Carlow Graiguecullen ABTA study area. The tool was set to search for the nearest two GP services to each grid square (within a twenty-minute walking distance). The map highlights that there are GP services scattered around the area within or close to the town centre, with the exception of one located in the northwest of Graiguecullen. In particular, there is a higher density of GP services near to Tullow Street / Barrack Street. Due to the central location of these services, 48% of grid squares are not within reach of any GP services within a twenty-minute walk. Locations with poorer walking accessibility to GP services are towards the northern and eastern sections of Carlow, further out from the centre – this could be a key issue given how many residential areas are situated to the east. Although, there are areas within closer walking proximity of GP services, just under 40% of grid squares are within a twenty-minute walk of two GP services. This shows that travel from these areas to GP services is short and manageable on foot. These locations, with higher accessibility, are within the town centre or the nearby surrounding areas.

Figure 5-15: ATOS Analysis of Walking Accessibility to GPs

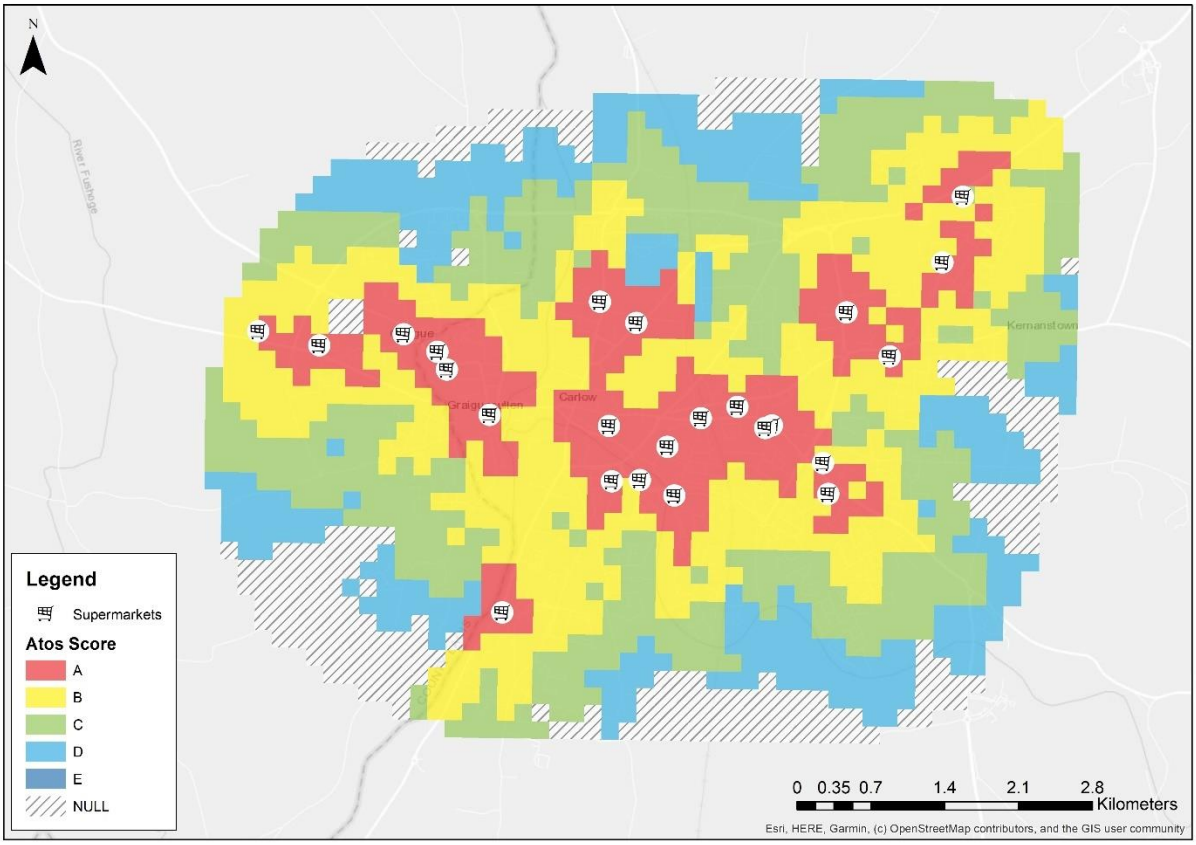


5.1.3.5 ATOS Assessment – Supermarkets

5.2

Figure 5-16 shows the results of the ATOS analysis for walking accessibility to supermarkets in the Carlow Graiguecullen ABTA study area. In contrast to the assessments outlined above, the tool was set to search for only the nearest supermarket to each grid square. The map shows that supermarkets are evenly spread across the Carlow area, with most residential areas being relatively close to a supermarket. This is supported by the ATOS results, over 88% of grid squares are within a twenty-minute walk of at least one supermarket. There are pockets of lower walking accessibility to supermarkets in northern and more rural sections of the Carlow Graiguecullen study area, however, generally walking access to these shops is good from most areas of Carlow and an uptake in walking for these trips could be promoted.

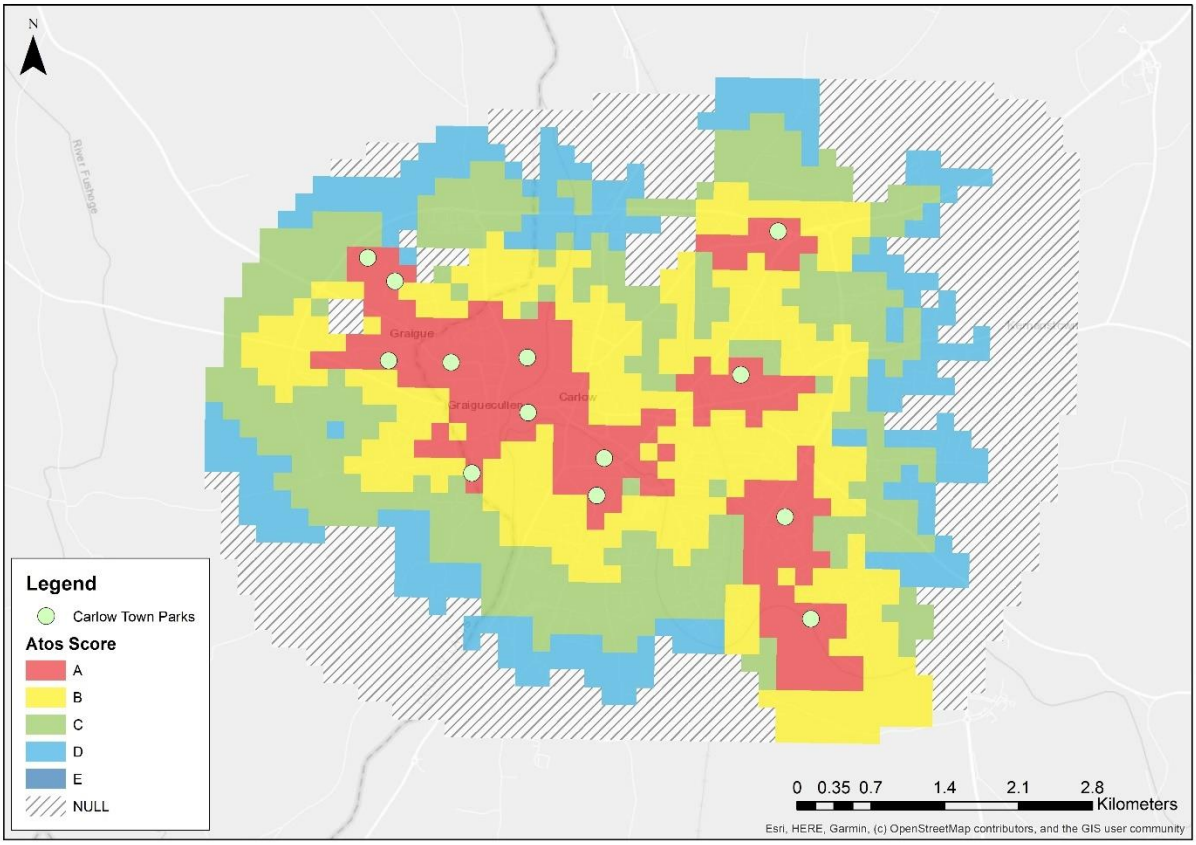
Figure 5-16: ATOS Analysis of Walking Accessibility to Supermarkets



5.2.1.1 ATOS Assessment – Parks and Open Spaces

Figure 5-17 shows the results of the ATOS analysis for walking accessibility to parks and open spaces in the Carlow Graiguecullen ABTA study area. Similar to supermarkets, and unlike other assessments, the ATOS tool was set to search for only one park or open space within a twenty-minute walk. The entranceway or middle point of the park or open space has been used as the measure point for this service. Roughly 70% of all grid squares have access to at least one park or open space within twenty-minutes of walking. This means that just 30% of grid squares are over a twenty-minute walk to a park or open space. The majority of these areas are either areas with little development or dense housing estates.

Figure 5-17: ATOS Analysis of Walking Accessibility to Parks and Open Spaces



5.3 Public Transport

5.3.1 Carlow Bus Services

5.4 The Carlow Graiguecullen ABTA study area is served by a number of bus services which offer connections within Carlow as well as to nearby towns and urban areas**. Figure 5-18** provides an overview of the routes which pass through Carlow Town, with The frequency of these services is outlined in the following table.

Table 5-4 below showing the bus service and timings. **Figure 5-19** provides the bus routing within Carlow Town for each of the services presented in the table. It should be noted there are some local link services, which are demand responsive services and usually run only one day a week, and therefore these are excluded from this mapping.

Figure 5-18: Bus Routes Origination/Passing Carlow Graiguecullen Study Area

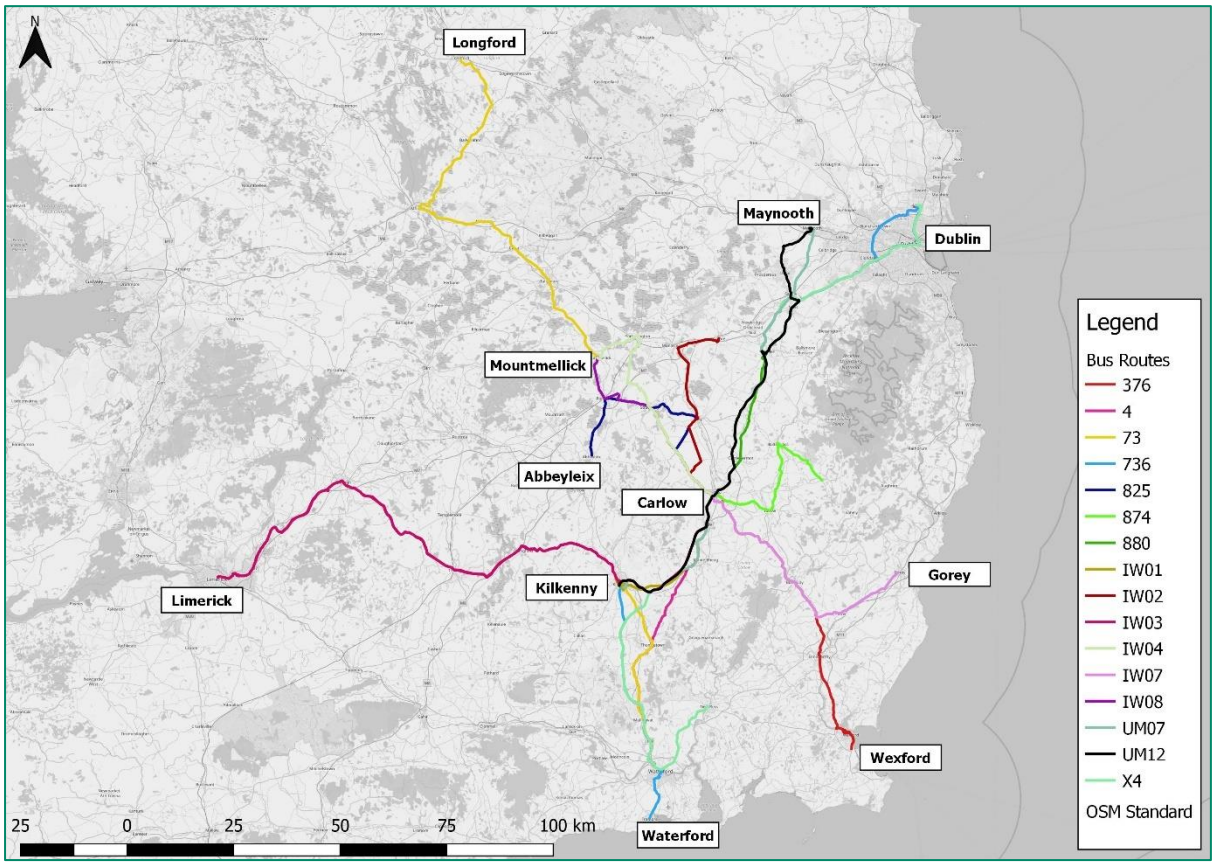


Figure 5-19: Bus Routes in Carlow Graiguecullen Study Area

The frequency of these services is outlined in the following table.

Table 5-4: Bus Services and Timings

Provider	Bus Service	Origin	Destination	Total Daily Services (operating to or via Carlow)	Days of Week
Brendan Dunne	IW01	Kilkenny	SETU Carlow	1	Monday – Friday
	IW07	Gorey	Carlow	1	Monday – Friday
Brian Callinan	UM07	Kilkenny	Maynooth University	1	Friday and Sunday
Bus Eireann	4 / X4	Dublin Airport	Waterford	12	Monday – Friday
	73	Waterford	Athlone	2	Monday – Saturday
	73	Waterford	Athlone	1	Sunday
PJ Martleys	IW08	Mountmellick	Carlow	3	Monday – Friday
Kenneallys	NG03	Galway	SETU Carlow	1	Friday and Sunday
	IW03	Limerick	SETU Carlow	1	Friday and Sunday
	UM12	Kilkenny	Maynooth University	2	Monday – Friday
	736	Dublin	Tramore	14	Monday – Friday
	736	Dublin	Tramore	13	Saturday and Sunday
JJ Kavanagh]98I	874	Hackettstown	Carlow	2	Monday – Friday
	825	Abbeyleix	Carlow	2	Monday – Friday
	IW04	Mountmellick	SETU Carlow	1	Monday – Friday
	IW02	Curagh	SETU Carlow	1	Monday – Friday
Wexford Bus	376	Wexford	Kilkenny	3	Monday – Saturday
	376	Wexford	Kilkenny	2	Sunday
Local Link	880	Carlow	Naas	3	Monday – Friday

5.4.1 Local Link Services

In addition to the more frequent services, there are also local link services that serve Carlow Town. These have been excluded from mapping and the table above due to the infrequency of the services and also, in most cases, the demand responsive nature. Demand responsive services are only run when demand is guaranteed, therefore, individuals are required to book in advance when they wish to travel on these services. There are six local link services, with each service calling at Fairgreen Shopping Centre. The services are listed below:

- 400 – Hackettstown to Carlow, this service runs on a Wednesday. The bus departs Hackettstown at 11:00am and begins its return from Carlow at 16:00. This is a demand responsive service.
- 473 – Graiguecullen to Carlow, this service runs on a Thursday and Friday morning. The bus departs Graiguecullen at 11:00 and begins its return from Carlow at 14:00. This is a demand responsive service.
- 469 – Graiguecullen to Carlow, this service runs on a Thursday evening. The bus departs Graiguecullen at 19:00 and begins its return journey from Carlow at 21:30. This is not demand responsive.
- 481 – Carlow South to Carlow Town, this service runs on a Monday and Wednesday. The bus departs Carlow South (Graiguenamanagh) at 09:00 and begins the return from Carlow at 13:30. This is a demand responsive service.
- 484 – Bunclody to Tullow and Carlow, this service runs Thursday and Friday. The bus leaves Bunclody at 08:30 and begins its return journey from Carlow at 14:30. This is a demand responsive service.
- 487 – Bilboa to Carlow, this service runs on a Monday. It leaves Killeshin at 11:15 and begins its return from Carlow at 15:30. This is a demand responsive service.

