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Leixlip Strategic Transportation Assessment

Kildare County Council

May 2019

Kildare County Council
Comhairle Contae Chill Dara

Quality information

Prepared by	Checked by	Approved by
Matthew Richardson / John Humphreys	Neil Caughey	Joseph Seymour
Senior Consultant	Principal Consultant	Director

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Prepared for:

Kildare County Council
Devoy Park,
Naas,
Co. Kildare,
W91 X77F

Project number: 60596485

AECOM Ireland Limited
4th Floor
Adelphi Plaza
Georges Street Upper
Co. Dublin
Ireland

T: +353 1 238 3100

aecom.com

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1. Introduction

1.1 Project Background

Kildare County Council has commissioned AECOM to develop a Strategic Transport Assessment (STA) to inform the drafting of the revised Local Area Plan (LAP) for Leixlip. The revised LAP will replace the Leixlip LAP 2017-2023 on foot of the Ministerial Direction to Kildare County Council under Section 31 of the Planning and Development Act 2000 (as amended).

The Ministerial Direction states that the LAP must be consistent with the following principles:

i. "Adoption of a sequential approach to additional residential land use zoning objectives which shall prioritise development of lands adjacent to town cores and public transport, especially rail routes and access nodes such as rail stations over locations peripheral to the town at the edge of the settlement;

ii. The integration of transport and land use planning with significant new housing development to be focused at locations proximate to high quality public transport, especially rail access, that is easily accessible to existing local infrastructure such as schools, and local services such as neighbourhood centres, in the interest of a sustainable pattern of urban development;

iii. Protection of the integrity of strategic employment lands for long-term employment and economic development related activities in accordance with national, regional and county economic policy objectives; and

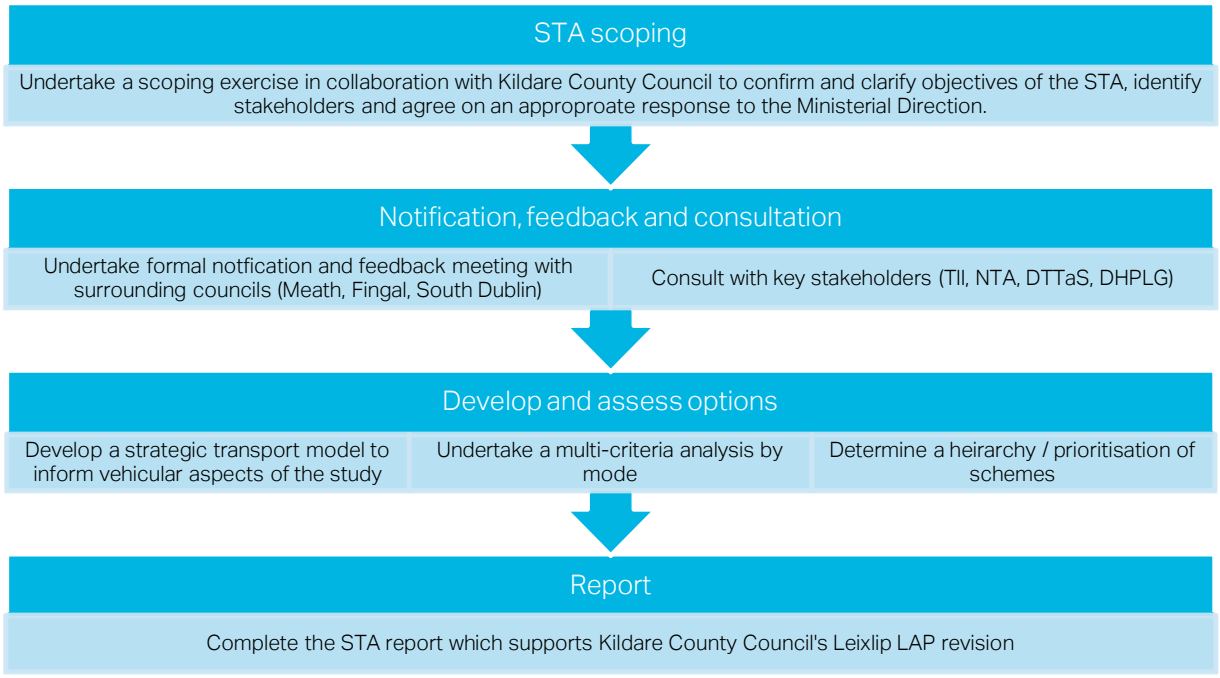
iv. The phasing of new development in tandem with the delivery of required infrastructure that should be determined through a detailed infrastructural assessment and master planning process for significant new housing development areas".

The purpose of this STA is to carry out an assessment of the transportation elements of the 'Network' infrastructure class, informed by policy review and stakeholder consultations. The STA shall inform all transportation requirements within the urban footprint of Leixlip over the next several plan cycles and potential new development lands north of the railway line at Confey in the coming years.

Figure 1.1 provides an overview of the process adopted in developing the STA[1].

[1] *The Strategic Transport Assessment encompasses all modes of transport: active modes, bus, rail and road.*

Figure 1.1 – STA process overview



1.2 Strategic Transport Assessment Scope

Leixlip is identified as a 'Large Growth Town II' in the Kildare County Development Plan 2017-2023 (CDP) – Large Growth Towns II play a key role in supporting the wider local economy and comprises populations of between 15,000 and 30,000 people. Leixlip has a population of approximately 15,600[2], although population is expected to increase by 27% to approximately 20,000 by 2023.

The growth provisions for Leixlip are set out in the CDP in Section 2 'Core Strategy' and Section 3 'Settlement Strategy'. The Core Strategy of the CDP allocates 10.2% of Kildare's housing growth to Leixlip over the period 2017-2023. The total housing allocation for Kildare over the period 2017 – 2023 is 32,497 no. units. Table 3.3 of the CDP identifies a dwelling target of 3,315 no. units for Leixlip over the plan period.

The 2023 population projection figure for Leixlip (of 19,794) is extrapolated from the County Development Plan and is based on Regional Planning Guidelines (RPG) assumptions of housing vacancy and household occupancy. The household occupancy rate in the 2016 Census (2.78 for Kildare) is higher than the RPG and the County Development Plan assumptions. The housing projections could therefore accommodate a greater population than assumed in the CDP Settlement Strategy. Based on CSO data, the dwellings forecast for Leixlip, could result in a total population of 23,433 people.

Leixlip's settlement boundary and the geographic scope of the STA are outlined in Figure 1.2.

[2] *2016 Census population for Leixlip*

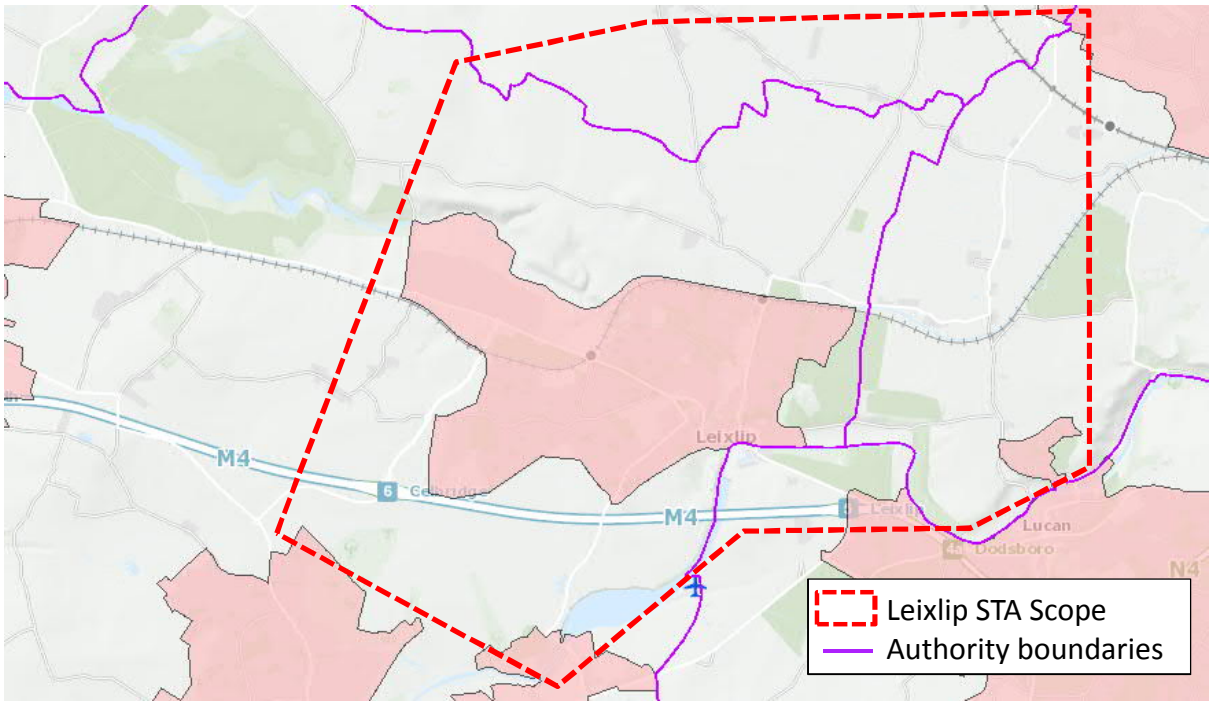


Figure 1.2 – Leixlip Town boundary, STA scope and neighbouring counties[3]

The Leixlip Local Area Plan 2017-2023 sought to accommodate 10.2% of Kildare's allocated housing growth (3,315 new dwellings), in Leixlip over the period 2017-2023 in accordance with the CDP Core Strategy.

The Leixlip Local Area Plan 2017-2023, which was the previous LAP, identified three Key Development Areas (KDAs) of undeveloped residentially zoned land located adjacent to established residential areas; these included:

- KDA1 - The Wonderful Barn: New Residential / Open Space and Amenity
- KDA2 - Easton (off Green Lane): New Residential Lands / Open Space and Amenity
- KDA3 - Leixlip Gate (off Lane): New Residential Lands / Open Space and Amenity

These three KDAs (illustrated in Figure 1.3) have a combined area of 39 hectares with potential to accommodate an estimated 1,170 houses. Furthermore, approximately 86 hectares of land had been identified at Confey with the potential to accommodate a new residential district with an estimated 1,500 houses. Further detail on the 2017-2023 LAP and future development can be found in Appendix A.

The revised LAP (2020-2026) has zoned lands for housing in Leixlip in the interests of meeting the housing allocation requirement in CDP Core Strategy. The plan to achieve the necessary growth is set out in in the revised LAP (2020-2026). The 2020 LAP outlines several Key Development Areas (KDA) which specifically seek to facilitate this increase in population.

[3] *Source: CSO Sapmaps and author scope*

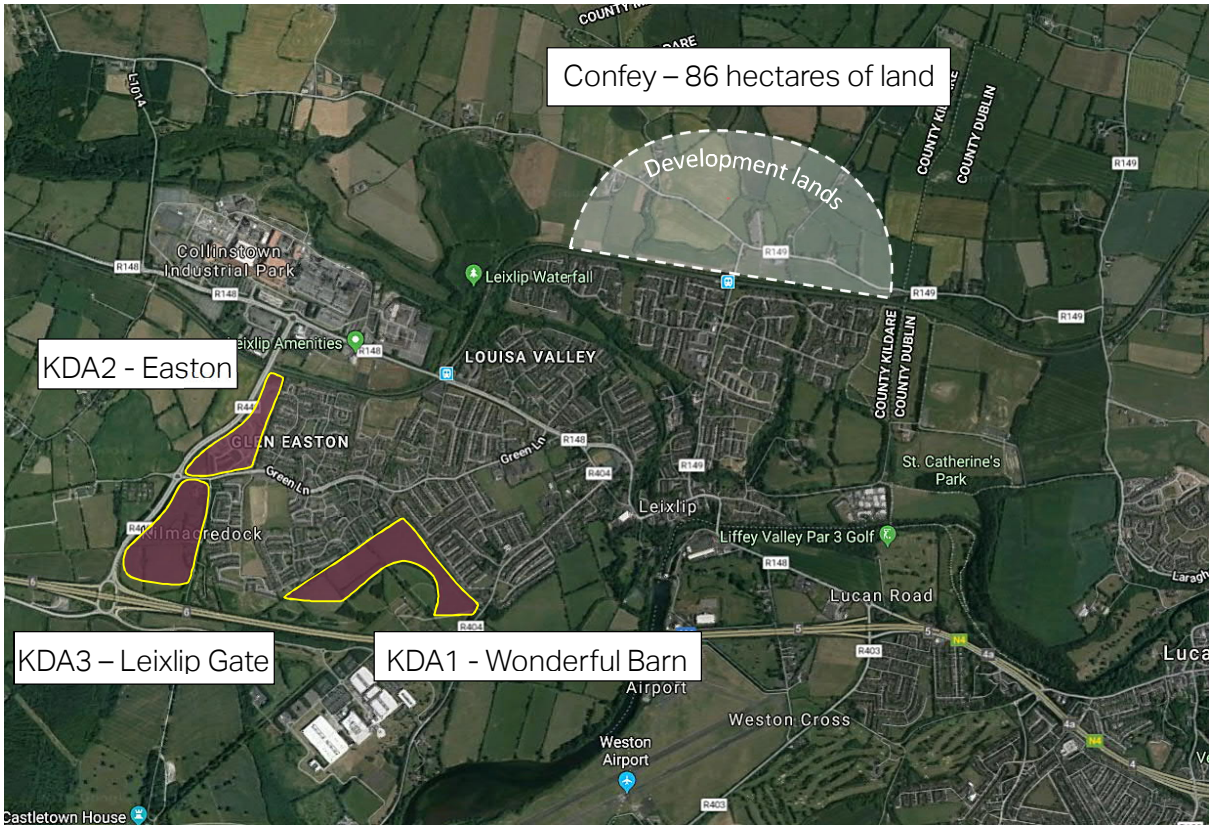


Figure 1.3 – Undeveloped residentially zoned land in Leixlip and Confey Masterplan area identified in the 2017-2023 LAP

1.3 Objective of the Strategic Transport Assessment

The objective of this STA is to inform the revised LAP **2020-2026** by:

- Recommending moderated and reasoned transport interventions (avoiding an over-provision or under-provision of assets or services) to support the town's growth, particularly for Confey
- Ensuring that existing road infrastructure is used as a productive asset and that proposed interventions are appropriate to the level of phased housing development
- Enable sustainable travel within the town and to surrounding areas for all trip purposes.

The STA is summarised as seeking to provide suitable recommendations for transport enhancements across Leixlip, and to ensure Confey is integrated into the existing Leixlip township.

1.4 Assessment methodology overview

To fulfil the objectives of this STA an assessment of Leixlip's current and future transport needs, a series of multi-criteria analyses have been undertaken using relevant data.

Prior to undertaking technical assessments or a multi-criteria analysis (MCA), a policy context review was undertaken for applicable literature – this ensures the STA is informed by the most recent, relevant information from government, surrounding councils and from transportation service providers and operators. This review takes place in Section 1.5.

Data used during the assessment has been provided by Kildare County Council, key stakeholders, site collected data and applicable modelling.

Particular performance and economic analyses of the MCA have been informed by a strategic traffic model based on census data, traffic volumes, road characteristics and anticipated mode shares. The strategic model was developed specifically for this STA, and scenarios considered are informed by

approved or anticipated planning applications known to Kildare County Council, and the expected residential housing requirements over the course of the LAP (to 2025). A separate strategic modelling report accompanies this STA.

1.5 Policy, guideline and transport context review

This section of the report discusses the planning and policy documents relevant to Leixlip. The documents reviewed for this STA are listed below:

- Project Ireland 2040 – National Planning Framework 2040 and National Development Plan 2018-2027
- Kildare County Development Plan 2017 – 2023
- The Leixlip LAP 2017 – 2023
- Transport Strategy for the Greater Dublin Area 2016 to 2035
- South Dublin County Council Development Plan 2016-2022
- Fingal County Council Development Plan 2017-2023
- Smarter Travel – A Sustainable Transport Future 2009 – 2020
- Building on Recovery: Infrastructure and Capital Investment 2016 – 2020
- Investing in Our Transport Future – A Strategic Framework for Investment in Land Transport
- Road Safety Authority Road Safety Strategy 2013 – 2020
- Regional Planning Guidelines for the Greater Dublin Area 2010 – 2020
- The NTA Permeability Guidelines
- N4-N7 Study TII 2017.

The following sub-sections provides a succinct summary of how each policy or literature piece informs this STA. The full policy review is provided in Appendix A.

1.5.1 Project Ireland 2040 – National Planning Framework

Project Ireland 2040 – National Planning Framework (NPF) provides a high-level strategic planning framework to guide development and investment over the coming decades. The NPF empowers each region to lead in the planning and development of their communities, containing a set of National Strategic Outcomes (NSOs) and key principles from which more detailed and refined plans will follow.

Leixlip is located in the Eastern & Midland Region which has experienced high levels of population growth in recent decades, at more than twice the national growth rate. A population of 2.58 million is forecast by 2040 in the region, 500,000 more than present.

Key future planning and development and place-making policy priorities for the Eastern Region which are relevant to Leixlip include:

- "Enabling the complementary development of large and county towns in the wider Greater Dublin Area and Midland areas on the key strategic and public transport routes in a regionally co-ordinated manner, with an enhanced emphasis on measures to promote self-sustaining economic and employment based development opportunities to match and catch-up on rapid phases of housing delivery in recent years."[4]
- "Building on the progress made in developing an integrated network of greenways, blueways and peatways, that will support the diversification of rural and regional economies and promote more sustainable forms of travel and activity based recreation utilising canal and former rail and other routes."[4]

[4] *Project Ireland 2040 – National Planning Framework, P35*

Another one of the many applicable references and objectives from the document includes the NPF's National Policy Objective (NPO) 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."[5]

1.5.2 Draft Regional Spatial and Economic Strategy 2019 - 2031

The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region 2019-2031 sets out a framework to direct future growth of the Eastern and Midland Region over the medium to long term and implement the strategic planning framework set out in the NPF. The draft RSES includes a strategic plan, the Metropolitan Area Strategic Plan (MASP) for the Dublin Metropolitan Area (DMA) – within which Leixlip is located. The MASP identifies a number of strategic development areas including Leixlip/Confey in recognition of the area's location and proximity to the Dublin - Maynooth railway line forming part of the north west transport corridor.

The Draft RSES sets out the settlement hierarchy for the DMA and the population and housing targets for each County. The draft RSES recognises that Leixlip, through its identification within a 'Strategic Development Corridor', will play a contributory role in supporting future residential and employment services for the DMA. Leixlip's position within the DMA is reflected within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.

1.5.3 Kildare County Development Plan 2017 – 2023

The Movement and Transport section (Section 6) of the Kildare CDP, aim is:

"To promote ease of movement within and access to County Kildare, by integrating sustainable land use planning with a high quality integrated transport system; to support improvements to the road, rail and public transport network, together with cycleway and pedestrian facilities and to provide for the sustainable development of aviation travel within the county in a manner which is consistent with the proper planning and sustainable development of the county."[6]

The CDP further identifies a number of policies that are relevant to the revision of the LAP as follows:

HU 1 – Seek to ensure that sufficient zoned land continues to be available at appropriate locations to fulfil the housing requirements of the county as set out in the Core Strategy.

SO1 – Support the sustainable long-term growth of the Metropolitan Area towns of Leixlip, Maynooth, Celbridge and Kilcock and zone additional lands, where appropriate, to meet the requirements of the Core Strategy and Settlement Hierarchy of this Plan.

SO2 – Carry out a strategic Land Use, Employment and Transportation Study of north east Kildare including the Metropolitan area towns of Leixlip (and Collinstown), Maynooth, Celbridge and Kilcock. The preparation of the study will have regard to existing and emerging local area plans. It is envisaged that the study will involve the participation of all strategic stakeholders, including the National Transportation Authority, adjoining local authorities (i.e. Meath, Fingal and South Dublin County Councils), the Regional Assembly, transportation providers, Waterways Ireland, Government Departments and Environmental Agencies.

SO12 – Investigate, in consultation with government departments, statutory agencies and stakeholders, options for the future growth of Leixlip, including the feasibility of developing a new residential district to the north of the Dublin – Sligo rail corridor. The Regional Planning Guidelines designate Leixlip as a Large Growth Town II within the metropolitan area of Dublin. The draft RSES recognises that Leixlip, through its identification within a 'Strategic Development Corridor', will play a contributory role in supporting future residential and employment services in the region.

[5] *Project Ireland 2040 – National Planning Framework, P82*
[6] *Kildare County Development Plan 2017 – 2023, P127*

MO 8 – Examine the feasibility of delivering an overpass of the M4 to link the Wonderful Barn at Leixlip to Castletown Demesne in Celbridge in consultation with TII.

MTO2 – Prepare a Strategic Land Use and Transportation Study for:

(a) North East Kildare including the Metropolitan area towns of Leixlip, Maynooth, Celbridge and Kilcock; and

(b) The central towns of Naas, Newbridge, Kilcullen, Kildare Town and Clane;

In consultation with the NTA, DTTS, TII and other stakeholders to inform the strategic development of these areas and identify the roads and transportation infrastructure that is required to support the future development of these areas.

MTO 3 – Review and implement Integrated Transport Studies for Maynooth, Leixlip, Celbridge, Naas, Newbridge, Kildare and Athy in conjunction with the DTTS, TII and NTA and to prepare new Integrated Transport Studies for other towns, villages and settlements as required, to provide a framework to cater for the movement of pedestrians, cyclists, public transport and private vehicles.

RS 9 – Co-operate with adjoining authorities and other public authorities to secure new and/ or improved road infrastructure at towns bordering the county boundary including Blessington, Kilcock, Maynooth and Leixlip

In terms of improvements to the road network, the following regional roads have been identified for improvement:

- R148: County boundary at Leixlip to county boundary at Cloncurry via Maynooth and Kilcock
- R149: Leixlip to county boundary
- R404: Leixlip to Junction with the R403

1.5.4 The Leixlip LAP 2017 – 2023

The previous Local Area Plan 2017-2023 sought "to accommodate 10.2% of Kildare's allocated housing growth in Leixlip over the period 2017-2023 in accordance with the County Development Plan Core Strategy." In order to achieve this, additional zoned land in Leixlip will be required cater for this level of growth. The existing LAP will need to be revised to address this.

The population of Leixlip is expected to increase by 27% (i.e. from 15,576 to 19,782) by 2023. Lands zoned for residential development under the current plan is not sufficient to cater for this level of growth. A revised LAP (2020-2026) is therefore required to ensure that additional lands are zoned for housing in Leixlip in the interests of meeting the housing allocation requirement in the core strategy of the Kildare County Development Plan 2017-2013.

The LAP (2017-2023) identified approx. 39 hectares of undeveloped residentially zoned land located adjacent to established residential areas. In order to provide an adequate supply of housing over the Plan period, additional new housing lands needs to come forward for development during the lifetime of the Plan. Approx. 86 hectares of land was identified at Confey, located to the north of the railway line, with the potential to accommodate a new residential district. An assessment of the residential units for the KDAs and for the Masterplan lands at Confey identified in the LAP are presented in Figure 1.4 below.

Location of Development	Quantum of Undeveloped Land (hectares approx.)	Estimated Residential Capacity (approx. no. of Units)	Density Range** (units per hectare)
Infill	2.3	60 - 80	30-35
KDA* 1 The Wonderful Barn	15	450 - 525	30-35
KDA 2 Easton	9	270 - 315	30-35
KDA 3 Leixlip Gate	13	390 - 455	30-35
Sub Total	*39.3*	1170 – 1380	30-35
Masterplan Lands at Confey	86	1500**	35
TOTAL	**125.3**	**2880**	**30-35**

* *Key Development Area*

** *Figures stated represent an estimate only. The density of development and number of units permissible will be determined at detailed design stage based on a full assessment of site characteristics and local sensitivities.*

Figure 1.4 – Extract of Leixlip LAP 2017-2023 Table 4.1 Residential Unit Assessment

1.5.4.1 LAP policies and objectives

In relation to movement and transport the past LAP (2017-2023) aimed to:

To promote and facilitate a sustainable transport system for Leixlip that prioritises walking, cycling and public transport and provides an appropriate level of road infrastructure, road capacity and traffic management to support the future development of the town.[7]

MT1 – Walking and Cycling – The objectives of the LAP supported the delivery of a high quality, permeable and attractive pedestrian and cycle network in Leixlip that allow for multiple direct connections between exiting key destinations and nodes where high quality amenity / tourism facilities could be provided.

MT2 - Public Transport - This objective of the LAP promoted the sustainable development of Leixlip by supporting and guiding the relevant national agencies in delivering improvements to the public transport network and to public transport service.

MT3 – Road and Street Network - The policy stated that, "It is the policy of the Council to maintain, improve and extend the local road network in and around Leixlip to ensure a high standard of connectivity and safety for all road users."

Key transport infrastructure from the LAP (2017-2023) is shown in Figure 1.5.

[7] Leixlip Local Area Plan 2017-2025, Section 8, P39

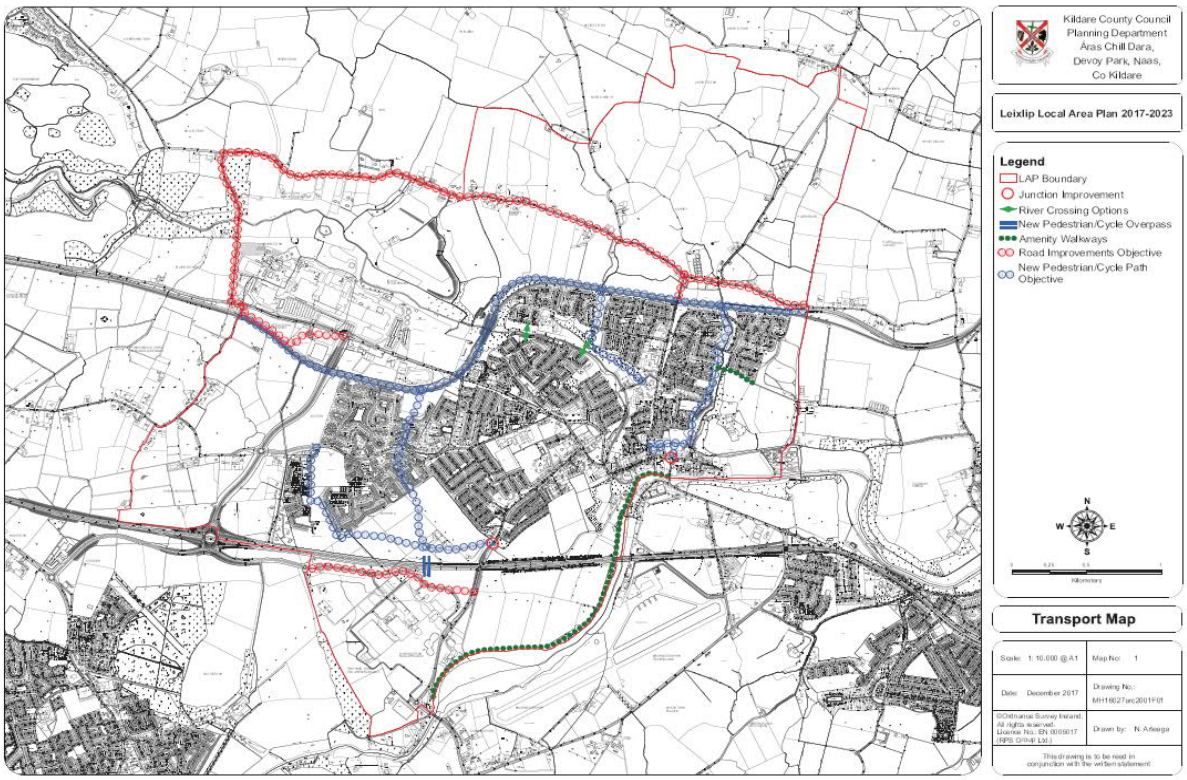


Figure 1.5 – Leixlip transport map (Source: Leixlip LAP 2017-2023)