The ticketing for these services works on a flat fare rate, meaning the same rate is paid regardless of trip length. This often makes travelling more convenient and attractive. Adult single trip is 3 euros and an Under 16 single trip is 2 euros, additionally children under the age of 5 can travel for free.

5.4.2 Rail Services

Carlow railway station is located approximately 1km to the northeast of the town centre and sits on the Dublin to Waterford line. At the station there are two platforms, one serving the Dublin Heuston Station route and the other, Plunket Station Waterford. There are 190 car parking spaces and sheltered bicycle parking, as well as 5 bicycle lockers for rent. **Table 5-5** summarises the departures from Carlow Station, with just departure times noted as often arrival times are the same or only a few minutes earlier.

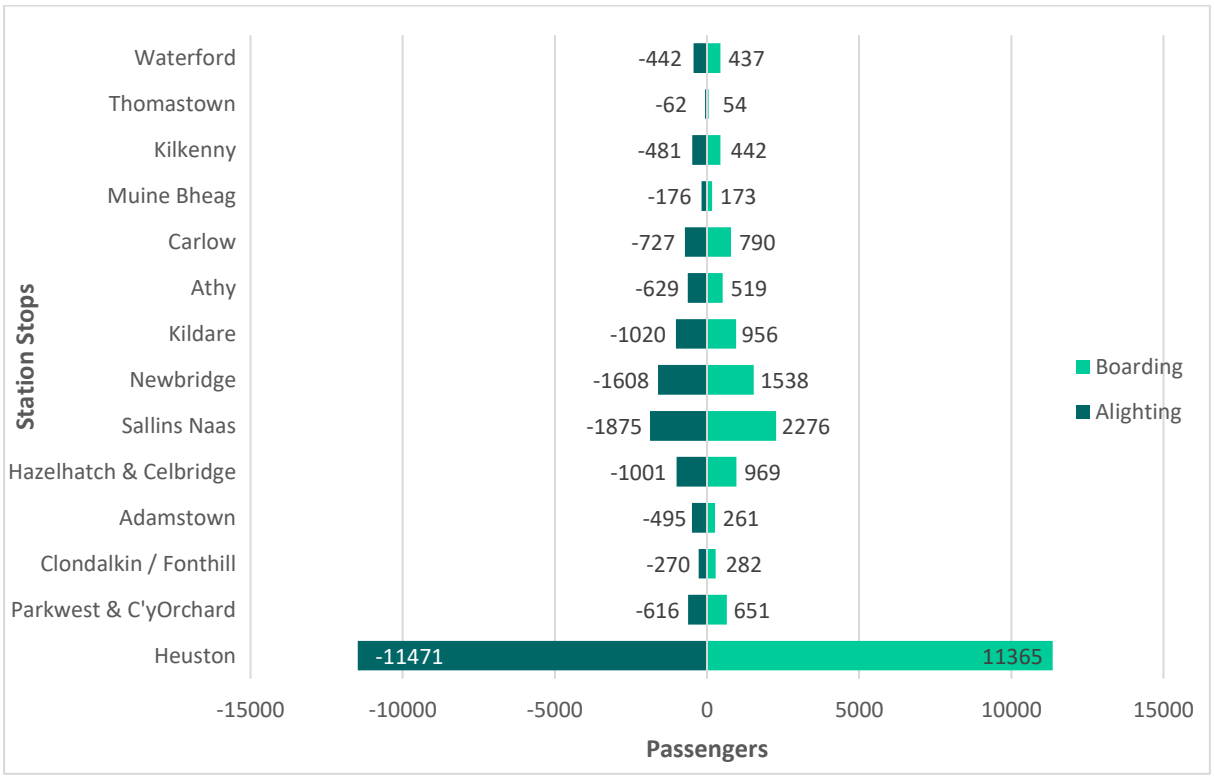
Table 5-5: Carlow Departures

Dublin – Waterford (Monday – Saturday)	Dublin – Waterford (Sunday)	Waterford – Dublin (Monday – Saturday)	Waterford – Dublin (Sunday)
08:22	10:14	06:30 (Weekdays only and starting stop is Carlow not Waterford)	10:15
11:11	15:11	07:03	13:48
14:12	18:46	07:55	16:18
16:10	19:42	08:58	19:15
17:25 (Friday only)		12:11	
17:53		14:12	
18:38		16:10	
19:42		17:00 (Friday and Saturday only and starting stop is Carlow not Waterford)	
		19:43	
		21:36 (Weekdays only and starting stop is Carlow not Waterford)	

Source: Irish Rail Online Timetables

Figure 5-20 shows the boarding and alighting profile along the Dublin – Waterford Line, based on data provided in the 2019 Heavy Rail Census. The data shows that Carlow has 790 daily boardings, compared with an average number of daily boardings along the line, excluding Heuston station, of 719 a day. This means that the number of passengers boarding daily at Carlow is just above the average for this line. Carlow Station ranks 5th overall in terms of the number of daily boardings and alighting's along the Dublin – Waterford Line (excluding Heuston).

Figure 5-20: Boarding and Alighting Profile along the Dublin Heuston – Waterford Line (2019)

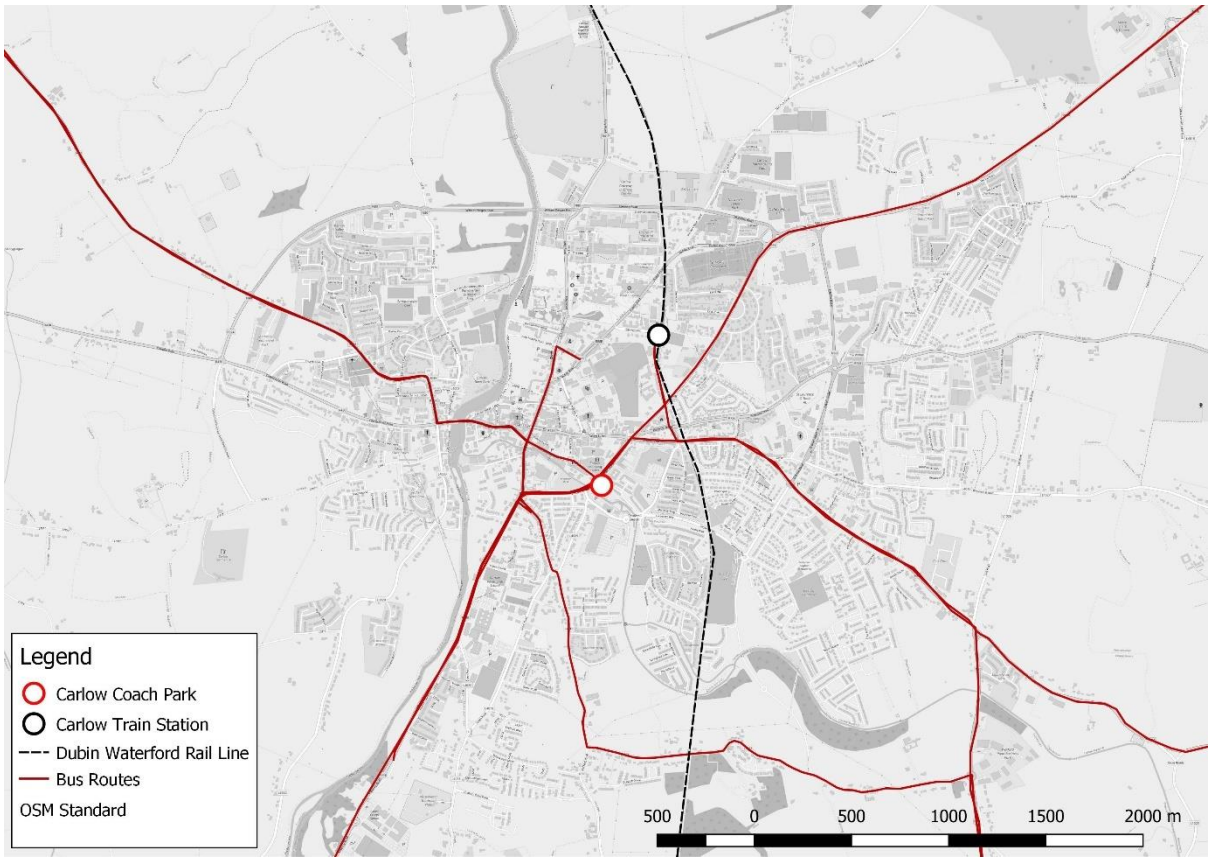


Source: Heavy Rail Census 2019

5.4.3 Existing Carlow Public Transport Network

As described above, Carlow town is served by both bus and rail services, with a summary of all routes shown in **Figure 5-21** below. While Carlow and Graiguecullen are well connected in terms of routes to neighbouring settlements, the frequency of connections could be improved, and there is potential to improve bus access along the local routes around the town.

Figure 5-21: Public Transport Network



5.4.4 Public Transport Capacity

A capacity analysis of public transport in Carlow Town has been undertaken which allows for comparisons between the existing public transport capacity and the desired capacity in the future. Operational capacity has been calculated based on the number of existing services multiplied by the capacity of the vehicle used to provide that service. Assumptions of the analysis are listed below in the relevant tables.

5.4.4.1 Existing Bus and Rail Capacity

Table 5-6 shows the existing capacity of inbound bus services to or through the study area. The service with the largest operational capacity is the 736, followed by the 4/X4. This demonstrates services running from, though, or to Dublin are more frequently provided.

Table 5-6: Bus Capacity

Service	Origin	Destination	No. Daily Services	Day of Week	Assumed Vehicle Capacity	Daily Operational Capacity
IW01	Kilkenny	SETU Carlow	1	Monday – Friday	55	55
IW07	Gorey	Carlow	1	Monday – Friday	55	55
UM07	Kilkenny	Maynooth University	1	Friday and Sunday	55	55
4 / X4	Dublin Airport	Waterford	12	Monday – Friday	55	660
73	Waterford	Athlone	2	Monday – Saturday	55	110
73	Waterford	Athlone	1	Sunday	55	55
IW08	Mountmellick	Carlow	3	Monday – Friday	55	165
NG03	Galway	SETU Carlow	1	Friday and Sunday	55	55
IW03	Limerick	SETU Carlow	1	Friday and Sunday	55	55
UM12	Kilkenny	Maynooth University	2	Monday – Friday	55	110
736	Dublin	Tramore	14	Monday – Friday	55	770
736	Dublin	Tramore	13	Saturday and Sunday	55	715
874	Hackettstown	Carlow	2	Monday – Friday	55	110
825	Abbeyleix	Carlow	2	Monday – Friday	55	110
873	Carlow	Kilkenny	2	Monday – Friday	55	110
IW04	Mountmellick	SETU Carlow	1	Monday – Friday	55	55
IW02	Curagh	SETU Carlow	1	Monday – Friday	55	55
376	Wexford	Kilkenny	3	Monday – Saturday	55	165
376	Wexford	Kilkenny	2	Sunday	55	110

Existing Bus Capacity Assumptions:

- Excludes local link services and university coach services, focused on commuter services
- It is assumed all services use coaches
- Based on 2019 GTFS data

Table 5-7 and **Table 5-8** provide the existing maximum operational capacity of the rail services for inbound and outbound services respectively passing through Carlow. The total operational capacity of inbound services is 2,128 and 2,736 for outbound services.

Table 5-7: Existing Inbound Train Capacity (Mon-Thurs)

Set Size	Origin	Destination	No. of Services	Total Maximum Seated capacity	Operational Capacity
InterCity Railcar 22000 Class	Dublin Heuston	Waterford	7	304	2128
		Total Capacity			**2128**

Table 5-8: Existing Outbound Train Capacity (Mon-Thurs)

Set Size	Origin	Destination	No. of Services	Total Maximum Seated capacity	Operational Capacity
InterCity Railcar 22000 Class	Waterford	Dublin Heuston	9	304	2736
		Total Capacity			**2736**

Existing Train Capacity Assumptions:

- Train capacity is based on seated passengers.
- Train capacity can differ depending on whether the train is 3, 4, or 5 cars in length. Therefore, a maximum operational capacity has been provided.

5.4.5 Public Transport Accessibility Analysis

This section explores local public transport accessibility through the study of PTALs (Public Transport Accessibility Levels) as well as region public transport accessibility through the study of POWSCAR trip distribution.