1.5.4.2 Community facilities

Leixlip has a wide variety of existing community facilities and services and active community groups that provide an important support network to the residential population:

- Numerous childcare facilities as shown in Figure 1.6
- Several community facilities such as churches, libraries, Garda stations as shown in Figure 1.7

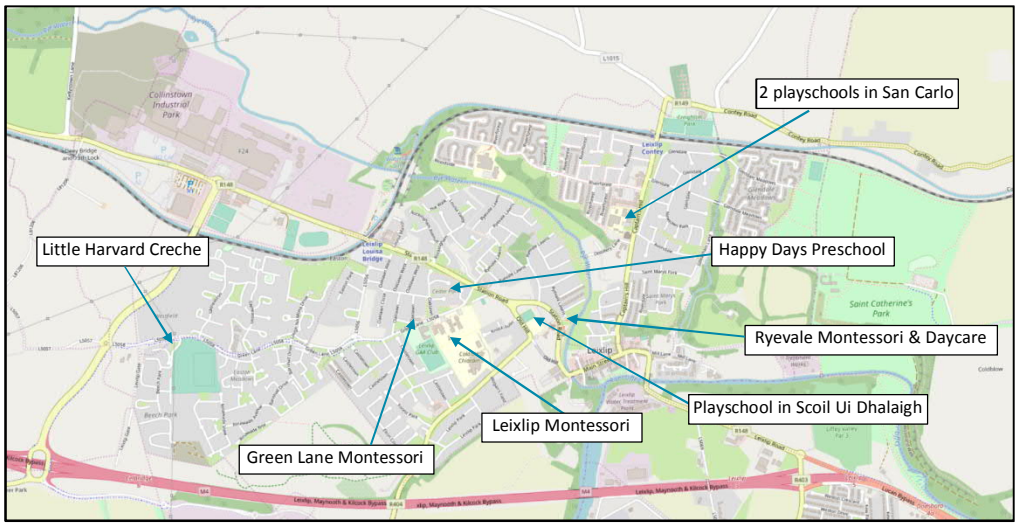


Figure 1.6 – Leixlip childcare facilities

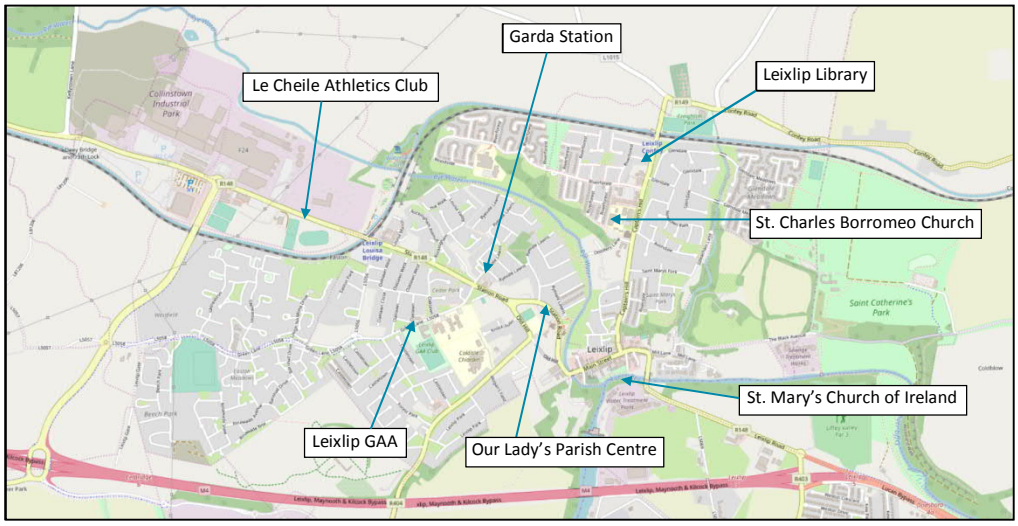


Figure 1.7 - Leixlip community facilities

Previous Figure 1.6 and Figure 1.7 are provided as illustrative, a comprehensive review of community facilities will be included within a Social Infrastructure Audit commissioned separately by Kildare County Council.

1.5.5 South Dublin County Development Plan 2016-2022

The River Liffey forms the boundary between Kildare County Council and South Dublin County Council (SDCC), thus future schemes earmarked within the SDCC Development Plan 2016-2022 have been considered for a potential impact on Leixlip.

The SDCC Road objectives, contained within the SDCC Development Plan, have the potential to provide relief to existing routes and also facilitate the development of new lands. The "medium to long term" objectives outlined in the SDCC Development Plan include the:

Western Dublin Orbital Route (north): This is a new high capacity road from Tootenhill to the Leixlip M4 interchange (with a provision to make a further connection to the N3 i.e. Ongar Link Road).

1.5.6 Fingal County Council Development Plan 2017-2023

The boundary between Co. Kildare and Fingal County Council (FCC) is located immediately to the east of Leixlip, passing through St. Catherine's Park. Like SDCC, future scheme within the FCC Development Plan may have impacts on Leixlip.

The N3-N4 link (Ongar to Barnhill) is a road objective within Fingal County Council's Development Plan. The scheme, set out in the FCC Development Plan, would provide a new quality road link from the N3 to the N4 and would involve the provision of a new bridge crossing of the River Liffey.

The road consists of a single carriageway link road commencing at the existing N4 Junction 5 (Leixlip) which then travels northwards (through St. Catherine's Park to the east of Leixlip) providing an eastern bypass of Leixlip, travelling through Barnhill and connecting to the Ongar Distributor Road at Hansfield.

1.5.7 N4 / N7 Corridor Study

This study, undertaken by TII assessed impacts of forecast growth in the SDCC administrative area on the road network up to a forecast year 2023. A future 'Do Something' scenario consisting of a number of potential local road schemes was identified for the Study Area. The schemes identified were divided into two broad categories, namely:

1. Localised Junction Upgrades
2. SDCC Road Objectives.

In addition to these schemes, two further scheme options were identified, whose delivery / implementation does not fall under the direct remit or control of SDCC:

3. Ongar Link Road (a N3/N4 link road)
4. M50 Demand Management Measures (multi point variable tolling on the M50)

The cumulative impact of the 'Do Something' measures results in significant positive impacts on the overall network performance, but do have some high expected trip numbers along the tested Ongar Link (Figure 1.8). The Ongar Link was provided as a sensitivity test and did not therefore have a conclusion regarding its progression or not.

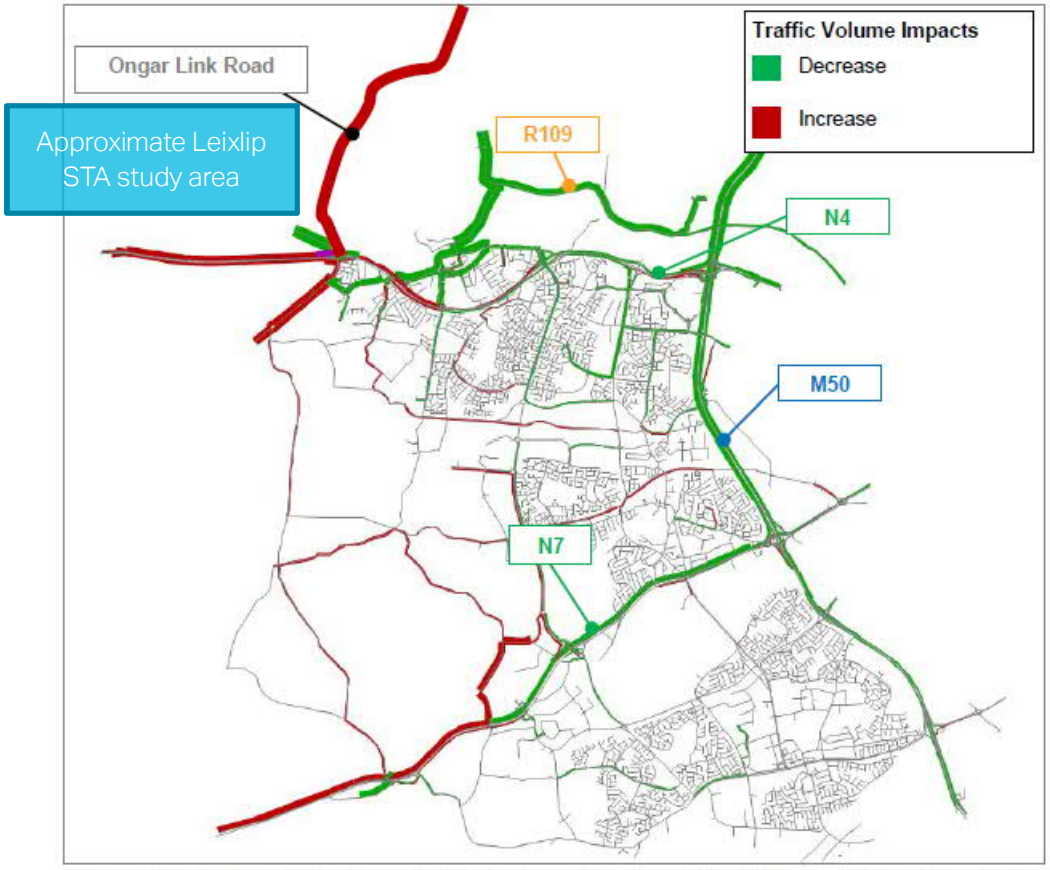


Figure 6.10: Do Something Scenario Vs Do Something Sensitivity A (Ongar Link) AM Peak 2023

Figure 1.8 - Reproduction of Figure 6.10 from N7-M4 study (with study area overlay)

1.5.8 The Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022

The Regional Planning Guidelines the Greater Dublin Area 2010-2020 (RPGs-GDA) provides an overall strategic context for the development plans of each local authority in the Greater Dublin Area (GDA) including population and housing targets, and also provide a framework for future investment in environmental services, transportation and other infrastructure.

The RPGs-GDA identify two planning policy zones in the GDA:

- Metropolitan Area - which includes the Kildare towns of Maynooth, Leixlip, Celbridge and Kilcock
- Hinterland Area - includes the rest of Kildare

The RPGs will imminently be replaced by the new RSES under the revised National Planning Framework hierarchy of development plans. The RSES for this region is currently in draft form.

1.5.9 Transport Strategy for the Greater Dublin Area 2016 to 2035

The Transport Strategy for the GDA 2016-2035 aims to contribute to the economic, social and cultural progress of the GDA by providing for the efficient, effective and sustainable movement of people and goods.

The strategy outlines a suite of transportation objectives for the GDA including the provision of additional public transport facilities (heavy rail, light rail, bus and bus rapid transit facilities), cycling and walking infrastructure and road network measures up to 2035.

The priorities of the strategy include:

- To address urban congestion
- To protect the capacity of the strategic road network
- To reduce the share of trips undertaken by car and increase walking, cycling and public transport
- To provide a safe cycling network
- To enhance the pedestrian environment, in particular to overcome severance and increase permeability
- To consider all-day travel demand from all societal groups.

1.5.10 Building on Recovery: Infrastructure and Capital Investment 2016-2020

On 29 September 2015 the Government announced its capital spending plan, entitled Building for Recovery 2016 – 2021. It represents an exchequer spend of €27 billion over six years. Key investments will be made in transport, education, health and enterprise. The following is applicable in Leixlip:

DART Expansion: A multi-phase DART expansion programme will begin with the extension of the DART line to Balbriggan. The design and planning for the further phases, which include expansion of DART services to Maynooth in the west and Hazelhatch in the southwest, will also be progressed.

1.5.11 Investing in Our Transport Future – A Strategic Framework for Investment in Land Transport

Demand for transport in Ireland grew significantly between 1990 and 2008, and further growth is expected into the future where it's estimated that commuting trips will increase by 35% over current levels by 2040. A minimum of 650,000 additional daily trips to and from work are expected to arise mainly on corridors within the principle cities. The existing transport system cannot cater for this increase and our main urban centres will suffer from severe congestion without appropriate intervention. It is therefore critical that adequate investment is provided so that we can provide for the travel needs of the future Irish workforce and maintain sustainable economic growth and competitiveness.

The document outlines a list of implementation priorities and actions as follows:

- Incorporating SFILT Transport Priorities in Investment Plans
- Integrating Land Use and Transport Planning
- Identifying a Strategic Road Network
- Developing a New Rail Policy
- Maintaining a Key Role for Careful Project Appraisal
- Applying SFILT Research in Future Transport Policy Development.

1.5.12 RSA Road Safety Strategy 2013-2020

This strategy sets out a target for reduction of road collision fatalities on Irish roads to 25 per million population or less by 2020 is required to close the gap between Ireland and the safest countries.