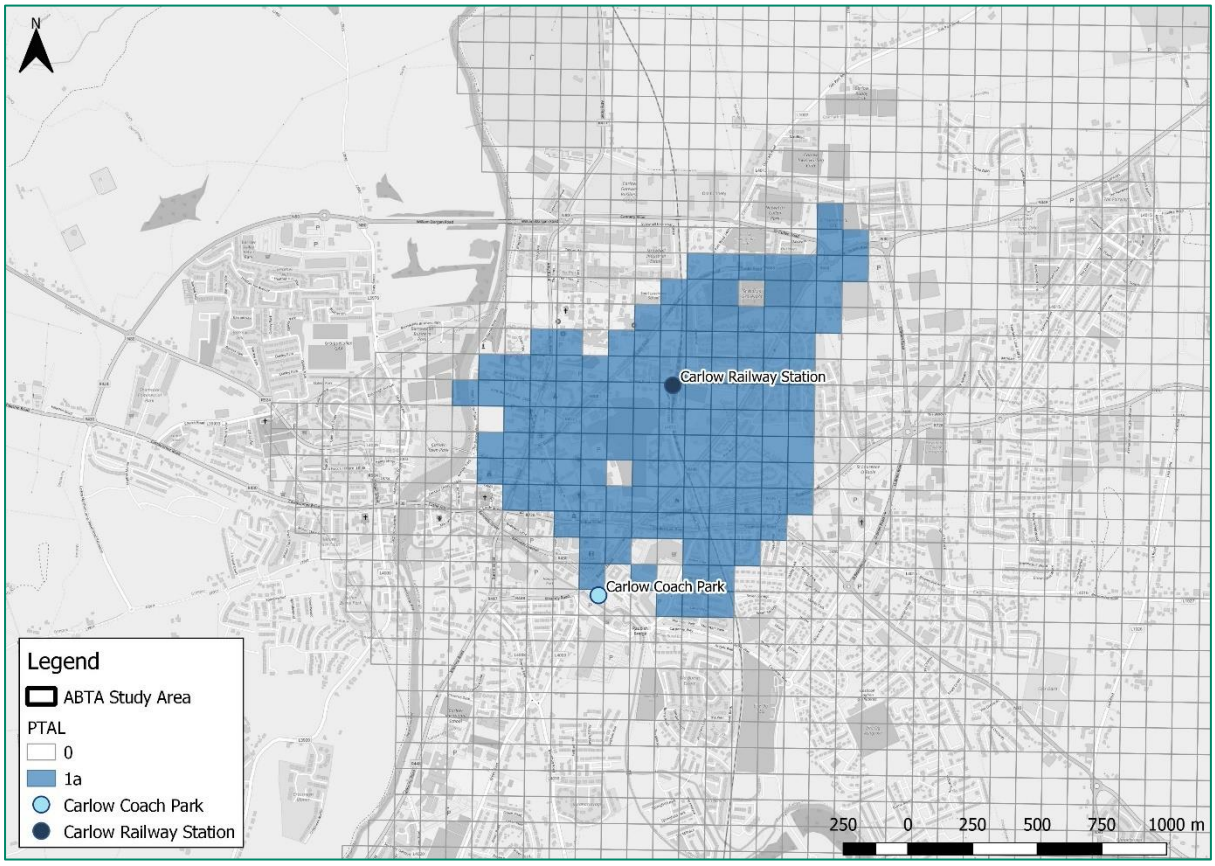
5.4.5.1 Public Transport Accessibility Levels (PTALs)

PTAL is a measure of the density of the public transport network. The analysis area is divided into a 100m grid, and each square receives a score. An accessibility index is calculated for each public transport stop and route at the stop. The index consists of the walk time to the public transport stop, service frequency and the average wait time at the stop. It also includes a reliability factor, which is different for rail and bus. The values of each stop and route in a square are summed and translated to a standardised score; the lowest score represents the worst and the highest score the best.

For Carlow, the highest PTAL scores are 1a. Squares which score a 1a are located in a small section of the study area. Areas such as along Dublin Street, Dublin Road, and Green Lane are considered to score 1a alongside parts of Tullow Street, Athy Road, Pollerton Road, and some south eastern parts of the town centre. These areas are likely to score a 1a due to their proximity to bus stops and the rail station, although higher scores are likely not achieved due to low service frequency and therefore high wait times.

The image clearly depicts a large area of the study area scores 0, the lowest possible score. This is probably caused by the fact that the rail station is not accessible to many on foot, bus stops are uncommon, and services are infrequent. Overall, there is a clear need to allow people easier access to public transport stops/stations as well as make other improvements to improve the public transport accessibility levels for the study area.

Figure 5-22: Carlow Graiguecullen PTAL Assessment



5.5 Road Network

5.5.1 Overview of Town Road Network

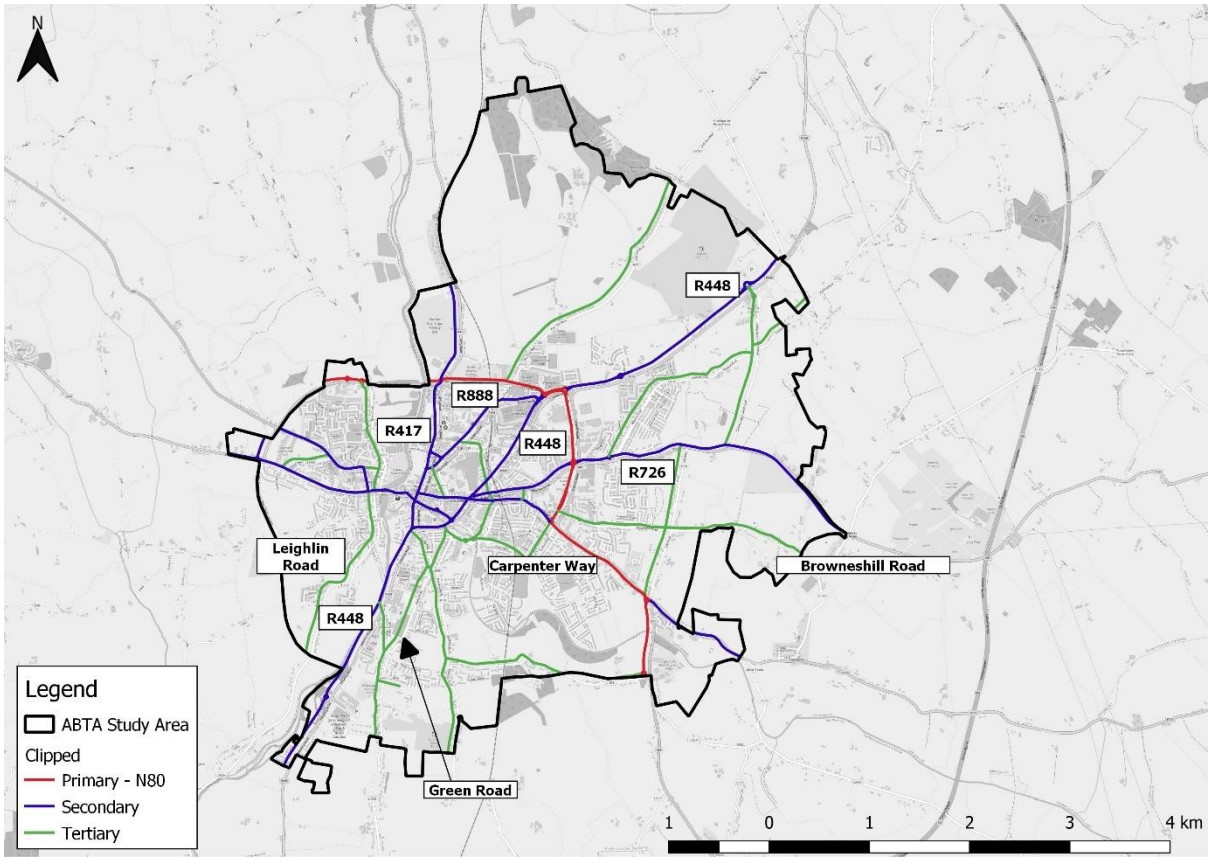
Figure 5-23 below shows the road network across the study area.

The N80 runs through the northern and eastern parts of the town. The N80 is a National Secondary Road that runs south-eastwards from its junction with N52 and R442 in Tullamore, in County Offaly, to the N30 junction just north of Enniscorthy in County Wexford. The N80 is around 71 miles long and usually is a two-lane road without hard shoulders, however, its characteristics changes throughout the route as it passes through busier and more rural areas. In Carlow, it is a single carriageway road, with wide footpaths either side, as well as cycle lanes or shared space along the majority of the route.

Additionally, the M9 motorway passes through Carlow just east of the town. The M9 is a motorway linking from near Kilcullen to Waterford, and the motorway section near to Carlow Town is the Carlow Bypass. Prior to the creation of the Carlow Bypass, opened in 2008, the N9 use to pass directly through the town centre.

There are regional roads which pass through Carlow town; these are: the R430 which links Carlow and Mountrath, R417 linking County Kildare and Carlow and R726 linking Rathvilly and Carlow. The R448 linking County Kildare with Waterford passes directly through the centre of Carlow from the north to the south; this route used to be the old national route 6. Regional roads are not classed as primary or secondary roads but still form an important link in the national route network. They are maintained by the local county or city authority and often have a speed limit of 80kph; but this does change in towns and residential areas. There are other smaller roads which are individually named, not making up part of the larger network, but acting as linkages in and about the town centre.

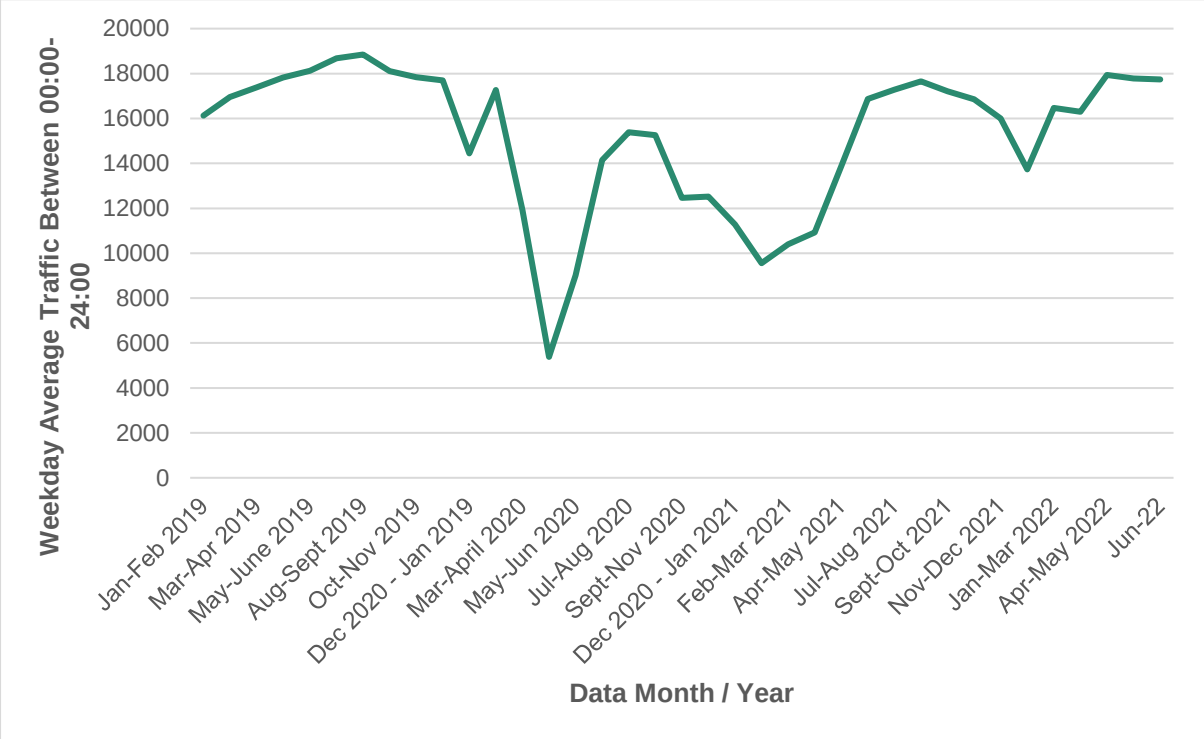
Figure 5-23: Carlow Graiguecullen Study Area Road Network



5.5.2 M9 Traffic Growth (motorway)

The Average Daily Traffic (ADT) from 2019 to 2022 is presented in **Figure 5-24,** which uses data taken from the TII permanent traffic counter located on the M9 Carlow Bypass between Junction 5 and Junction 6 (TMU M9 049.0 N). The data shown in the graph is the weekday average traffic for all days between January 2019 up until 29th June 2022. When the first month of data, which covers January and February 2019, is compared to the last month of data, covering June 2022, it is shown there is a 10% increase in traffic. However, the traffic flow growth has not been consistent, for example it peaked in August/September 2019 and then fell sharply during the COVID-19 restrictions.

Figure 5-24: M9 Daily Traffic Growth



However, this dataset only provides data for the last three years, limiting the scope to create a longer profile view of traffic growth in the area. Therefore, further NTA data which has traffic counts dating back to 2000 have been analysed in **Figure 5-25.** The data covering the longest timeframe used in the analysis has come from a traffic counter on the N80 in Carlow. In this dataset data is provided for the average daily volumes, broken down by month, for 2000 through to 2012. The graph demonstrates the yearly average of traffic volumes, produced by finding the average of the monthly average daily traffic volumes.

This demonstrates that year-by-year traffic volumes along the corridor are increasing, up until around 2008 after which the traffic volumes plateau and continues to experience less significant fluctuations in traffic volumes.

Figure 5-25: N80 Daily Traffic Growth

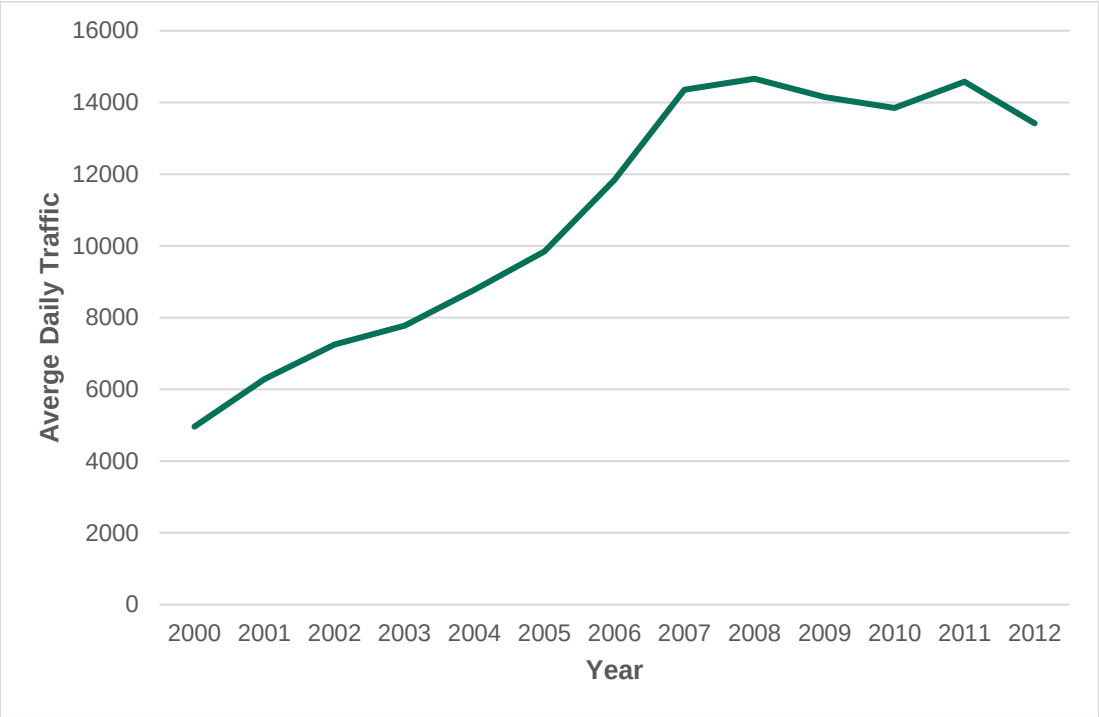
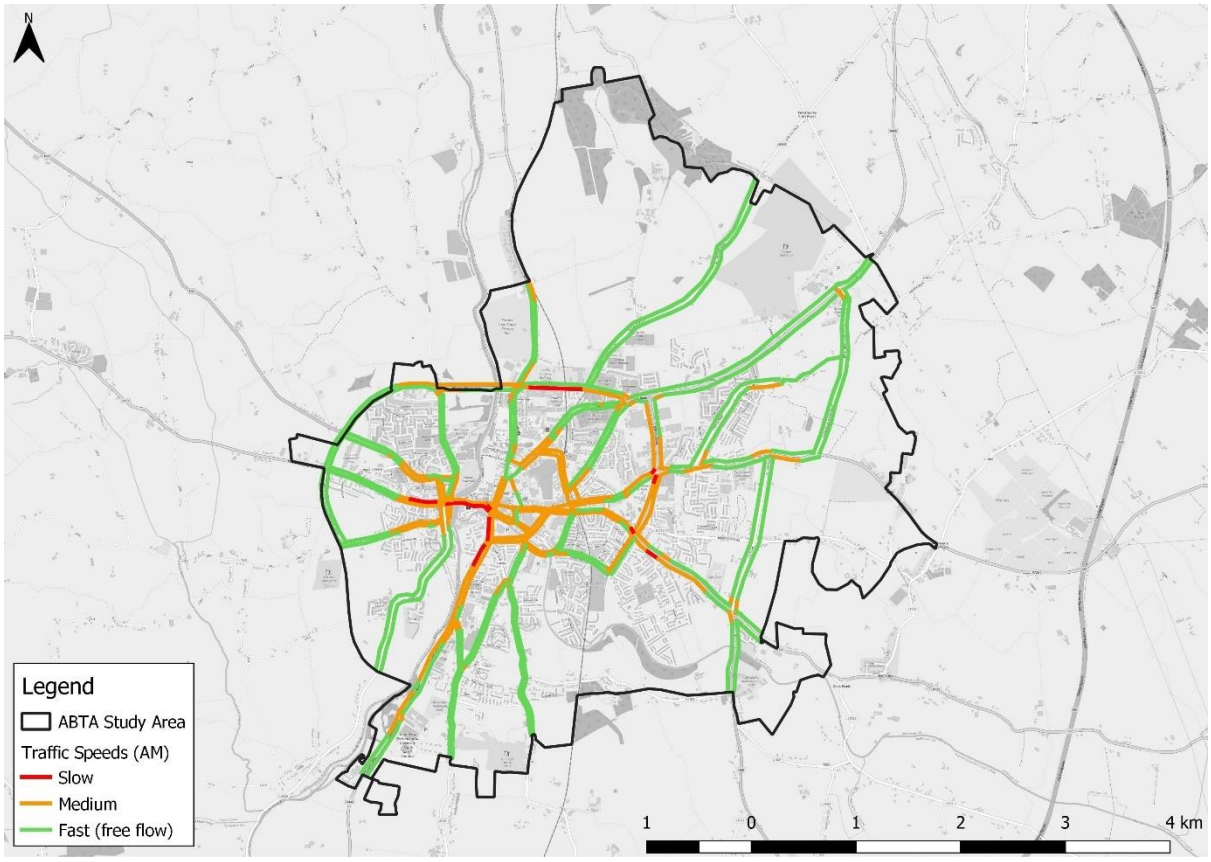


Figure 5-26 and **Figure 5-27** represent traffic congestion in the study area based on average speeds taken from Google. The times and weekdays chosen for the images were based on showing the worst-case scenario. Therefore, the AM peak is represented by 09:00 Wednesday and the PM peak represented by the 17:00 Thursday.

The images demonstrate that at 09:00 there is slower moving traffic in large sections of the town centre core, represented by the amber colouring. Slow moving traffic, which is suggestive of higher traffic volumes and potentially congestion, is seen on many key roads in Carlow, this includes Kilkenny Road, N80, particularly to the east, and Graiguecullen Bridge. The large areas of slow-moving traffic in the town centre core are likely to be caused by people commuting to workplaces and educational facilities, however, could also be caused by people wanting to access other amenities situated in this area.

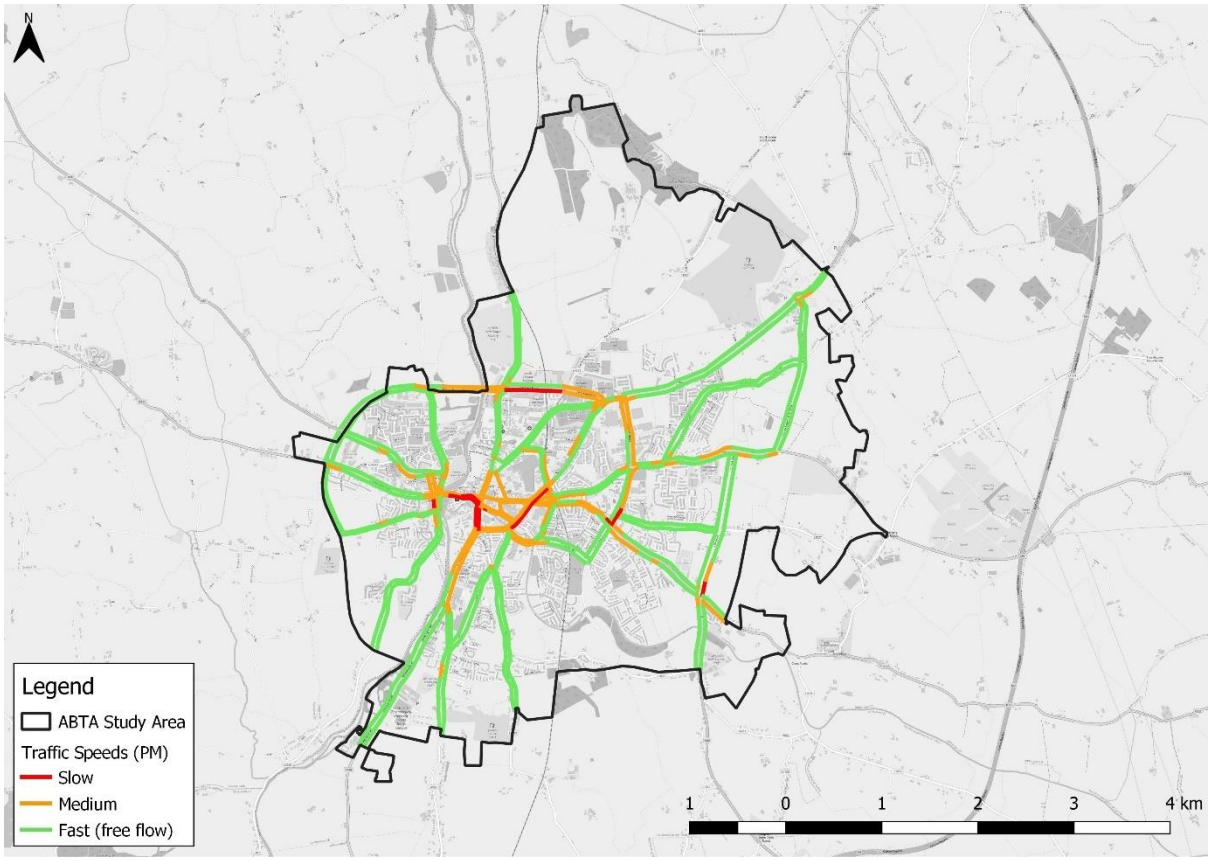
Congestion patterns are similar across both peak periods, with overlap of key pinch points. As with the AM peak, there is a lot of slow-moving traffic in the town centre, with some sections of Barrack Street and Burrin Street been coloured red showing that traffic is barely moving. The areas of very slow-moving traffic can be seen to be stretching over the bridge into Graiguecullen, with the physical constraints imposed by the bridge creating a barrier to free-flowing movement as all vehicles have to be funnelled through a single point. Contrastingly to the AM, there is better flow of traffic along Kilkenny Road and St. Joseph's Road in the PM, which could suggest the educational facilities in these locations are added to the traffic volumes in the morning.

Figure 5-26: AM Congestion (0900 Wednesday)



Source: Google Maps

Figure 5-27: PM congestion (1700 Wednesday)



Source: Google Map

5.5.3 Road Collisions

The Road Safety Authority (RSA) database of collisions in County Carlow and other nearby counties is presented below. **Table 5-9** sets out the number of persons killed, and persons injured between 2015 and 2019. Carlow has the lowest number of fatalities and persons injured during this period. Overall, there is progressive decline in numbers killed within Carlow from 4 in 2015 to 2 in 2019, and the same for number of people injured in accidents down from 95 in 2015 to 56 in 2018. Overall, within the south-east region, it is reasonable to assume that based on the casualty figures available road safety in Carlow County has improved over the years.

Table 5-9: Number of Persons Killed and Injured in Carlow and Comparative Counties (2015 – 2019)

County	Persons Killed					Persons Injured			
	2015	2016	2017	2018	2019	2015	2016	2017	2018
Carlow	4	0	3	2	2	95	86	76	56
Kildare	9	7	6	4	4	343	387	338	396
Kilkenny	2	6	4	2	6	166	169	136	122
Laois	4	3	2	5	1	96	106	172	159
Wexford	7	4	7	3	7	234	217	231	235
Wicklow	8	2	2	5	3	191	179	210	159

Source: Road Safety Authority (RSA)

Figure 5-28 below shows the location of serious and minor collisions in Carlow Town itself, between 2012 and 2016. This data period has been used as it is the most recent five years of full data available at the time of writing this report.

The mapping demonstrates that in Carlow Town, the majority of accidents were minor, with only nine accidents in these five years been classified as serious. Of these nine serious accidents, three occurred along the N80. Analysing accident locations, it is clear that during the five years, junctions such as N80/R726, N80/R417, and along Castle Hill (bridge crossing between Carlow and Graiguecullen) and the R726, were collision hotspots. Additionally, there were a few reported collisions near to the railway station along Saint Joseph's Road which is a concern due to the high number of schools within this area.

Figure 5-29 highlights accidents involving pedestrians; with accidents involving one pedestrian shown in green and accidents involving two pedestrians shown in blue. There was one accident involving two pedestrians within the five-year period, and this was along Burrin Street. The majority of the accidents involving pedestrians happened in the town centre and along the N80 to the east of Carlow Town. There are two accidents involving pedestrians near SETU, two along St. Joseph's Road near to a group of local schools, as well as in the core town centre near Potato Market, Tullow Street, and Kennedy Street.

Figure 5-28: Road Collisions 2012-2016

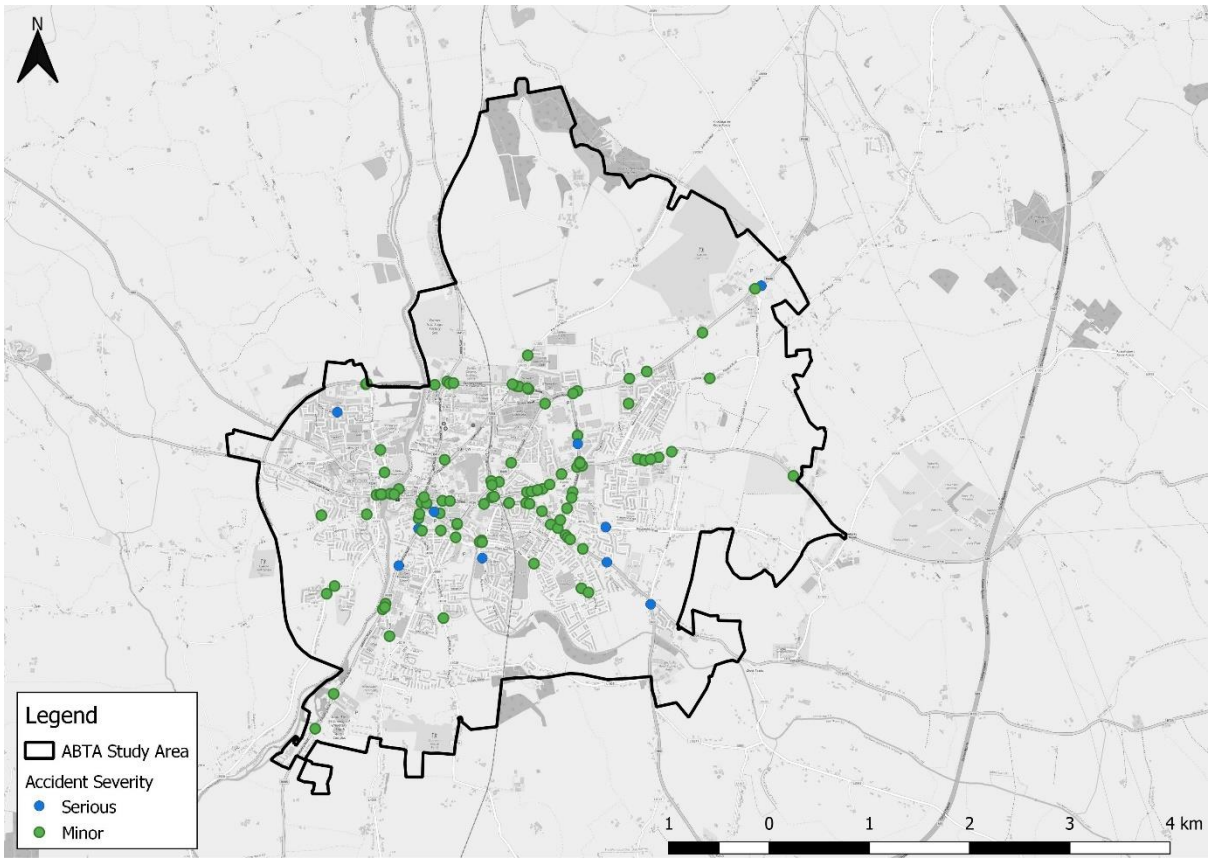
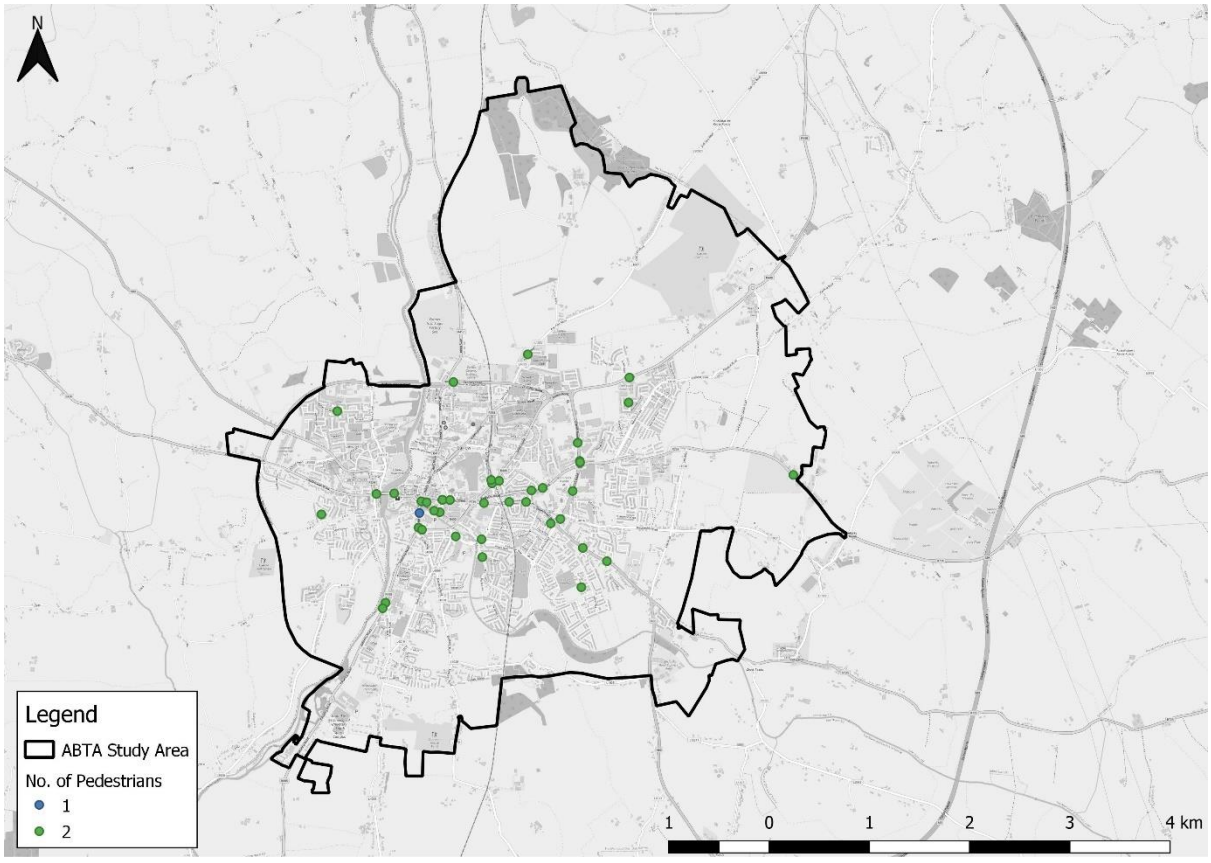