This means reducing deaths from 162 in 2012 to 124 or fewer by 2020. A provisional target for the reduction of serious injuries by 30% from 472 (2011) or fewer to 330 by 2020 or 61 per million population has also been set. However, despite an overall reduction in road deaths, there is a need to focus on vulnerable road-users and causal factors where there are low levels of compliance and this will be a major focus of the Government Road Safety Strategy 2013—2020. The RSA strategy provides specific guidance in relation to reducing pedestrian, cyclist and road collisions.

1.5.13 Smarter Travel – A Sustainable Transport Future 2009 – 2020

Smarter Travel – A Sustainable Transport Future 2009 – 2020 (Smarter Travel) is the transport policy for Ireland that sets out how the vision of a sustainable travel and transport system can be achieved.

The five key goals of this policy document are:

- To reduce overall travel demand
- To maximise the efficiency of the transport network
- To reduce reliance on fossil fuels
- To reduce transport emissions
- To improve accessibility to transport.

Achieving sustainable transport will require a suite of actions that will have complementary impacts in terms of travel demand and emissions. They can be grouped into essentially four overarching ones:

- Actions to reduce distance travelled by private car and encourage smarter travel, including focusing population and employment growth predominantly in larger urban areas and the use of pricing mechanisms or fiscal measures to encourage behavioural change
- Actions aimed at ensuring that alternatives to the car are more widely available
- Actions aimed at improving the fuel efficiency of motorised transport
- Actions aimed at strengthening institutional arrangements to deliver the targets. It is important to underline that the targets and actions are relevant to both urban and rural living.

1.5.14 National Transport Authority Permeability Guidelines

Promoting walking and cycling as modes of transport is a key objective of the National Transport Authority (NTA), particularly for shorter length journeys. Permeability describes the extent to which an urban area permits the movement of people by walking or cycling. The five needs of pedestrians and cyclists are: safety, coherence, directness, attractiveness and comfort. With this in mind, the key principles governing the creation and maintenance of connections in urban and suburban areas are:

- Origins and destinations, such as schools and shops, should be linked in the most direct manner possible for pedestrians and cyclists
- Greater priority should be given to pedestrians and cyclists
- The physical design of links should be fit for purpose in terms of capacity and security
- Junctions in urban and suburban areas should cater for pedestrians and cyclists safely and conveniently.

It has been demonstrated that communities can benefit if direct access by walking and cycling is maintained to the following facilities and services in towns and cities:

- Bus and tram stops
- Rail stations
- Neighbourhood centres
- Local shops or services
- Health facilities
- Schools
- Supermarkets
- Sports grounds and leisure facilities
- Places of Work.

1.6 Application of literature for the Leixlip Strategic Transport Assessment

The literature reviewed (sections 1.5.1 through 1.5.14), in advance of preparing this Leixlip STA takes into account many facets of transportation improvements, for many modes, a range of potential scales and urbanisation levels. Leixlip is referenced in many of the documents as a town expecting significant growth being located in the Dublin Metropolitan Area and GDA.

This STA therefore seeks to fulfil the transport requirements of the town, with particular reference to its expected population and housing growth, high-quality public transport connectivity need (and improvement programmes such as DART Expansion and BusConnects), surrounding council's development plans, and the need to improve the level of sustainable travel.

1.6.1 Leixlip's transport challenges

Overall connectivity between communities' residences and destinations in Leixlip (and further afield) is poor because of the natural topography and geographic features – Rye Water and River Liffey exhibit steep gradients which have historically restricted growth areas. Furthermore, the built environment of the Royal Canals and longstanding railway act as permeability barriers. A limited number of crossing points over the Rye Valley, Royal Canal and railway line inhibit travel by almost all modes of transport creating pinch points such as Cope Bridge, Captain's Hill, Kellystown Lane Bridge.

Permeability and connectivity may also be recognised as limited across the town (for the reasons above), and aged planning practices of enclosed housing developments. These challenges in the existing environment represent weaknesses for transport currently, and more specifically sustainable transport, as some road users (pedestrians particularly), are unable, or less likely, to travel sustainably.

1.6.2 Leixlip's transport opportunity

The objectives of the STA are to support the delivery of a high quality, permeable and attractive transport network for Leixlip. Such a network will align with the aspirations and expectations of the many strategies, guidelines and relevant literature.

The Leixlip transport network should allow for multiple direct connections between existing key sites of the town and any anticipated destinations in the future. Particular focus will be placed on the expected travel requirement of Confey in-light of the imminent residential growth. Where possible connections should favour non-motorised travel, although some road-based interventions may cater for residual demand not facilitated by other modes.

The STA seeks to support:

- The upgrading of existing off-road pedestrian routes within the town to cater for pedestrians and cyclists for all trip purposes.
- Opportunities for local 'on-road' permeability improvements that would provide more direct and safer pedestrian and cyclist access to schools, shops, public transport nodes, amenity areas and community facilities, including the removal of barriers such as boundary walls / hedges along existing or future desire lines.
- Increased access to the rail and bus services, particularly for the Confey Urban Design Framework (UDF) lands located in close proximity to Confey Railway Station and opportunity for BusConnects connection and DART expansion in time.
- The productive use of existing assets.
- Residual trips by private motor vehicles in a timely manner, without an over-promotion of road trips, or over-provision of road assets.

2. Transport context

Prior to investigating potential future options and improvements, it is important to understand Leixlip in respect to its demographic information, modal split, travel behaviour and permeability. Using a variety of data sources, this section seeks to investigate the many existing transport and travel aspects of Leixlip.

2.1 Population and land use

The Leixlip Central Statistics Office (CSO) Settlement boundary contained 15,504 people in 2016 (census, 2016). Figure 2.1 shows the change in population between 2011 and 2016 on a square kilometre grid for Leixlip and the surrounding area. This indicates that the central and eastern areas of Leixlip have experienced modest population decline, which is likely related to aging populations in established neighbourhoods. Critically, the greatest population growth in Leixlip is in the south-west corner near Junction 6 of the M4 where there are few public transport alternatives and walking distances to schools and services are the longest. During the intervening period between censuses, the population of Leixlip has not grown to the same extent as nearby urban centres such as Maynooth, Celbridge and the western Dublin suburbs.

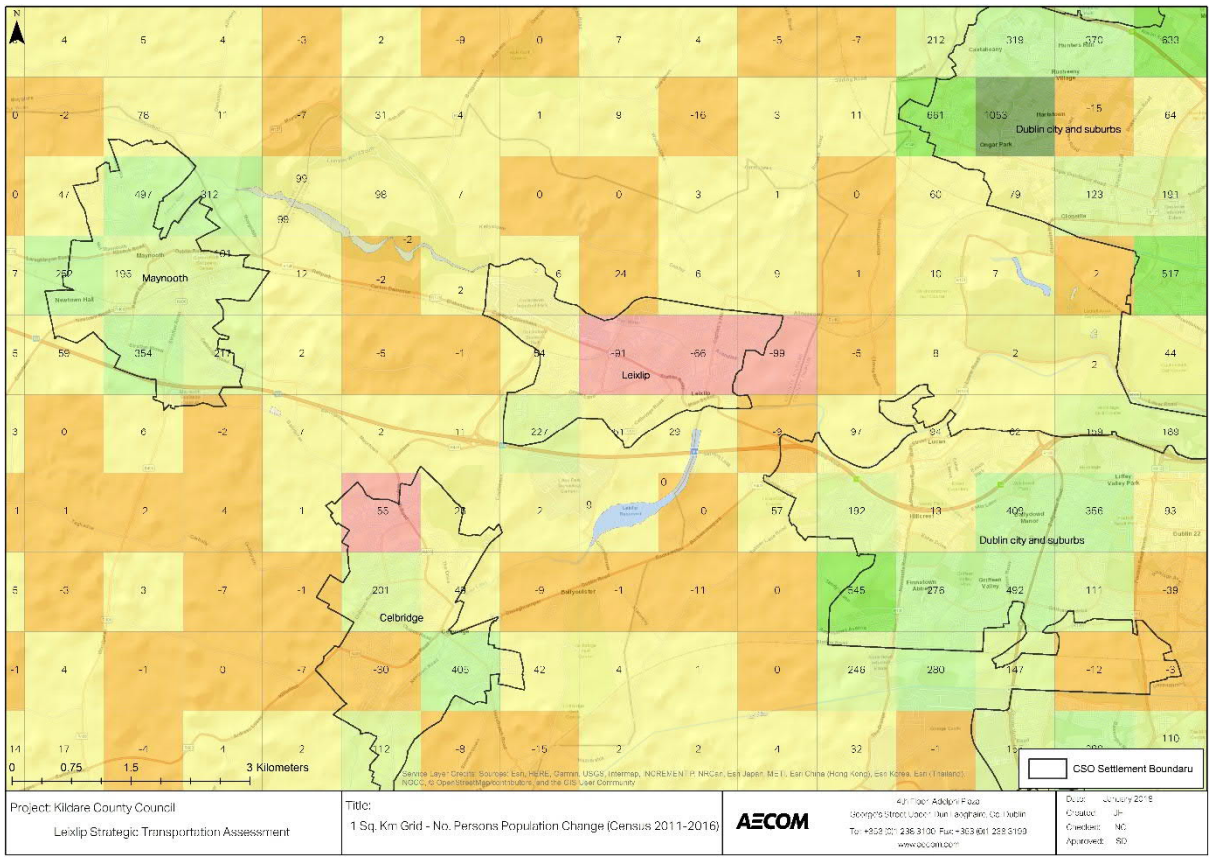


Figure 2.1 – Regional population change on square km grid (Census, 2011-2016)

Figure 2.2 provides an overview of the split between commercial and residential buildings in Leixlip using the GeoDirectory dataset. This map indicates two small concentrations of commercial activity within the town (one along the Main Street and another commercial cluster located near the junction of Captain's Hill and River Forest).

Leixlip predominantly consists of single-use residential housing with very little mixed-use development. On the north-west boundary of the town, the Intel site provides the largest area of continuous commercial activity.

Figure 2.2 – Residential and commercial buildings in Leixlip (GeoDirectory, 2017)

2.2 Public transport

2.2.1 Existing public transport

Leixlip has several bus and rail services which generally provide for radial travel along a corridor from Dublin City Centre to Maynooth. The public transport routes connecting Leixlip and the major destinations are shown in Table 2.1.

Table 2.1 – Summary of destinations served by existing Leixlip public transport services

Operator	Route	Westbound destinations	Eastbound destinations
Irish Rail	Dublin-Maynooth	Maynooth, Longford	Dublin City Centre
Dublin Bus	66	Maynooth	Lucan, Liffey Valley, Dublin City Centre
Dublin Bus	66a	N/A	Lucan, Liffey Valley, Dublin City Centre
Dublin Bus	66b	Hewlett Packard Site	Lucan, Liffey Valley, Dublin City Centre
Dublin Bus	66e	Maynooth	Lucan, Liffey Valley, Dublin City Centre
Dublin Bus	66x	N/A	Dublin City Centre
JJ Kavanagh	139	Maynooth, Sallins, Naas	Blanchardstown
Airport Hopper	767	Maynooth	Lucan, Liffey Valley, Dublin Airport

The Leixlip train stations are located on the Dublin-Sligo line which provides services to the city centre and the opportunity to interchange with services at Clonsilla and the Luas Green Line at Broombridge (Figure 2.3).

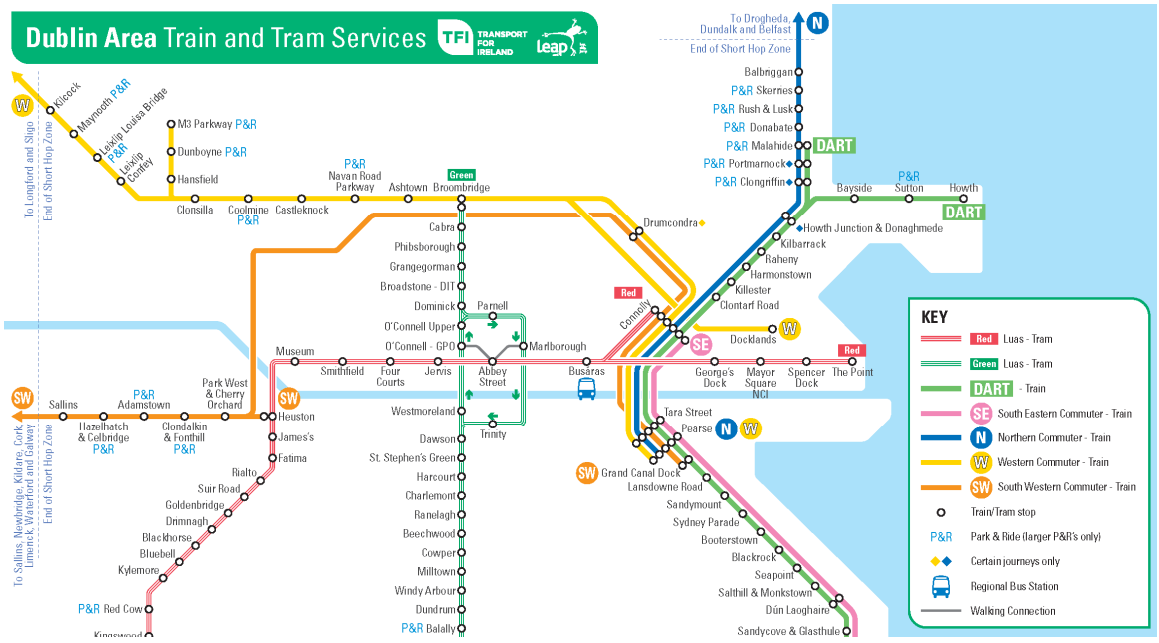


Figure 2.3 – Dublin rail network (source: Transport for Ireland)

While there are multiple public transport services in Leixlip, access to routes varies considerably throughout the town (Figure 2.4) with the south-western areas relatively poorly served in comparison to central areas. There are good opportunities for bus-rail interchange as the majority of bus routes stop by or near Leixlip's two train stations.