Figure 5-29: Road Collisions 2012-2016 Involving Pedestrians



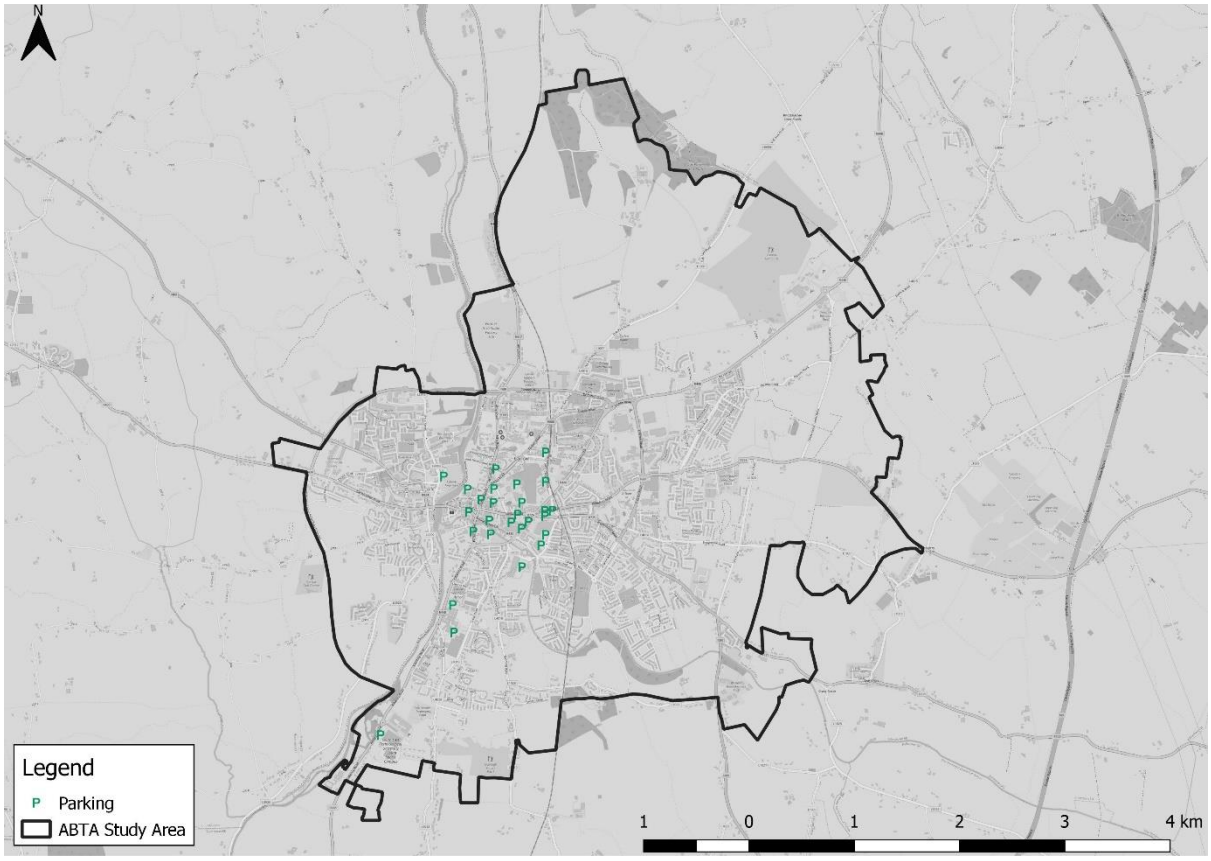
5.6 Parking

Figure 5-30 below highlights the parking provision in Carlow Town. A desktop study was undertaken to analyse the parking provision in the study area, focusing on Carlow Town centre, as it is likely that most of the official parking provision is within this area; and also, that parking demand is highest within the town centre. It is assumed much of the parking outside this area will be on-street parking for residents or private parking.

The map shows there is a high volume of parking available in Carlow Town centre. The data reveals that roughly 62% of the provision is on-street pay and display parking, a further 26% is off-street parking comprised of larger car parks which operate on pay and display or hourly rates. The remaining parking provision is on-street short-stay or set down only parking, found near shops, amenities, and schools. Additionally, there are other car parks in Carlow Town centre, such as at Penney's, shopping centres, supermarkets, or educational facilities.

The data has shown there is a lot of parking provision in the town centre, which coupled with the restricted sustainable transport network, reinforces the dominance of private cars as the preferred transport option. Therefore, changes to the parking provision are important to create a modal-shift towards sustainable modes and also provide a better public realm.

Figure 5-30: Carlow Graiguecullen Study Area Car Park Locations

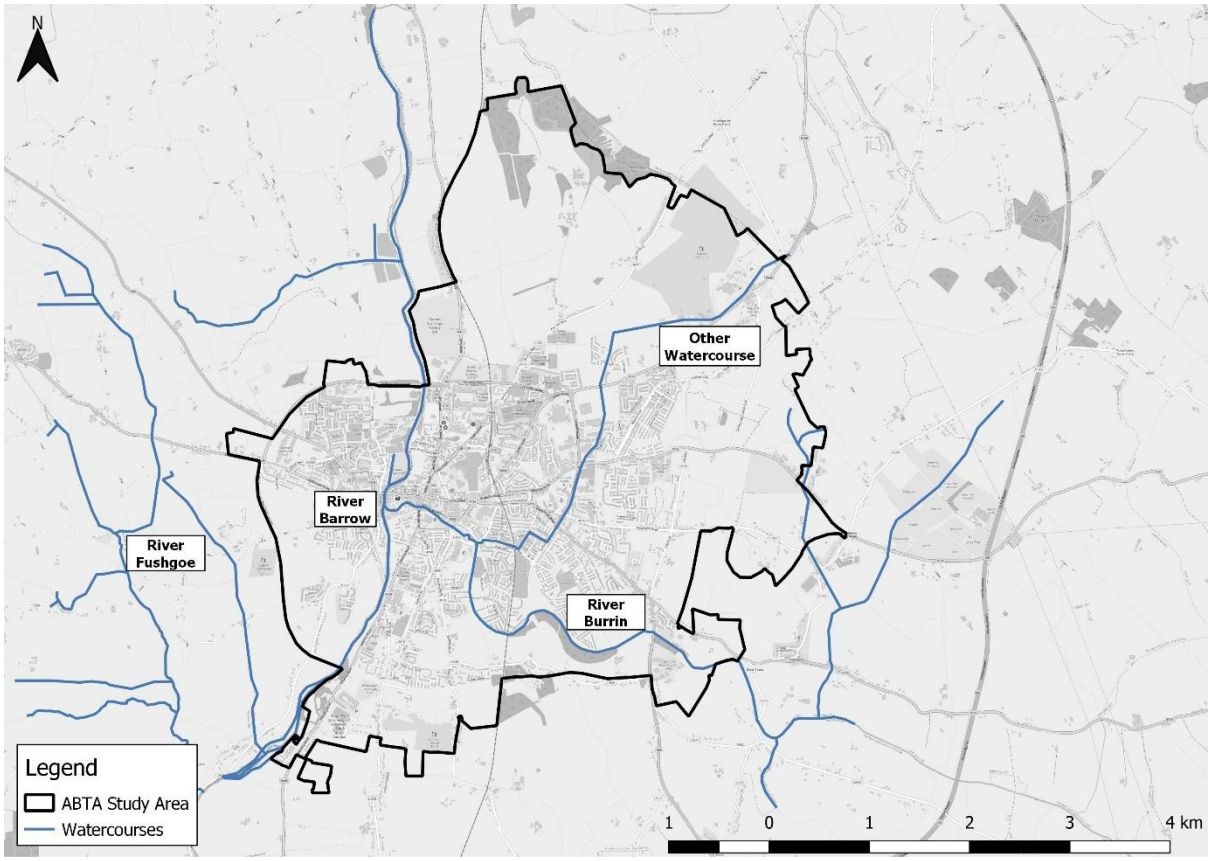


6. Physical Characteristics

The physical characteristics of the study area impact on existing connectivity as well as future transport infrastructure proposals. The two/three key types of physical characteristic which require consideration as part of the ABTA process are the rail line and waterbodies within the study area alongside the topography of the area.

Figure 6-1 shows the rivers and streams within the study area which are contained within the 'River Network Routes' dataset and published by the Environmental Protection Authority. The rivers and streams are classified according to their 'Strahler Stream Order', a standard classification based on stream / tributary relationships. The uppermost channels in a drainage network are designated as first-order streams, whilst a second order stream is formed below the confluence of two first-order channels. Furthermore, third-order streams are created when two second-order channels join, and so on.

Figure 6-1: Rivers and Streams[2]



Rivers can sometimes present opportunities for linear movement along their alignments subject to space and environmental constraints, but they can also present barriers to movement – particularly if there is an absence of sufficient and well-distributed bridges to facilitate direct trips by active modes of travel.

The two rivers in the study area, causing the greatest permeability barriers, are the River Barrow which runs north-south through Carlow splitting Carlow Town Centre from Graiguecullen and also the River Burrin running east-west just south of the town centre. In Carlow Town at present there is only one road bridge crossing the River Barrow, as well as two points of crossing for active travellers, one which is shared with road traffic and an active mode bridge accessed through Carlow Town Park; however, this is only accessible during certain periods of the day. This means the river acts as a pinch point creating both congestion, increased travel distances, and a barrier to movement.

[2] https://gis.epa.ie/EPAMaps/

Additionally, rail lines can present a constraint and barrier to movement. The rail line travels north-south through the centre of the Carlow Graiguecullen ABTA study area and sits to the east of Carlow town centre. This section of railway is part of the Dublin – Waterford line, with Carlow Station been the only calling stop within the study area. The location of the rail line can be seen in **Figure 5-4**, shown in dashed black line. Unlike the rivers in Carlow, the railway acts less as a permeability barrier, due to numerous crossing points through a bridge or under pas. However, such crossings could be upgraded to improve the active travel potential and additional crossing points could be provided to allow for improved free flow movement.

6.1 Environmental and Heritage Sites

The location of environmental and heritage sites within the study area may impact upon the feasibility of some potential transport and land use options. There are numerous National Monument Service Records and National Inventory of Architectural Heritage Structures within the study area. Further details on these are provided below.

The Sites and Monuments Record (SMR) is a database maintained by the Archaeological Survey of Ireland (ASI) which is a unit of the National Monuments Service. The SMR contains details of all monuments and places (sites) where it is believed there is a monument known to the ASI pre-dating 1700AD and also includes a selection of monuments from the post-AD 1700 period. There are 73 National Monuments Service sites within the study area which are listed in **Table 6-1**. As shown in the second column of the table, these sites consist of a wide variety of different types of features. The locations of all sites within and surrounding the study area are shown in **Figure 6-2**.

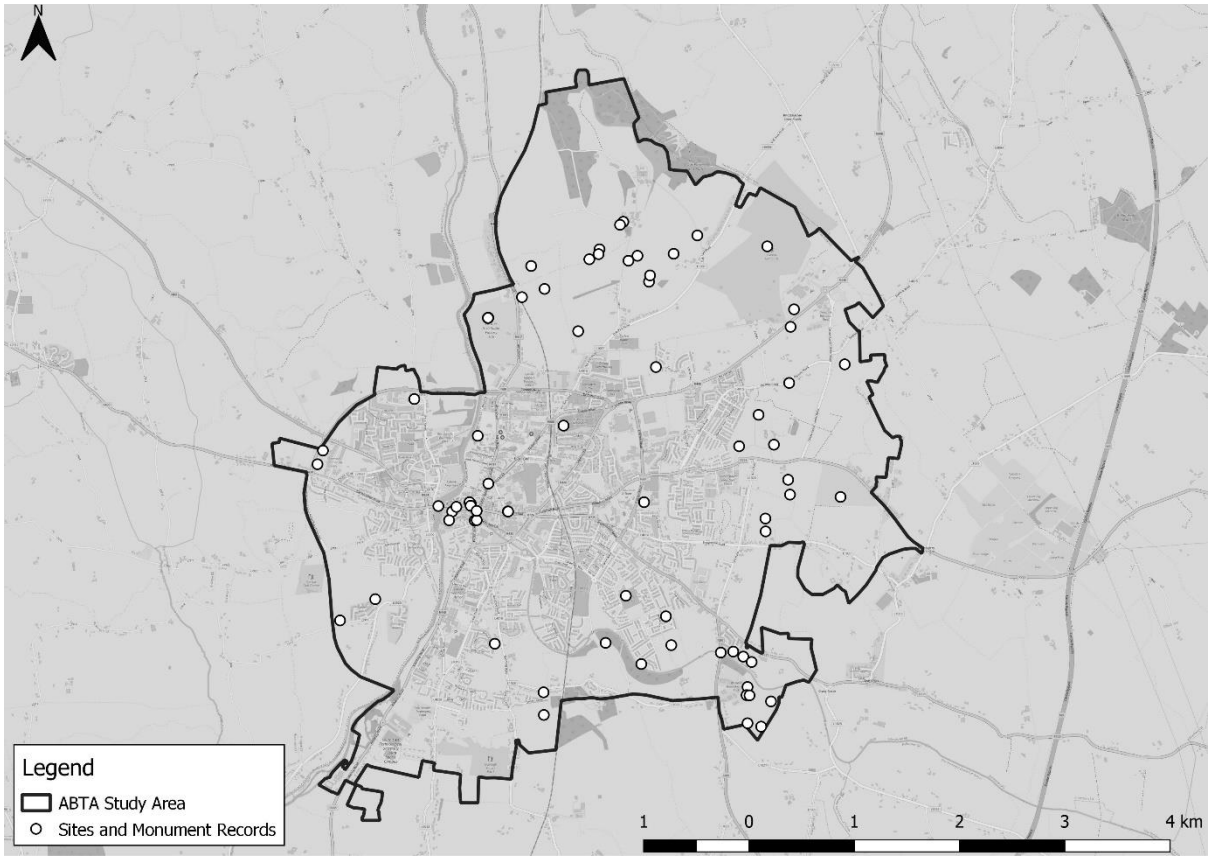
Table 6-1: National Monuments Service Sites and Monuments Records in Study Area