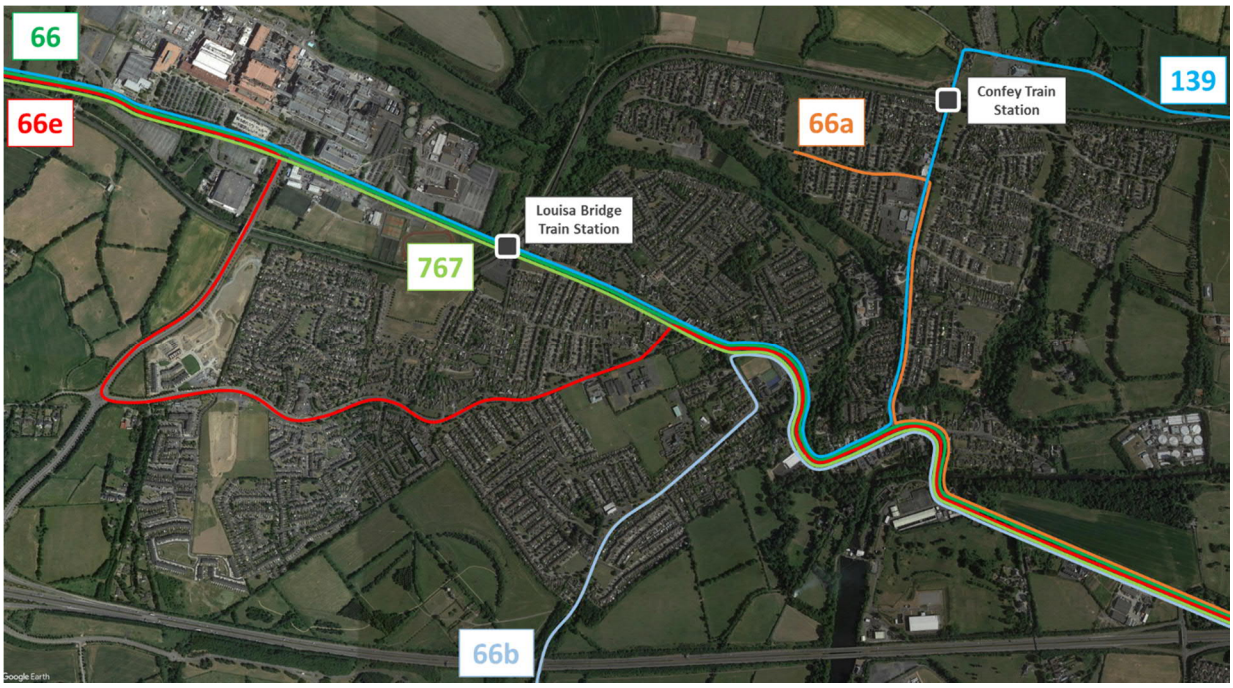


Figure 2.4 – Bus routes and train station locations in Leixlip

There are multiple public transport services in Leixlip, but the frequency differs significantly depending on the route. Figure 2.5 shows the frequency of public transport services in the AM peak. This indicates that rail frequencies are reasonably strong with 3-4 services per hour. Equally some bus routes such as the 66 and 66x have a relatively strong frequency of 2-3 per hour. However, the 66a, 66b and 139 only provide an hourly service and the 66e does not provide AM peak services.

The under provision of commuting services of the 66e route means that a large proportion of Green Lane housing estates do not have access to an effective public transport alternative. The privately-operated 767 provides a half-hourly service linking Leixlip with Dublin Airport.

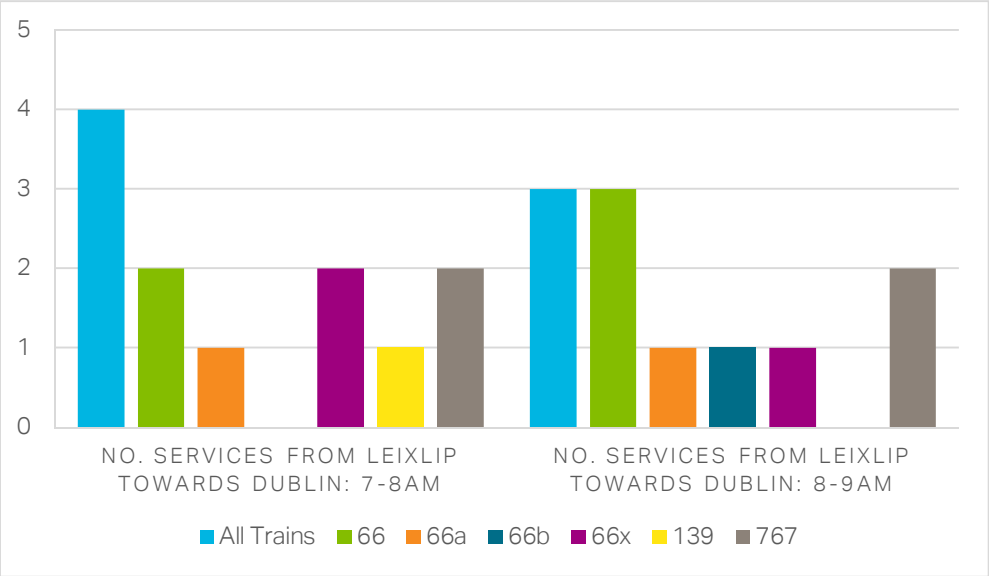


Figure 2.5 – Frequency of public transport services in the AM peak

In 2017, there were 616 daily boarding's at Confey and 1059 daily boarding's at Louisa Bridge. The number of boarding's has grown slightly since 2012 when they were 511 and 969 respectively. In respect to 2017 alightings, there were 611 alightings at Confey and 880 alightings at Louisa Bridge.[8]

2.2.2 Planned public transport changes

The National Development Plan (2018-2027) states that the Dublin-Maynooth railway will be electrified as part of the DART expansion programme by 2027 with additional fleet capacity (Figure 2.6).

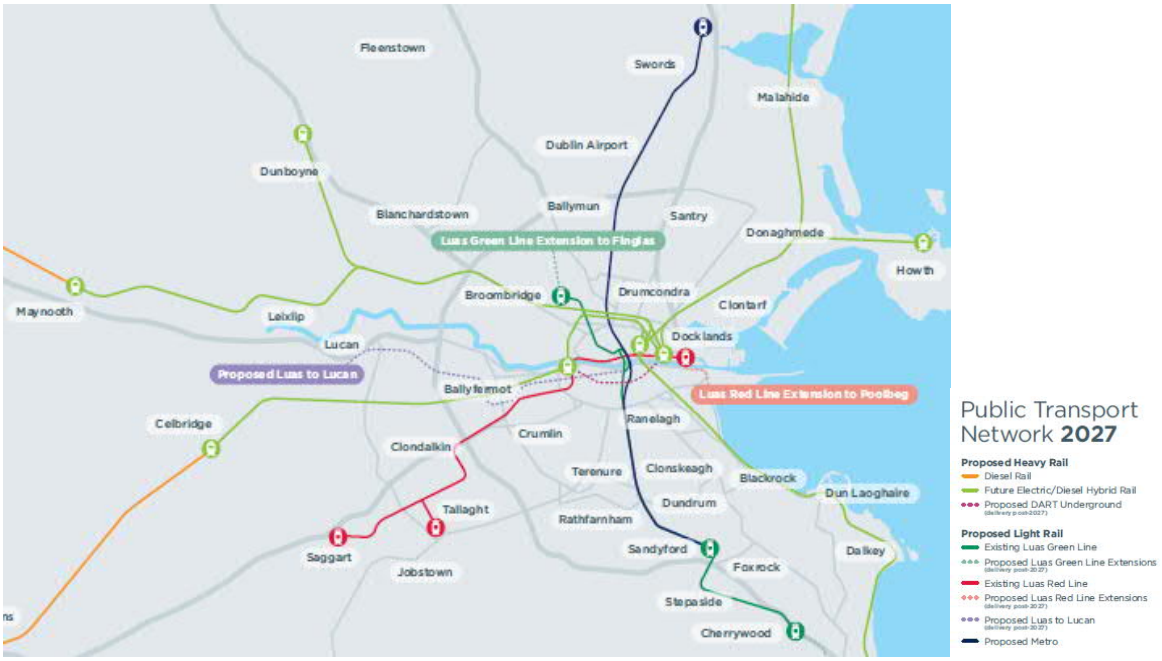


Figure 2.6 – National Development Plan (2018-2027) planned rail infrastructure

The BusConnects network redesign envisions two main radial routes through Leixlip from the city centre; the C3 to Maynooth and the C4 to Celbridge. An orbital bus, the 259 will also be introduced to link Leixlip Confey station with Celbridge & Hazelhatch station. A local view of the proposed BusConnects network for Leixlip is shown in Figure 2.7.

[8] NTA Heavy Rail Census, 2018

Figure 2.7 – BusConnects redesigned network in Leixlip

A wider scope of the redesigned BusConnects network in respect to Leixlip is shown in Figure 2.8.

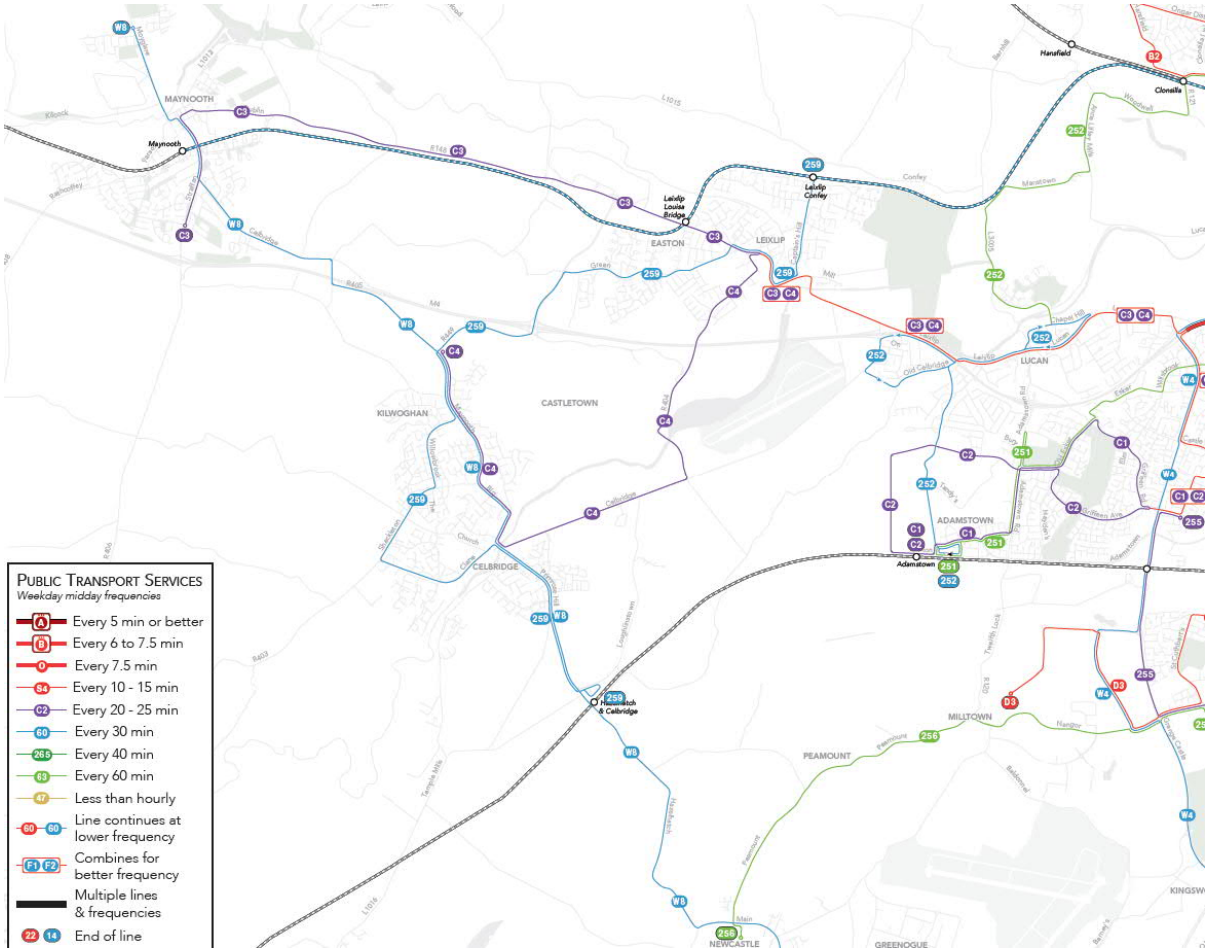


Figure 2.8 – BusConnects redesigned network in the Kildare region

Supplementing the proposed all-day bus routes, there will be a number of peak-only services which travel through Leixlip:

- *323*: Three express services between Maynooth and UCD via Leixlip
- *324*: Three express services between Celbridge and UCD via Leixlip

- *325*: One express service between Leixlip (Captain's Hill) and the city centre
- *326*: One express service between Leixlip (Green Lane) and the city centre

2.3 Road network

The significant roads in Leixlip are shown in Figure 2.9, the main east-west road through the town is the R148 (Station Road and Main Street), and the main north-south road is the R149 (Captain's Hill). A primary constraint to timely daytime road travel in Leixlip is the presence of only one road crossing over the Rye Water - all road traffic between the north and the west of the town must travel via the bridge on the Main Street. In respect to future development at Confey, the bridge over the Royal Canal only has a single lane for traffic and so future development traffic would increasingly be accommodated on the L1015-L1014 or R149 towards Lucan (in the absence of a specific road intervention).