Entity ID	CLASSDESC	TOWNLAND_NAME
CW00140	Burial ground	POLLERTON LITTLE
CW00162	Town defences	CARLOW
CW00216	Enclosure	CHAPELSTOWN
CW00156	Historic town	CARLOW, GRAIGUE
CW00008	Redundant record	STRAWHALL
CW00009	Enclosure	STRAWHALL
CW00010	Ring-ditch	STRAWHALL
CW00011	Church	OAKPARK OR PAINESTOWN
CW00012	Ring-ditch	OAKPARK OR PAINESTOWN
CW00014	Ringfort - rath	OAKPARK OR PAINESTOWN
CW00015	Enclosure	OAKPARK OR PAINESTOWN
CW00016	Ringfort - rath	OAKPARK OR PAINESTOWN
CW00018	Enclosure	POLLERTON BIG
CW00137	Burial ground	CARLOW
CW00138	Dovecote	POLLERTON BIG
CW00139	Designed landscape - tree-ring	POLLERTON BIG
CW00141	Armorial plaque	POLLERTON BIG
CW00142	Enclosure	KERNANSTOWN
CW00143	Enclosure	KERNANSTOWN
CW00145	Ecclesiastical site	CHAPELSTOWN
CW00146	Megalithic tomb - portal tomb	KERNANSTOWN
CW00158	Castle - Anglo-Norman masonry castle	CARLOW
CW00159	Bridge	CARLOW

CW00160	Bridge	CARLOW
CW00161	Mill - unclassified	CARLOW
CW00163	Church	CARLOW
CW00165	Enclosure	CARLOW
CW00166	Moated site	BALLINACARRIG
CW00167	Enclosure	RATHNAPISH
CW00168	Enclosure	CARLOW
CW00169	Ringfort - rath	CARLOW
CW00170	Bridge	BALLINACARRIG, CHAPELSTOWN, STAPLESTOWN
CW00222	Burial ground	KERNANSTOWN
CW00224	Enclosure	CHAPELSTOWN
CW00225	Enclosure	CHAPELSTOWN
CW00226	Enclosure	CHAPELSTOWN
CW00228	Field system	STAPLESTOWN
CW00229	Redundant record	STAPLESTOWN
CW00230	Enclosure	STAPLESTOWN
CW00235	Enclosure	QUINAGH
CW01499	Redundant record	STRAWHALL
CW01500	Redundant record	STRAWHALL
CW01501	Ring-ditch	OAKPARK OR PAINESTOWN
CW01502	Ring-ditch	OAKPARK OR PAINESTOWN
CW01360	Ring-ditch	STAPLESTOWN
CW01361	Enclosure	STAPLESTOWN
CW01362	Enclosure	STAPLESTOWN
CW01639	Flat cemetery	STRAWHALL
CW01653	Tomb - effigial	CARLOW
CW01771	Cremation pit	POLLERTON LITTLE
CW01784	Ring-ditch	OAKPARK OR PAINESTOWN
CW01294	Graveyard	CARLOW
CW01295	Graveyard	CARLOW
CW01309	Graveyard	OAKPARK OR PAINESTOWN
CW01389	Redundant record	CARLOW
CW01797	Linear earthwork	CARLOW
CW01833	Enclosure	OAKPARK OR PAINESTOWN
CW01834	Field system	OAKPARK OR PAINESTOWN
CW01881	Ring-ditch	OAKPARK OR PAINESTOWN
CW01882	Designed landscape feature	OAKPARK OR PAINESTOWN
CW02021	Stone head (present location)	CARLOW
CW02024	Battlefield	CARLOW
CW02040	Enclosure	OAKPARK OR PAINESTOWN
CW02058	Enclosure	CARLOW
CW02059	Enclosure - large enclosure	QUINAGH

CW02084	Enclosure	POLLERTON LITTLE
CW02133	Ring-ditch	STRAWHALL
CW02159	Tomb - effigial (present location)	CARLOW
LA01941	Ringfort - rath	CROSSNEEN
LA02102	Burnt spread	GRAIGUE (Slievemargy By.)
LA02103	Burnt spread	GRAIGUE (Slievemargy By.)
LA02104	Burnt spread	GRAIGUE (Slievemargy By.)
LA02412	Ring-ditch	CROSSNEEN

Figure 6-2: National Monuments Services Sites and Monuments



The National Inventory of Architectural Heritage (NIAH) is a state initiative under the administration of the Department of Housing, Local Government and Heritage and is established on a statutory basis. The purpose of the NIAH is to identify, record and evaluation the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of built heritage. A Record of Protected Structures (RPS) forms part of each Local Authority's development plan and the Minister for Housing, Local Government, and Heritage may recommend structures to the Local Authorities for inclusion in the RPS. Sites, structures, or groups of structures which are given a Regional, National, or International Rating by the NIAH are included in the Minister's recommendations.

There are 19 structures included in the NIAH within the study area, all of which have a 'Regional' rating. Of this list many relate to Pollerton House, Oak Park House, and Browne's Hill House. All NIAH structures within the study area are summarised in **Table 6-2** according to their original type (which may not be the same as the sites current usage) and location. **Figure 6-3** shows the location of all NIAH structures within the study area.

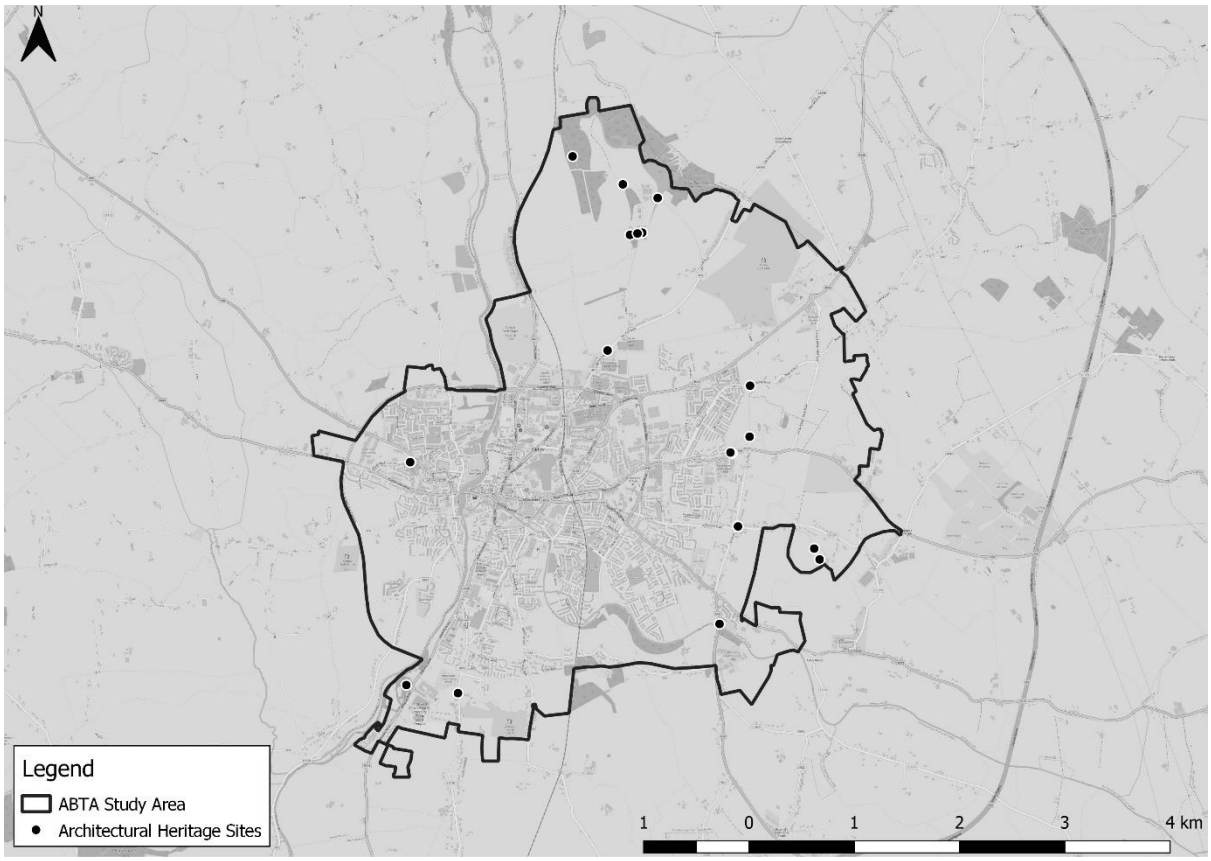
Further information on individual features contained within the SMR and the NIAH can be accessed using the Historic Environment Viewer provided by the Department of Housing, Local Government and Heritage[3] and both datasets are also available in a range of other formats[4].

Table 6-2: National Inventory of Architectural Heritage Structures

Original Type	Name	Date
mausoleum	Oak Park House	1840 - 1845
country house	Oak Park House	1740 - 1780
bridge	Oak Park House	1830 - 1840
dairy	Oak Park House	1840 - 1860
demesne walls/gates/railings	Oak Park House	1830 - 1840
graveyard/cemetery	Oak Park House	1700 - 1750
stables	Oak Park House	1750 - 1780
church/chapel	Killeshin Church	1825 - 1835
country house	Erindale	1800 - 1820
farm house		1840 - 1870
demesne walls/gates/railings	Pollerton House	1860 - 1880
gate lodge	Pollerton House	1860 - 1880
building misc	Pollerton House	1840 - 1900
demesne walls/gates/railings	Pollerton House	1800 - 1840
stables	Browne's Hill House	1840 - 1850
country house	Browne's Hill House	1760 - 1800
gate lodge	Browne's Hill House	1840 - 1850
culm crusher		1840 - 1870
church/chapel	Killeshin Church	1825 - 1835

[3] https://www.archaeology.ie/archaeological-survey-ireland/historic-environment-viewer-application
[4] https://data.gov.ie/dataset/national-inventory-of-architectural-heritage-niah-national-dataset?package_type=dataset; https://data.gov.ie/dataset/national-monuments-service-archaeological-survey-of-ireland?package_type=dataset

Figure 6-3: National Inventory of Architectural Heritage Structures



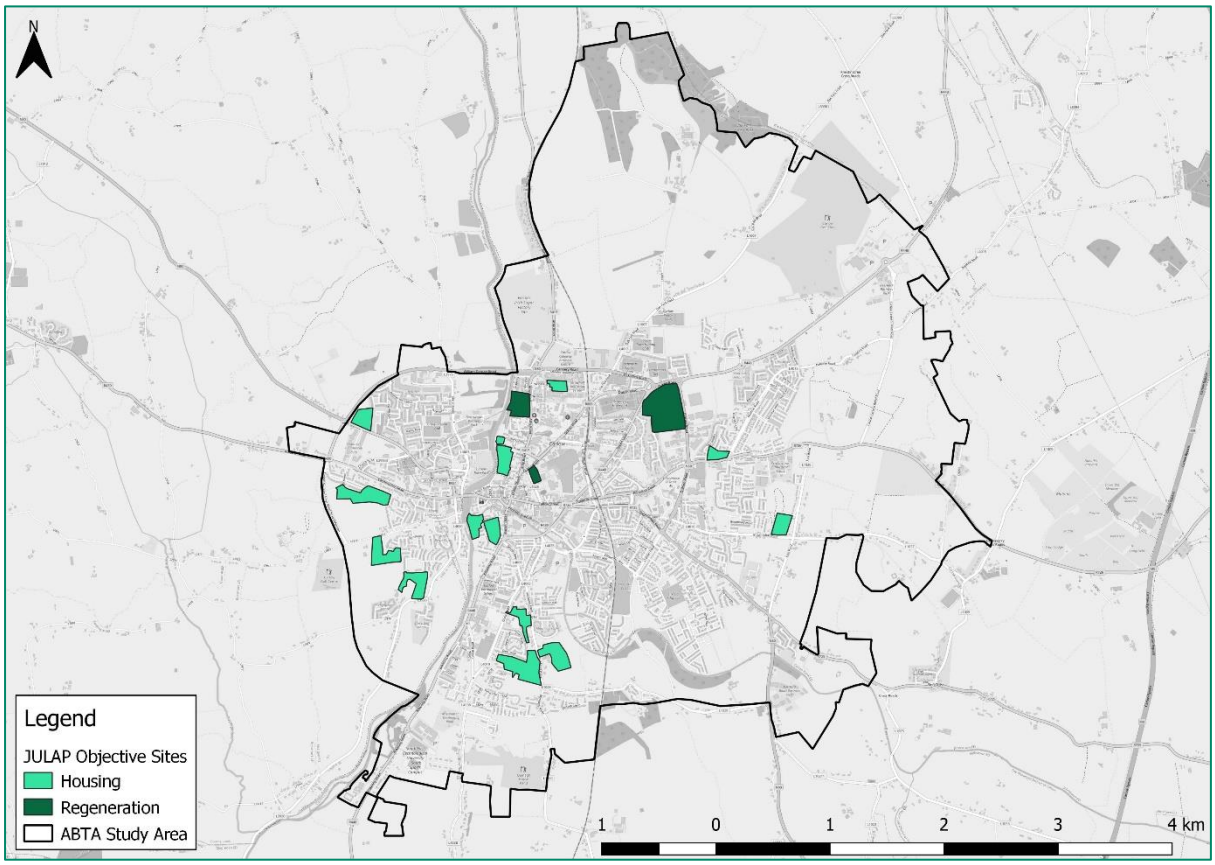
7. Future Context

Future changes in the spatial distribution of development will have a big impact on the operation of the transport network in the Carlow Graiguecullen study area. This chapter of the report sets out key development locations identified in the Local Area Plan. Future committed transport schemes are also identified in this chapter, to understand where transport improvements are already being proposed.

7.1.1 Future Developments

Carlow County Council and Laois County Council are currently undergoing a review of the existing Joint Spatial Plan for the Carlow Graiguecullen Greater Urban Area (2012 – 2018) which will be replaced by the new Joint Urban Area Local Area Plan (JULAP). The purpose of the JULAP is to set out land use in the Carlow town area for planning and sustainable development between 2022 and 2028. Previous land use zones were identified and adopted in July 2022 as part of the Carlow County Development Plan 2022-2028; these land use zoning will be brought forward as part of the JULAP. The aim of the land use zones is to promote compact urban growth in a phased and sequential way from the centre of Carlow Town, and with a focus on potential brownfield sites. The following plan shows the sites identified for future development with the Carlow Graiguecullen ABTA study area.