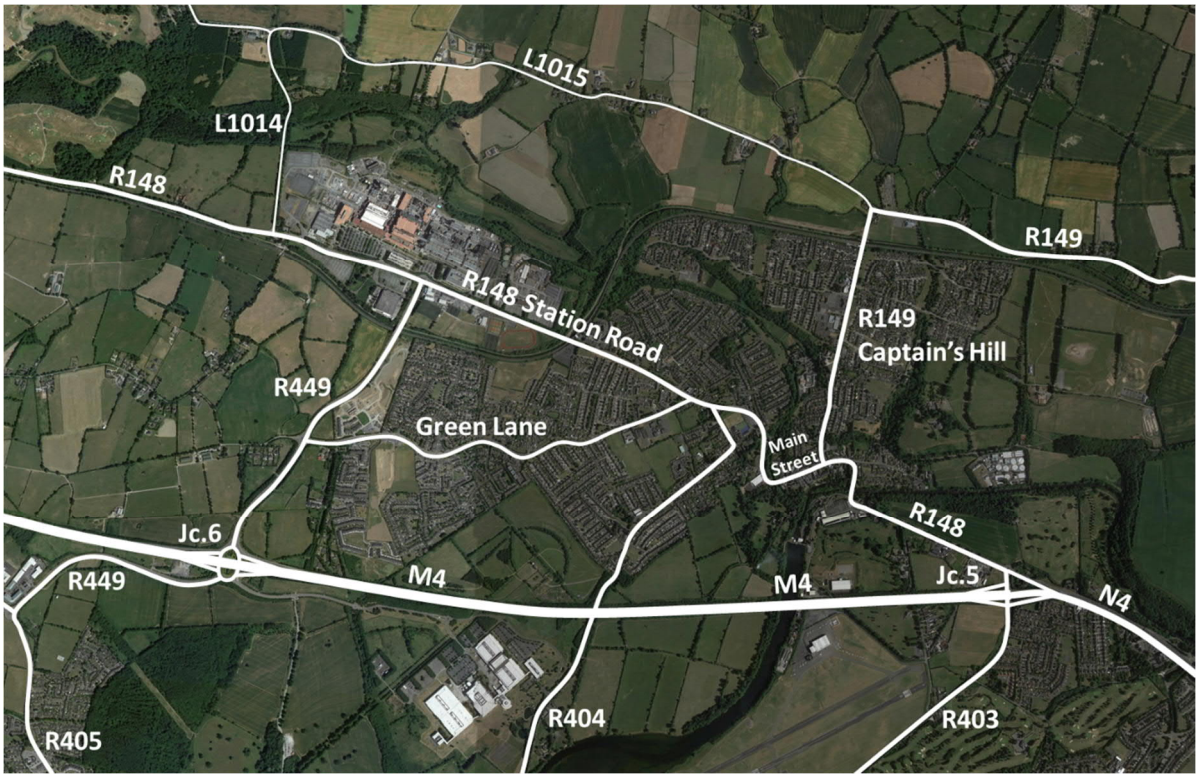


Figure 2.9 – Significant roads in Leixlip

2.4 Modal split

2.4.1 Work trips

Figure 2.10 shows the modal split for work trips in Leixlip. This highlights that Leixlip residents are highly car dependent with 69% of commuters travelling via private motor vehicle, followed by a smaller percentage using public transport; rail (11%) or bus (10%). The lack of mixed-use or commercial development in the town cause a low active mode modal share, with 6% walking and only 1% cycling to work.

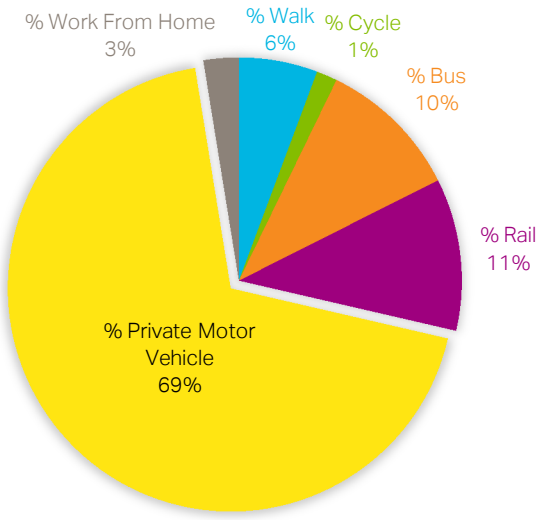
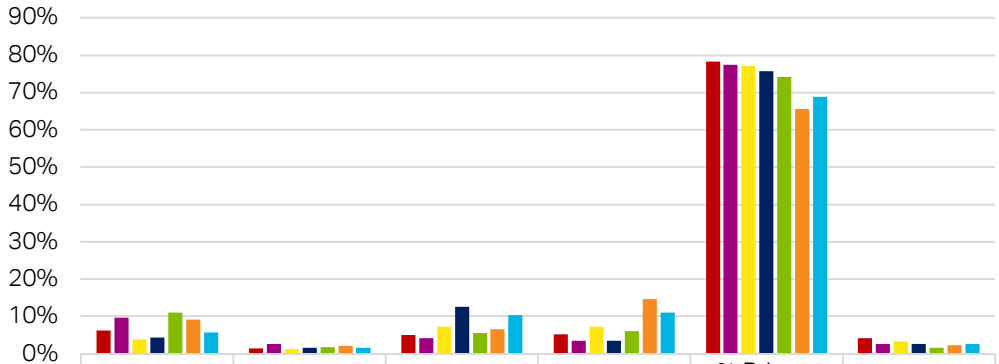


Figure 2.10 – Modal split for work trips by Leixlip residents (census, 2016)

Figure 2.11 compares the modal split for work trips in Leixlip with other Kildare urban centres. This shows that while Maynooth may have lower levels of car dependency, in general the levels of car use observed in Leixlip are substantially lower than the county average, Naas and Dunboyne. The modal split for public transport in Leixlip is generally higher than other settlements, with the exception of Celbridge in relation to bus travel and Maynooth for rail travel. The work trip modal split for active modes in Leixlip is poor in comparison to most other Kildare settlements, reflecting the limited availability of local walking-distance employment. In contrast, Maynooth has a large university located in the centre of the town for employment and there is a stronger mixed-use core for retail and services than Leixlip. Maynooth may less reliant upon the employment opportunity of the Dublin Metropolitan Area.



	% Walk	% Cycle	% Bus	% Rail	% Private Motor Vehicle	% Work From Home
County Kildare	6.2%	1.4%	5.0%	5.2%	78.2%	4.1%
Naas	9.6%	2.6%	4.2%	3.5%	77.5%	2.7%
Dunboyne	3.8%	1.3%	7.2%	7.3%	77.0%	3.3%
Celbridge	4.3%	1.5%	12.5%	3.4%	75.6%	2.6%
Kildare Town	11.0%	1.7%	5.6%	6.0%	74.1%	1.6%
Maynooth	9.1%	2.0%	6.5%	14.6%	65.5%	2.3%
Leixlip	5.7%	1.5%	10.4%	11.0%	68.8%	2.6%

Figure 2.11 – Comparison of modal split for work trips in Kildare towns (census, 2016)

Figure 2.12 shows the percentage of work commutes by private motor vehicle for each CSO small area in 2016. The following spatial observations are made:

- Lower car use near train stations and frequent bus corridors

- Lower car use in areas adjacent to mixed-use development
- Higher proportional car use in the south-west where there is limited public transport opportunity, very little mixed-use development and single entrance housing estates which increase trip distances.

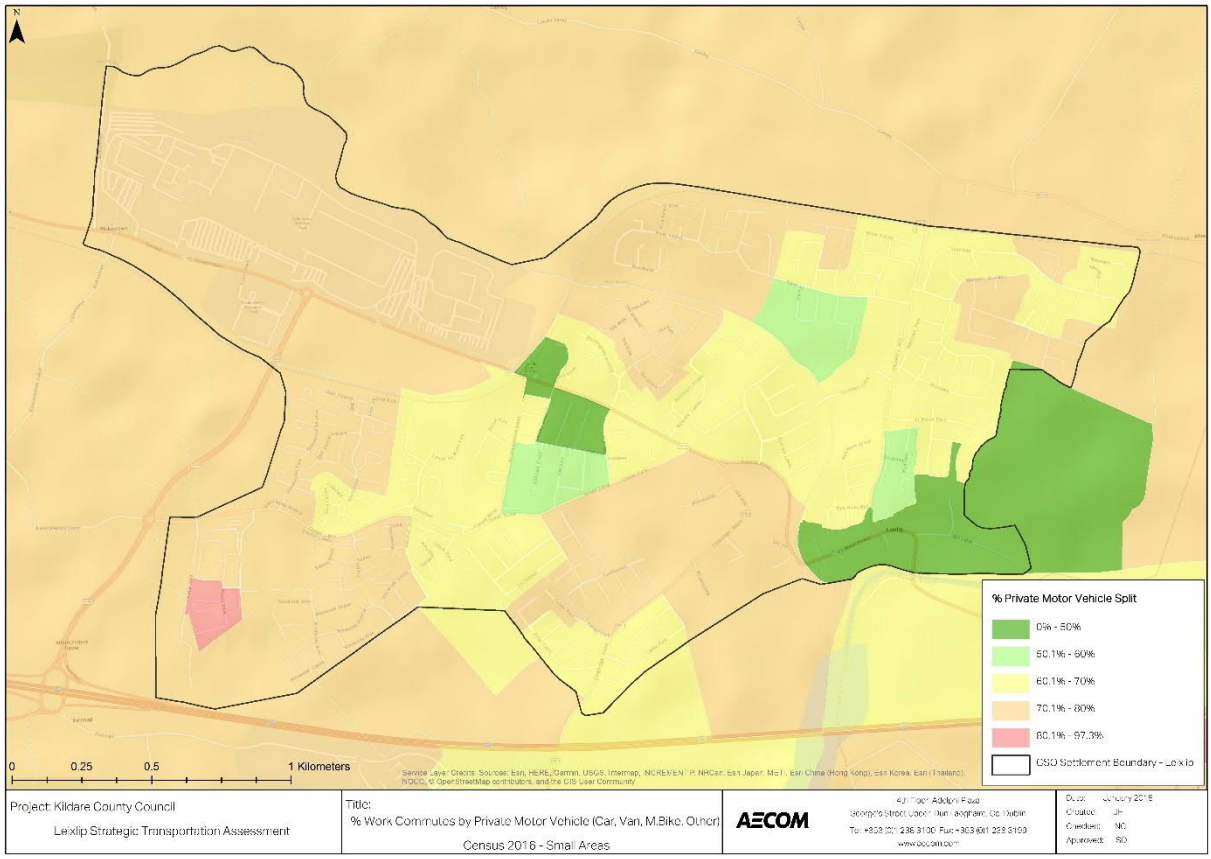


Figure 2.12 – % work commutes by private motor vehicle (census, 2016)

2.4.2 Education trips

Figure 2.13 shows the modal split for education (school and college) trips for Leixlip residents. This highlights that the primary mode of travel is walking (43%) followed by private motor vehicle (34%), with only a small percentage of trips taking place on public transport. It is notable that very few students cycle to school or college (3%).

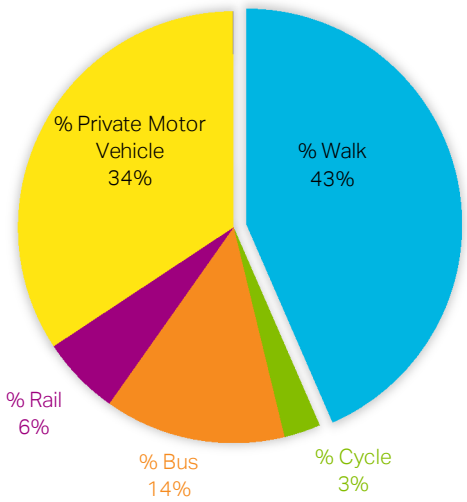
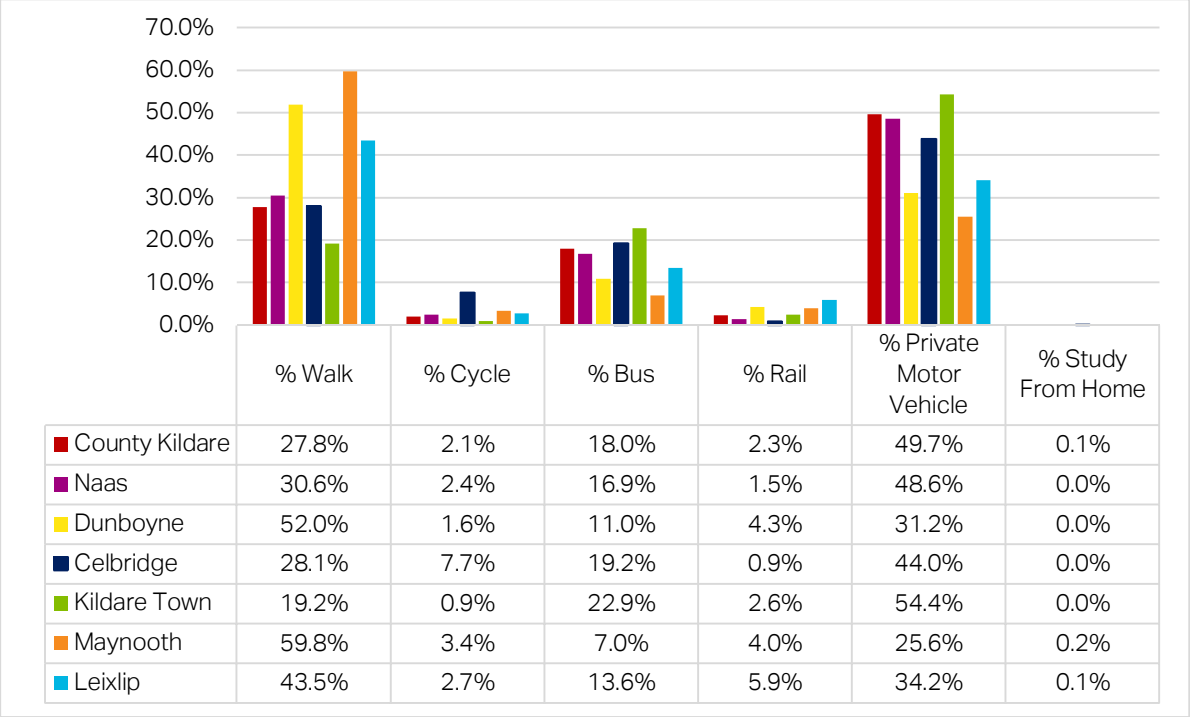


Figure 2.13 – Modal split for education trips by Leixlip residents (census, 2016)

Figure 2.14 compares the modal split for education trips in Leixlip with other Kildare urban centres. Car use is generally lower in Leixlip than other Kildare towns or the county average, with the exception of Maynooth. This is due to a greater proportion of walking in Leixlip and a relatively strong performance for bus and rail travel. In general, cycling for education trips is very low throughout Kildare with the exception of Celbridge.