Figure 7-1: Joint Urban Local Area Plan Development Sites



7.1.2 Committed Transport Schemes

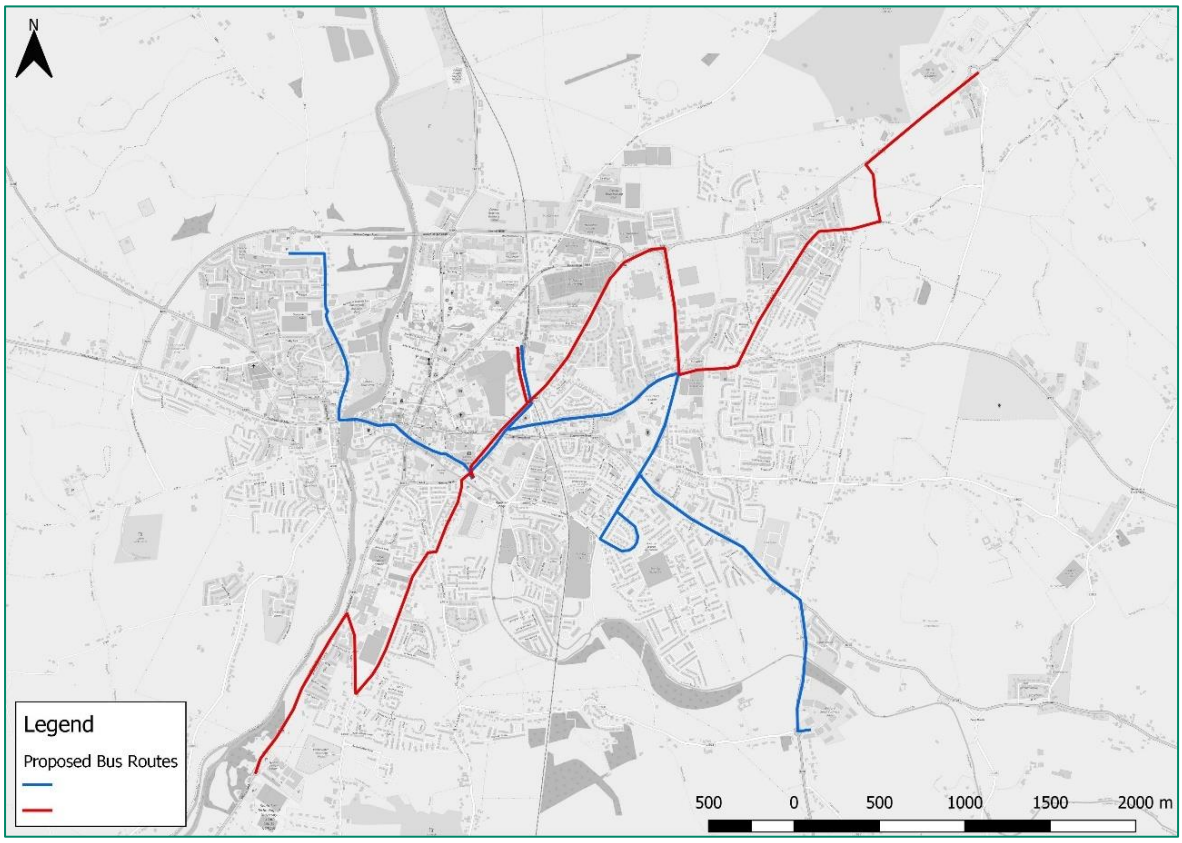
The Irish Government has committed a 2:1 ratio of expenditure between new public transport infrastructure and new road infrastructure in its government lifetime. This demonstrates the large commitment which is being made to the public transport network across Ireland.

7.1.2.1 Bus

There is a desire to provide enhanced bus services in Carlow Town as well as connections to rural areas of the county. Commitments have been made to support transport agencies providing these new services and also to increase the quality, frequency, and speed of existing services.

Figure 7-2 highlights the proposed future bus network in Carlow Town. This was produced in 2021 by the National Transport Authority and CCC and is set to be implemented in 2023. NB: At the time of publication, this bus service has now been implemented. The blue route travels from the northwest of Carlow Town, near to Barrow Valley Retail Park, and travels towards the southeast near to Wexford Road Business Park. Along the route, the service will pass by parks, tourist destinations, residential areas, Carlow railway station as well as Carlow Town. The red route travels southwest to northeast, serving Tyndall College and MSD Carlow at either end of the route. This route serves SETU, Carlow town centre, Carlow railway station, business parks and residential areas. These routes will provide enhanced connections to and between services in and around Carlow Town, making trips more accessible and more sustainable. However, these routes do have limitations, such as neither of them pass by the hospitals in Carlow Town and also, they are very compact to Carlow Town itself and may not be a feasible option for those residing farther out of town.

Figure 7-2: Future Bus Network Carlow Town



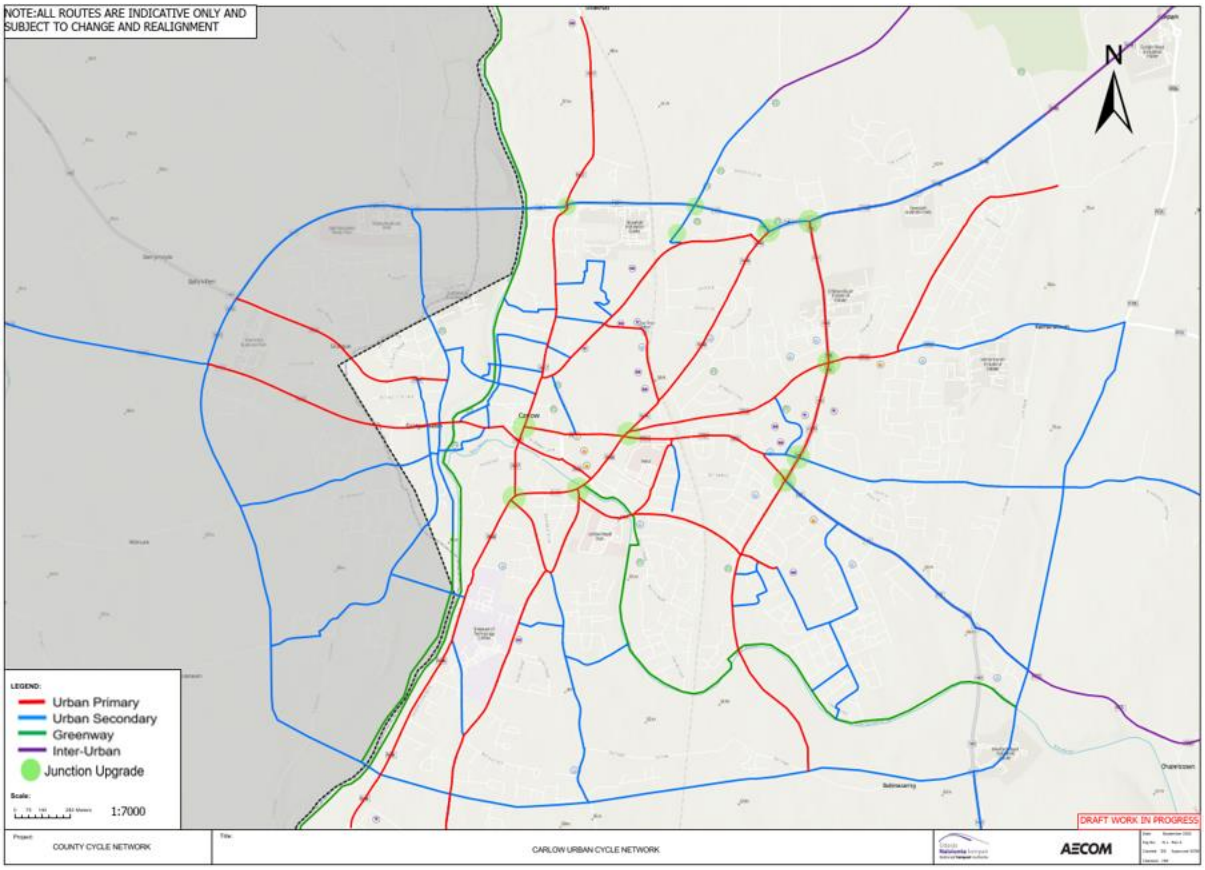
7.1.2.2 Rail

Like bus service improvements, it has also been stated that the transport agencies will be supported to provide new services and also increase quality, frequency, and standards of existing services. The Programme for Government: 'Our Shared Future' strategy, released in 2020, discusses the aim to enhance suburban commuter rail across the country. Alongside this, Iarnród Éireann committed general network improvements as well as enhancement of the outer Greater Dublin Area (GDA) commuter services. These services will pass through Carlow and provide trains to Dublin every 20-mintues in the peak hours and half hourly in the off-peak hours. The Southern Region, in their RSES, committed investment into existing rail infrastructure and services, to ensure renewal and maintenance occurs to a quality service, in terms of safety, accessibility, and frequency, can be provided.

7.1.2.3 Proposed Cycle Network

A study has been undertaken looking at the current and proposed cycle network across the whole country. The map in **Figure 7-3** sets out the proposed cycling route upgrades within Carlow, specifically focussing on the Carlow Urban Area. The routes for upgrading have been classified to provide a primary, secondary and greenway network, with key junctions highlighted for upgrading to further enhance the cycling routes. The urban primary cycle routes cover the core and east of Carlow Town, whereas the urban secondary routes cover the west of the town, as well as the built-up areas which are slightly farther out. There are 12 junctions which have been highlighted for proposed upgrades, with 7 of these being located along the N80. Furthermore, 2 greenway routes are proposed, these are not only beneficial for locals, but can be popular for recreation and tourism.

Figure 7-3: Proposed Future Cycling Network Carlow Urban Area



8. Conclusions and Next Steps

The Baseline Assessment has provided a comprehensive review of available data to identify problems in the existing transport network and highlight opportunities for improvement in Carlow and Graiguecullen. This evidence will feed into the development of options to improve conditions for all modes of transport; walking, cycling, roads, parking and public transport. In the final ABTA report, these options will be assessed thorough a Multi-Criteria Analysis (MCA) process to identify the preferred solutions to be incorporated into strategies for each mode.

8.1 Strengths, Weaknesses, Opportunities and Threats

Table 8.1 provides a summary of the strengths, weaknesses, opportunities and threats (SWOT) analysis for the Carlow Graiguecullen ABTA study area to inform the development of options for each mode.

Table 8-1: SWOT Analysis

Strengths	Weaknesses
• Carlow's geographical location is beneficial, there is relatively easy access to Dublin, other neighbouring counties, and the remainder of the South East region. • SETU presence and its potential to provide further education to current Carlow school leavers. • SETU's ability to attract students from other areas who will spend in the Carlow economy. • Residents of Carlow being higher educated can provide businesses with a better pool of labour. • Quality of life for Carlow is deemed excellent and is seen as a great area for those wanting to 'settle down'. • The cost of living is respectable, especially compared to other major cities. • The town is reasonably affordable for the student population. • There are strong transport links to areas external to Carlow via the road and rail. • There is a strong presence of businesses, mainly located in the business parks or town centre. • There is presence of some major multi-national companies who are large employers in Carlow. • Many people who live in Carlow also work here. • Within the town most residential areas are within close proximity of the town centre and amenities. • There is natural beauty and a rich history which can promote tourism. • There are various shopping areas in Carlow, including high streets, shopping centres, as well as out-of-town retail parks. • There are bus services between Carlow and other nearby places, in particular Dublin and Dublin Airport. • There is a growing population. • Many of the population are aged 34 or under.	• Lack of sustainable links between residential areas and employment/education opportunities. • High-level of congestion across the town during peak hours. • Parking availability and drop-off opportunities surrounding educational facilities promotes unsustainable travel trips. • Lack of alternative routes leading to high through traffic in the town centre. • A surplus of low-cost town centre parking opportunities. • Lack of safe crossing opportunities for active travellers. • Lack of dedicated cycle infrastructure. • Permeability constraints due to physical barriers (River, Railway, and Developments). • Lack of accessible and high-quality bus stops. • Infrequent public transport services. • Poor perception of public transport acting as a barrier to use. • Limited public realm provision prevents an attractive town centre. • High vacancy rate for retail and employment buildings in the town centre. • Carlow needs greater external market presence to attract more large businesses. • The retail and evening market in Carlow can often struggle and this contributes to a lack of vibrancy. • Often students who graduate SETU do not remain in the area meaning talent and potential employees are lost. • Lack of investment from large external sources. • Lack of preparation to accommodate remote and hybrid working lifestyles. • High levels of car dependency.
Opportunities	**Threats**
• Expand the largely untapped tourism industry. • Create 'remote hubs' for the new style of working. • Build upon Carlow's excellent quality of life. • Increase links between SETU and businesses to provide graduates work potential jobs and employers with improved pool of labour. • Providing more accommodation for town-centre living. • Improved the outwards brand of Carlow to attract new investment, residents, and visitors. • Improve the skill level in the population. • Improve active travel safety. • Improving public transport frequency and connectivity to other towns. • Increasing the number of bus stops to provide greater accessibility. • Provision of two new bus town services linking residential areas and key amenities. • Create a thriving evening market and café culture for those living, working, and visiting Carlow. • Improved rail services due to Carlow being identified as a key commuter town of Dublin. • Delivery of compact growth in the town centre. • Reduction of on-street parking to deliver space back to people and improve the environment. • Improved permeability in the town, especially across the River Barrow for residents in Graiguecullen to access the town centre. • Promotion of electric vehicles. • Park and stride for educational trips to promote active travel and reduce congestion. • Provision of apprenticeships to give Carlow school leavers greater opportunities.	• Objection to the reallocation of space to active modes. • Objection of changes in the town centre, in particular parking and one-way systems or pedestrianisation, which will have a large impact on general traffic. • Continuing vacancy issue if new businesses cannot be attracted. • Lack of demand for town-centre living if the town is not seen as vibrant and attractive. • Unwillingness to undertake a modal-shift. • Southern Relief Road Phase 3 not being delivered meaning many journeys still route through the town. • High level of car commuting to the university. • Increased travel demand due to population growth and further development of SETU. • Negative impact of Covid-19 and unwillingness to use public transport services. • Broadband provisions need to be improved to allow for better technology in relation to businesses, homes, and education.

aecom.com

Appendix V
Infrastructure Assessment

1.0 Infrastructure Assessment

The Infrastructure Assessment is provided to support the Carlow-Graiguecullen Joint Urban Local Area Plan 2024-2030 (JULAP) in regard to the co-ordination of proposed 'New Residential' land use zonings for undeveloped lands with existing and planned development services.