	% Walk	% Cycle	% Bus	% Rail	% Private Motor Vehicle	% Study From Home
County Kildare	27.8%	2.1%	18.0%	2.3%	49.7%	0.1%
Naas	30.6%	2.4%	16.9%	1.5%	48.6%	0.0%
Dunboyne	52.0%	1.6%	11.0%	4.3%	31.2%	0.0%
Celbridge	28.1%	7.7%	19.2%	0.9%	44.0%	0.0%
Kildare Town	19.2%	0.9%	22.9%	2.6%	54.4%	0.0%
Maynooth	59.8%	3.4%	7.0%	4.0%	25.6%	0.2%
Leixlip	43.5%	2.7%	13.6%	5.9%	34.2%	0.1%

Figure 2.14 – Comparison of modal split for education trips in Kildare towns (census, 2016)

Figure 2.15 shows the percentage of education commutes by private motor vehicle in each CSO small area. This indicates that car use is lowest in areas adjacent to schools and along frequent public transport corridors.

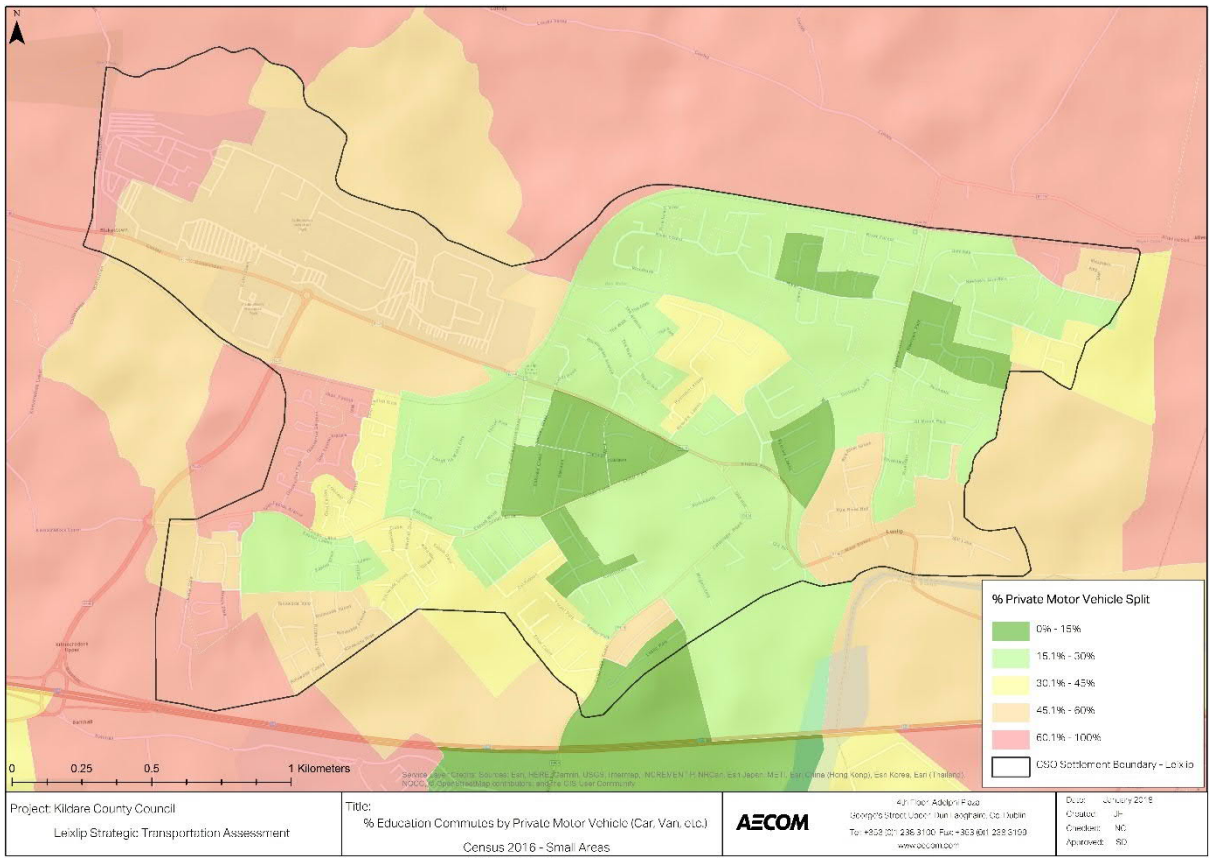


Figure 2.15 – % Education commutes by private motor vehicle (census, 2016)

2.5 Origin-destination analysis

The Place of Work School and College Anonymised Records (POWSCAR (2016)) dataset was used to assess the origin and destinations of trips for Leixlip residents. In the case of education trips, 71% of trips were internal to local schools with the remainder going to Dublin City and Suburbs (18%) or Maynooth (7%) for school/college destinations.

The situation for work trips is significantly different with only 13.3% of Leixlip residents travelling internally within the settlement for work (Table 2.2). Instead, 60.8% of Leixlip residents travel to Dublin City and Suburbs for work with remainder commuting to Swords and a variety of Kildare settlements.

Table 2.2 – POWSCAR (2016) work trip destinations for Leixlip residents

Rank	Destination town	Trips from Leixlip	%
1	Dublin City and Suburbs	3,546	60.8%
2	Leixlip	776	13.3%
3	Dublin Rural	387	6.6%
4	Kildare Rural	371	6.4%
5	Maynooth	231	4.0%
6	Celbridge	101	1.7%
7	Swords	61	1.0%
8	Naas	61	1.0%
9	Meath Rural	44	0.8%
10	Clane	22	0.4%

In respect to people travelling to Leixlip for work, Table 2.3 shows that the largest proportion of people are travelling from Dublin City and Suburbs to Leixlip (29.9%) followed by internal trips (13.8%) and trips from Maynooth (6.2%).

Table 2.3 – POWSCAR (2016) origin of work trips to Leixlip

Rank	Origin town	Trips to Leixlip	%
1	Dublin City and Suburbs	1,680	29.9%
2	Leixlip	776	13.8%
3	Maynooth	347	6.2%
4	Kildare Rural	319	5.7%
5	Celbridge	310	5.5%
6	Meath Rural	191	3.4%
7	Kilcock	90	1.6%
8	Clane	85	1.5%
9	Mullingar	74	1.3%
10	Naas	70	1.2%

2.5.1 Work trip destinations - sustainable modes

Figure 2.16 shows the local work destinations for Leixlip residents who use sustainable modes (public transport, walk, cycle). This indicates that there are a moderate number of sustainable travel commutes to Intel, the Main Street, Ryevale Nursing Home, SuperValu and schools with the exception of Confey Community College.

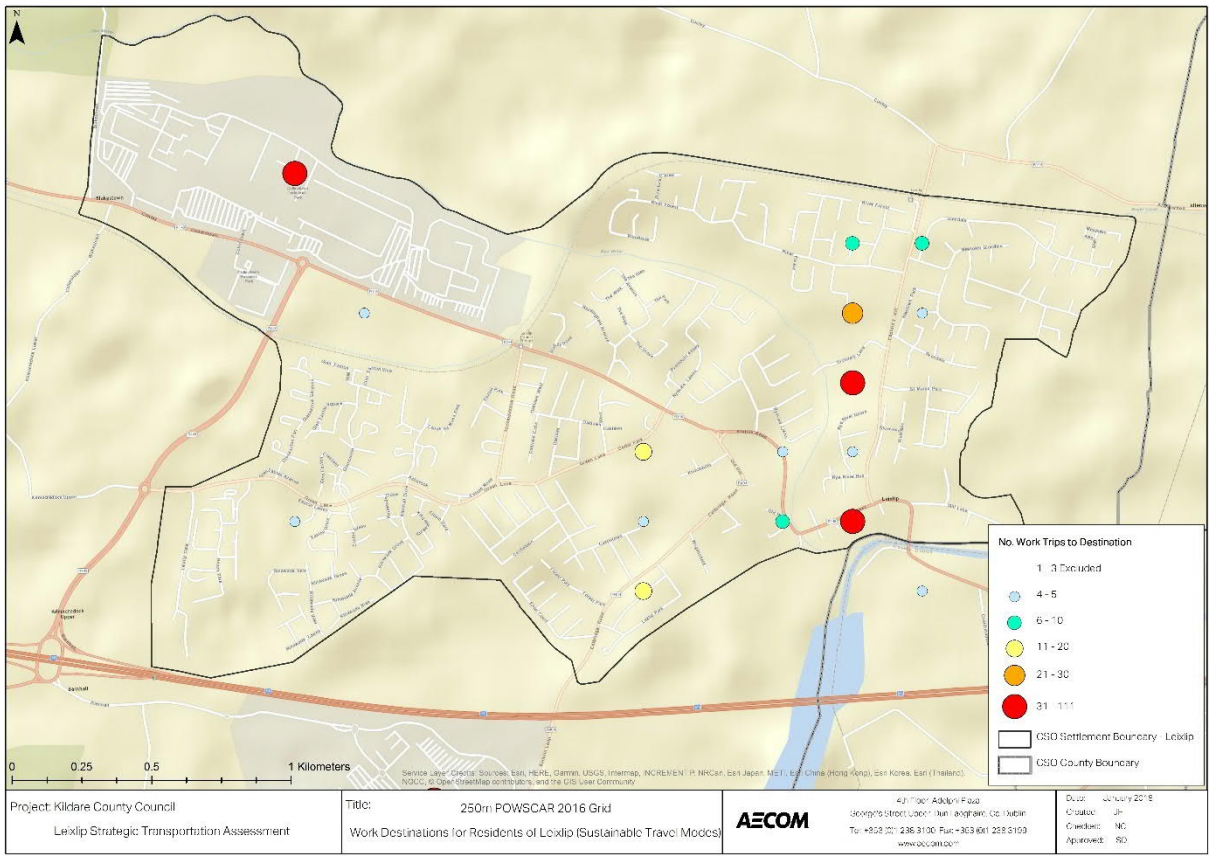


Figure 2.16 – Local work destinations for Leixlip residents by sustainable modes

Figure 2.17 shows the regional work destinations for Leixlip residents travelling via sustainable modes. Adjacent to Leixlip, there are a large number of trips to the Hewlett Packard site to the south of the town. However, most trip destinations are longer distance commuters to the city centre by bus or rail. This highlights the radial nature of the public transport network which provides effective travel to the city centre but provides limited alternatives for inter-suburban orbital travel.