The National Planning Framework (NPF) requires that the zoning of undeveloped lands is carried out in accordance with a standardised methodology termed a Tiered Approach to Zoning (TAZ)[1]. The objective of the TAZ is to avoid zoning lands that cannot be brought forward for development due to deficiencies in necessary infrastructure and services. It provides an evidence-based approach that identifies which:

- Lands are already serviced;
- Lands can connect to services; and,
- Lands are to be provided with services within the lifetime of a development plan.

In accordance with the NPF, infrastructure and services include:

- Road and footpath access, including public lighting;
- Foul sewer drainage;
- Surface water drainage; and,
- Water supply.

It is a requirement that the Infrastructural Assessment is aligned with the approved infrastructure investment programmes(s) of relevant delivery agency(ies) such as Uisce Éireann, or is based on a written commitment of the relevant delivery agency to provide the identified infrastructure within a specified timescale i.e. within the lifetime of the plan.

Carlow County Council or Laois County Council may also commit to the delivery of the required and identified infrastructure in their own infrastructural investment programmes (i.e. Budgeted Capital Programmes) in order to support certain lands for zoning.

The methodology for TAZ is included in Appendix 3 of the NPF, which sets out a two-tier approach to land use zoning as follows:

Tier 1: Serviced Zoned Land

Comprises zoned lands that can accommodate new development as they can connect to existing services and there is service capacity available. The NPF states that these lands will generally be positioned within the existing built-up footprint of a settlement or be contiguous to existing development lands and will be within the footprint of or spatially sequential within the identified settlement.

Tier 2: Serviced Zoned Land

Comprises zoned lands that are not currently sufficiently serviced to support new development but have the potential to become serviced during the lifetime of the development plan. The NPF states that these lands may be positioned within the existing built-up footprint of a settlement or be contiguous to existing development lands or Tier 1 zoned lands, where required to fulfil the spatially sequential approach to the location of new development within the identified settlement.

The NPF requires that where lands are identified as Tier 2 lands, the potential for the delivery of the required services and/or capacity to support new development, must be identified and specific details provided by the planning authority at the time of publication of the draft and final plan.

1.1 Methodology for Infrastructural Assessment

[1] National Policy Objectives 72a-c and Appendix 3

In the absence of Departmental guidelines which as referred to in the NPF are expected to issue under Section 28 of the Planning and Development Act 2000 (as amended), the Infrastructural Assessment has been development in accordance with Appendix 3 of the NPF.

The Infrastructure Assessment applies to the joint urban area of Carlow-Graiguecullen for which a proposed land use zoning map has been prepared and incorporated into Chapter 12 of the written statement. The assessment involves a review of zoned undeveloped land in the joint urban area, which includes lands zoned for town centre, mixed use, and residential purposes, and which takes account of the potential for brownfield and infill development.

The focus of the Infrastructural Assessment is on roads, foul sewer drainage, surface water, and water supply infrastructure. The assessment has been informed by consultation with the internal departments of Carlow County Council and Laois County Council, as well as by consultation with Uisce Éireann. This is in addition to the examination of the infrastructure and services mapping available to Carlow County Council and Laois County Council for their respective functional areas.

The consultations with the Councils' internal departments and with Uisce Éireann provided an overview of future infrastructure requirements in Carlow-Graiguecullen, in addition to more detailed analysis on a site-by-site basis where this was deemed necessary. Each internal department was required to provide details of the following:

- Any infrastructure deficits that would impede the development of lands;
- The current status of any plans/programmes in place to address these infrastructure deficits; and,
- The anticipated timeframe for the delivery of these projects.

Transportation Infrastructure

Chapter 6 of the Plan identifies the transportation infrastructure required to ensure that people and goods can continue to be efficiently transported throughout the joint urban area, with an emphasis on integrated land use and transport planning, and on supporting sustainable travel modes such as walking, cycling and public transport. As part of the preparation of this JULAP an Area Based Transport Assessment (ABTA) has been undertaken on behalf of Carlow County Council and Laois County Council and in conjunction with the National Transport Authority (NTA). The ABTA has also informed a series of strategy options, with associated objectives and proposed interventions to support the shift towards sustainable movement throughout the joint urban area and to accommodate anticipated transport demand due to planned population growth.

Costing

No new strategic road links to facilitate release of lands zoned for development have been identified on the zoning maps. The zoning of lands within Carlow-Graiguecullen are centrally located and serviced to a relatively high level by footpath infrastructure. Where footpath / cycling infrastructure is required current indicative costings may range between €150-€250 per sqm. However, full cost of delivery of such infrastructure would be informed at site specific detailed design stage. Smaller interventions to facilitate vulnerable road users will be facilitated over the period of the JULAP and will be informed by provisions of the ABTA as referred to (See also Appendix IV).

Water and Wastewater Infrastructure

Uisce Éireann is responsible for the delivery of water services infrastructure, and they identify the necessary investments in water and wastewater treatment plants and associated collection and distribution network to facilitate future population and economic growth in urban areas such as Carlow-Graiguecullen. As part of their input into the preparation of the JULAP, Uisce Éireann have provided the following information:

- **Water:** Carlow-Graiguecullen is served by the Carlow North Water Resource Zone (WRZ) and it is envisaged that the Carlow North WRZ has capacity to cater for growth in the in the joint urban area.

- **Wastewater:** Capacity is available at the Mortarstown WWTP which serves Carlow-Graiguecullen. Upgrade to increase capacity at the WWTP is due to be completed in 2025 subject to statutory and budgetary approvals processes.

Costing

Carlow County Council and Laois County Council will continue to engage with and be advised by Uisce Éireann regarding the delivery of the upgrade to the Mortarstown WWTP. Estimated costs for the delivery of the upgrade to the WWTP has not yet been identified by Uisce Éireann. However, as referred to above, the upgrade to the WWTP is due to be completed during the lifetime of this JULAP i.e. in 2025.

Tier 1 and Tier 2 Zoned Lands

Tier 1

In order for a parcel of land to be identified as 'Tier 1' there shall be no infrastructure impediments restricting the development of the lands i.e. all transportation and water services infrastructure needs to be in place.

Sites which may require minor additional works or investment have also been identified as Tier 1 in certain circumstances, depending on the nature and scale of the works required.

Tier 2

The identification of a site as 'Tier 2' highlights to landowners and potential investors that there are deficiencies in infrastructure that need to be addressed prior to the lands being developed. The nature of the deficiencies can vary between lands and settlements.

All lands examined in Carlow-Graiguecullen are designated as Tier 1.

Traffic Light Rating System

A traffic light rating system has been developed that highlights any deficiencies in the lands, analysed as follows:

- A green colour indicates that infrastructure/services are available;
- An amber colour indicates that infrastructure/services are not available or further investment in same is required and this investment is likely to be provided during the lifetime of the Plan;
- A red colour indicates infrastructure/services are not available and are unlikely to be provided during the lifetime of the Plan.

An example of this system is set out as Table B on the following page.

Legend	Tier
Infrastructure/services available	
Further investment required	
Provision of infrastructure/services unlikely during period of Plan	

Table B: Traffic Light Rating System Example

Land Use Evaluation

The Infrastructure Assessment has also been combined with a land use evaluation, which also utilises the traffic light rating system (See Table C). The land use evaluation takes account of compact growth considerations and physical suitability considerations in terms of built and natural heritage and flood risk. In this regard, the traffic light rating system also reflects a score rating of 1 to 3 for land use evaluation, with 1 being the most optimal and 3 being the least optimal score.

	1
	2
	3

Table C: Land Use Evaluation Scores

Infrastructure Assessment Matrixes

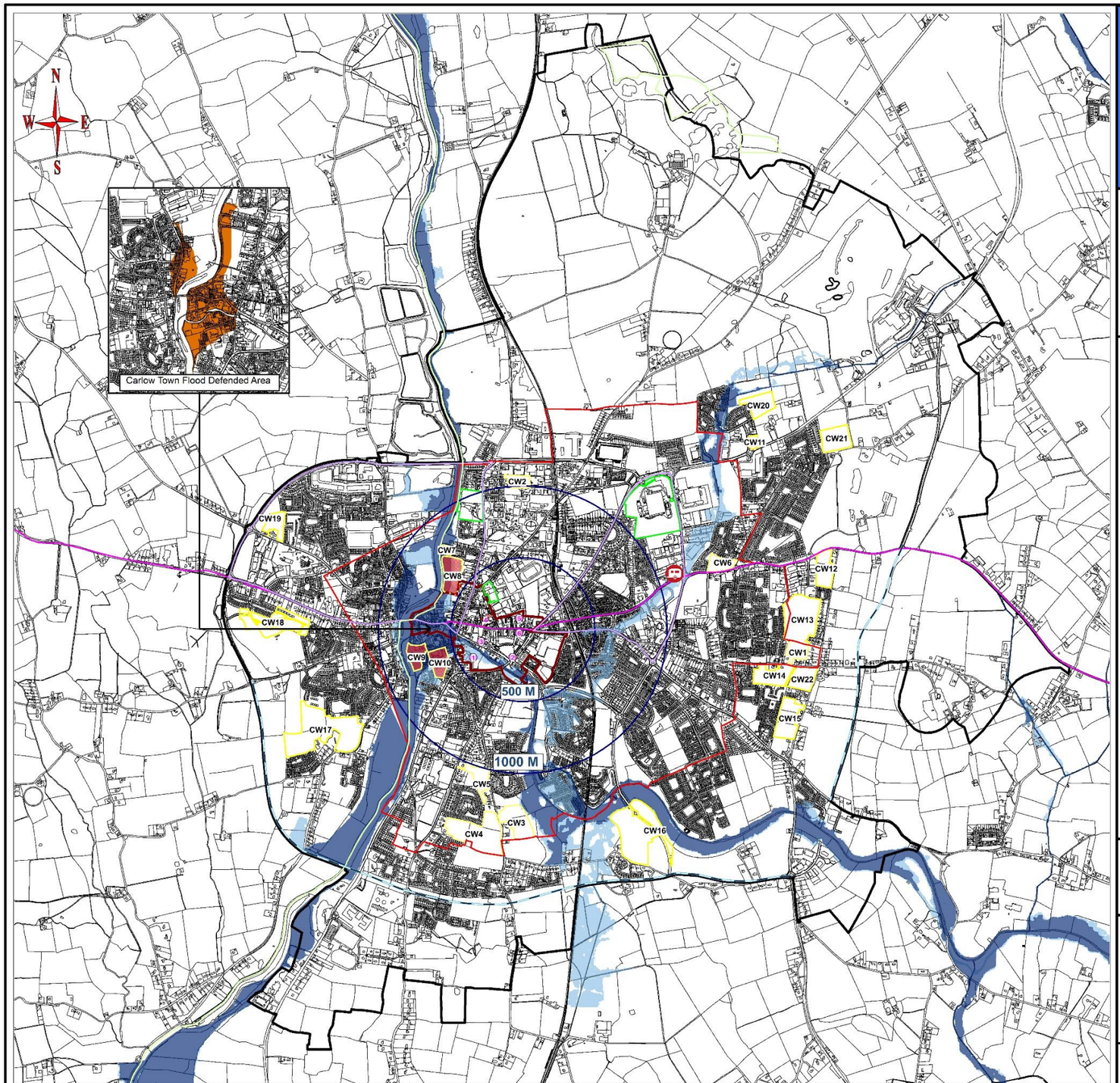
The Infrastructure Assessment for Carlow-Graiguecullen is set out in table form in this section (See Table 1). All lands that have been examined are identified in the table with individual reference numbers. These reference numbers can be used to identify the lands on the Objectives Map (Map 12.2) included in Chapter 12 of the JULAP and at the end of this document.

TABLE 1: CARLOW-GRAIGUECULLEN – KEY TOWN
(SEE OBJECTIVES MAP REF. 12.2)

		INFRASTRUCTURE ASSESSMENT	LAND USE EVALUATION		
		Infrastructure/Services (Roads, foul sewer, water supply, surface water)	**Compact Growth (within existing settlement, infill/consolidation, proximity to town/village centre, promotes sustainable mobility)**	**Physical Suitability (built & natural heritage, flood risk)**	
Tier	**Map Ref.**				**Justification**
T1	CW1				*Infrastructure / services available & within existing built-up footprint*
T1	CW2				*Infrastructure / services available & within existing built-up footprint*
T1	CW3				*Infrastructure / services available & contiguous to existing development lands*
T1	CW4				*Infrastructure / services available & contiguous to existing development lands*
T1	CW5				*Infrastructure / services available & within existing built-up footprint*
T1	CW6				*Infrastructure / services available & within existing built-up footprint*
T1	CW7				*Infrastructure / services available & within existing built-up footprint*
T1	CW8				*Infrastructure / services available & within existing built-up footprint*
T1	CW9				*Infrastructure / services available & within existing built-up footprint*
T1	CW10				*Infrastructure / services available &*

					within existing built-up footprint
T1	CW11				*Infrastructure / services available & within existing built-up footprint*
T1	CW12				*Infrastructure / services available & contiguous to existing development lands*
		INFRASTRUCTURE ASSESSMENT	**LAND USE EVALUATION**		
		Infrastructure/Services (Roads, foul sewer, water supply, surface water)	**Compact Growth (within existing settlement, infill/consolidation, proximity to town/village centre, promotes sustainable mobility)**	**Physical Suitability (built & natural heritage, flood risk)**	
T1	CW13				*Infrastructure / services available & within existing built-up footprint*
T1	CW14				*Infrastructure / services available & within existing built-up footprint*
T1	CW15				*Infrastructure / services available & contiguous to existing development lands*
T1	CW16				*Infrastructure / services available & contiguous to existing development lands*
T1	CW17				*Infrastructure / services available & contiguous to existing development lands*
T1	CW18				*Infrastructure / services available & contiguous to existing development lands*
T1	CW19				*Infrastructure / services available & contiguous to existing development lands*
T1	CW20				*Infrastructure / services available & contiguous to existing development lands*
T1	CW21				*Infrastructure / services available & contiguous to existing development lands*

T1	CW22				*Infrastructure/services available & contiguous to existing development lands*



CARLOW - GRAIGUECULLEN JOINT URBAN LOCAL AREA PLAN 2024 - 2030

Legend

- Settlement Consolidation Sites
- Regeneration Sites
- Infrastructure Assessment Lands
- Core Retail Area
  (See Appendix V Retail Strategy - Carlow County Development Plan 2022 - 2028)
- Opportunity Site
  (See Appendix V Retail Strategy - Carlow County Development Plan 2022 - 2028)
- Traveller Accommodation Site
- Roads Objectives
- Public Right of Ways
- Slí Na Sláinte Walking Routes
- Trails of the Saints
- Flood Zone A: 1% AEP (or a 1 in 100 chance of occurring in any given year)
- Flood Zone B: 0.1% AEP (or a 1 in 1000 chance of occurring in any given year)
- Carlow Town Flood Defended Area
- Former Carlow Town Council Boundary
- Joint Urban Local Area Plan Boundary

Objectives Map (Map 12.2)

COMHAIRLE CONTAE CHEATHARLACH
CARLOW COUNTY COUNCIL

CARLOW COUNTY COUNCIL
AND
LAOIS COUNTY COUNCIL
FORWARD PLANNING SECTIONS