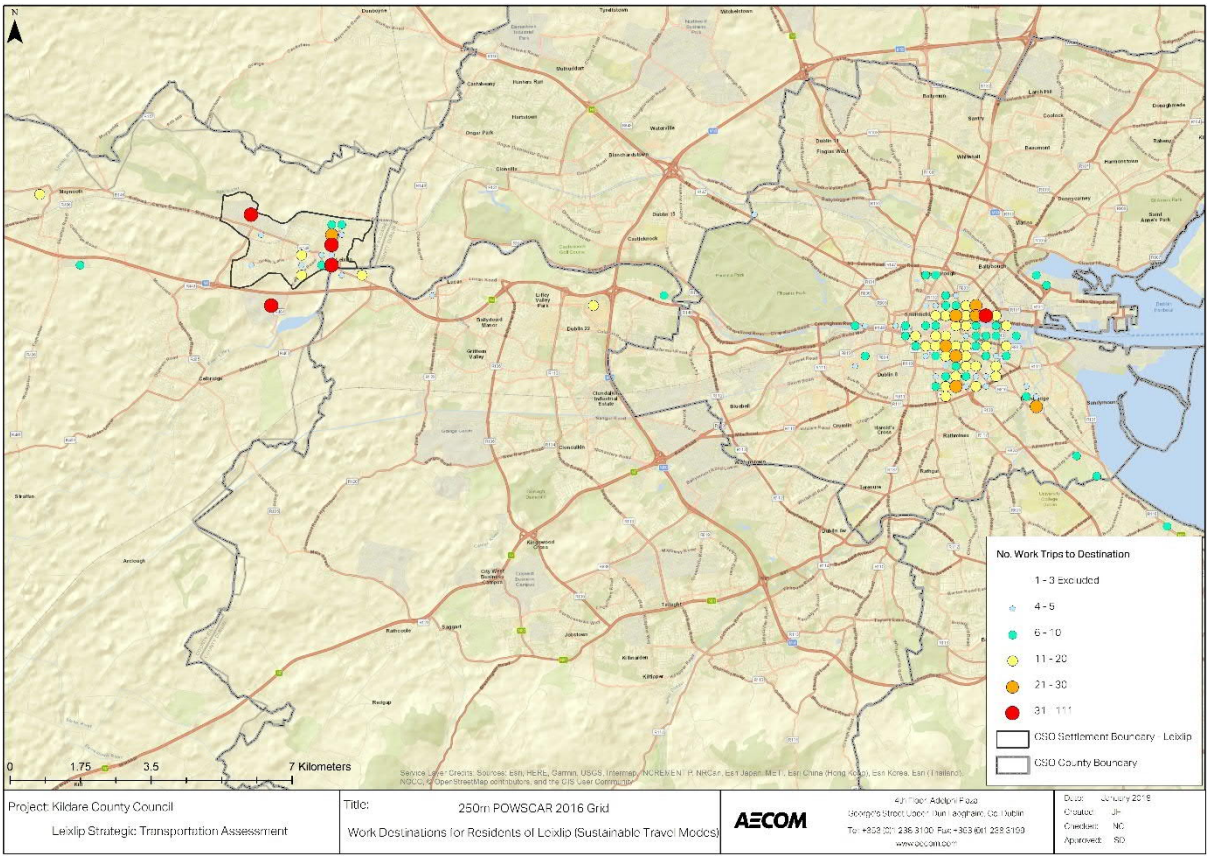


Figure 2.17 – Regional work destinations for Leixlip residents by sustainable modes

2.5.2 Work trip destinations - private motor vehicle

Figure 2.18 shows the local work destinations for Leixlip residents who use private motor vehicles. This highlights a high number of short distance work trips by car which could be completed by active modes instead.

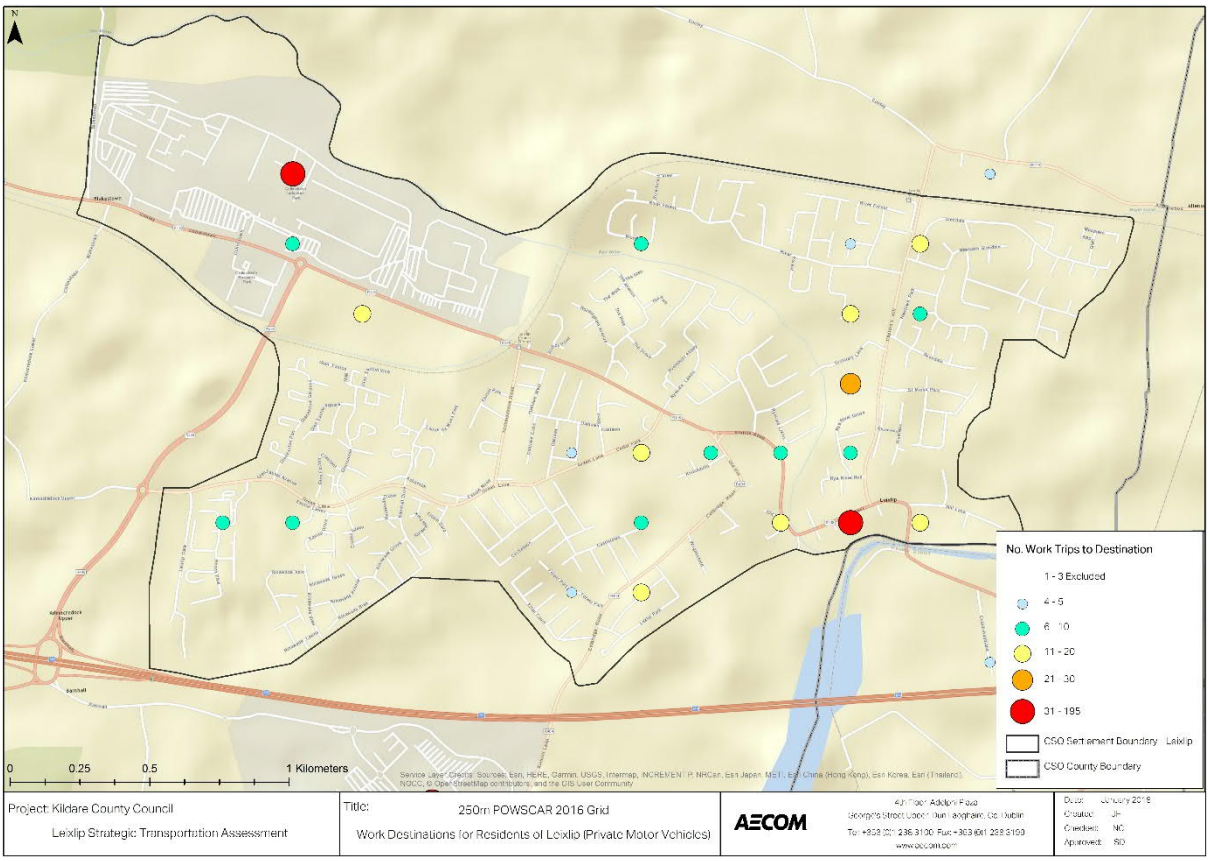


Figure 2.18 – Local work destinations for Leixlip residents by private motor vehicles

Figure 2.19 shows the regional work destinations for Leixlip residents who use private motor vehicles. This highlights a large number of car trips to Hewlett Packard, the city centre and Maynooth; all of which have public transport alternatives to the private car. However, most destinations are highly dispersed across the GDA in areas which are hard to reach via public transport e.g. Sandyford, Tallaght, Citywest and Blanchardstown.

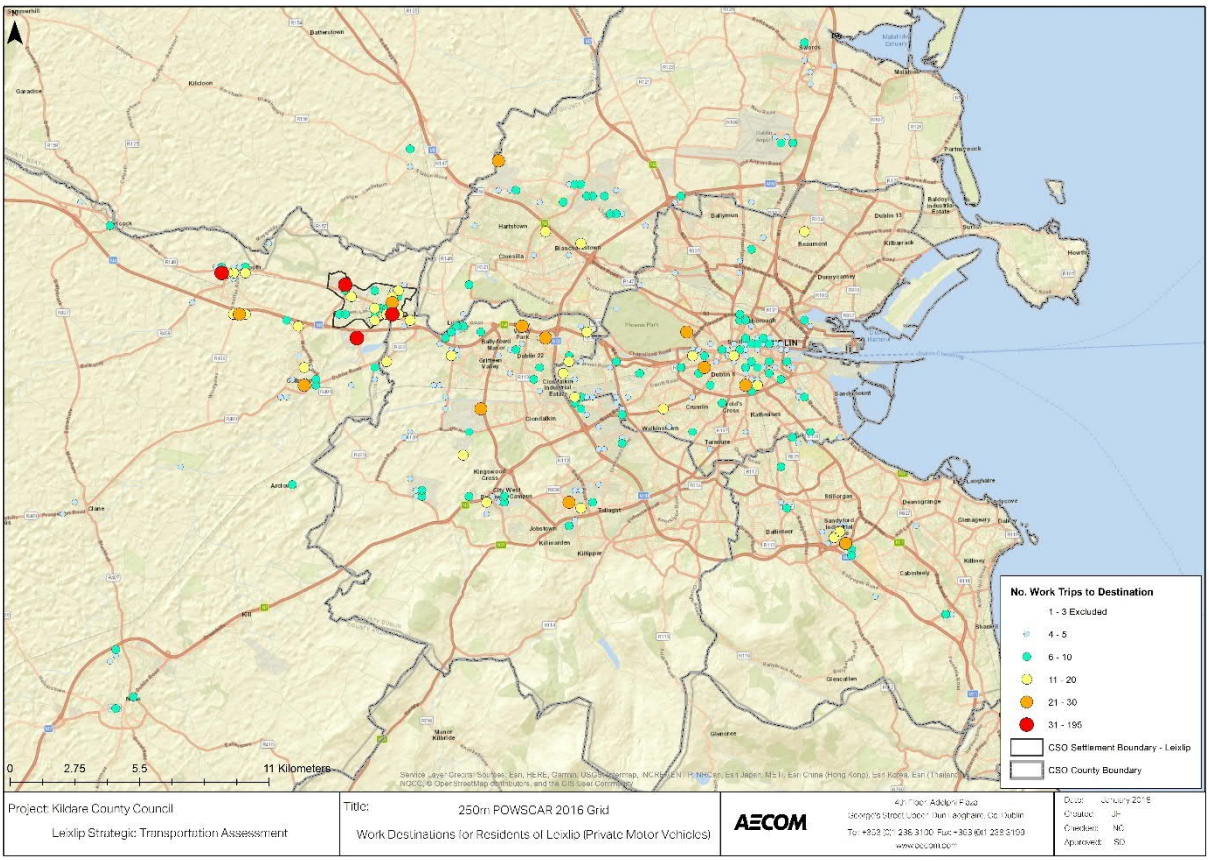


Figure 2.19 – Regional work destinations for Leixlip residents by private motor vehicles

2.5.3 Origin of trips to Leixlip schools

Figure 2.20 shows the number of trips from each CSO small area to schools in Leixlip for active mode users. This highlights the large number of school trips by active modes from most areas within the town boundary, particularly from areas near to schools. Low values do not necessarily represent car dependent areas and may just reflect aging neighbourhoods where there are fewer children.

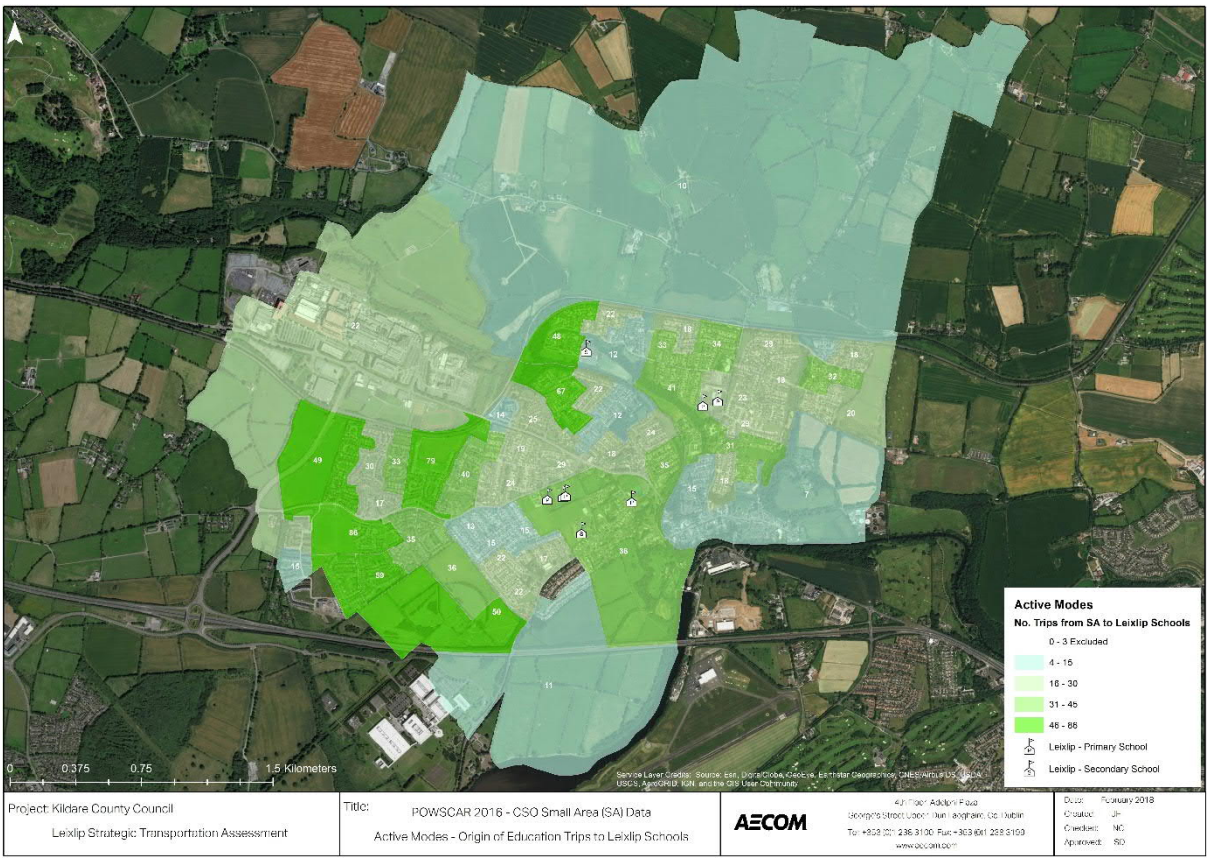


Figure 2.20 – Number of trips from CSO Small Areas to Leixlip schools by active modes

Figure 2.24 shows the number of trips from each CSO small area to schools in Leixlip town for trips by private motor vehicle. When viewed in combination with the equivalent map for active modes, it is clear that most trips within the centre and east of the town are completed by walking and cycling while the newer developments to the west off Green Lane produce a large number of car trips to school. This is likely caused by; the longer distances to schools from this location and the lack of east-west permeability in Green Lane housing estates.

Figure 2.22 shows the same data from a strategic level to highlight that a reasonable number of long-distance trips are being made by private motor vehicle to access schools in Leixlip.

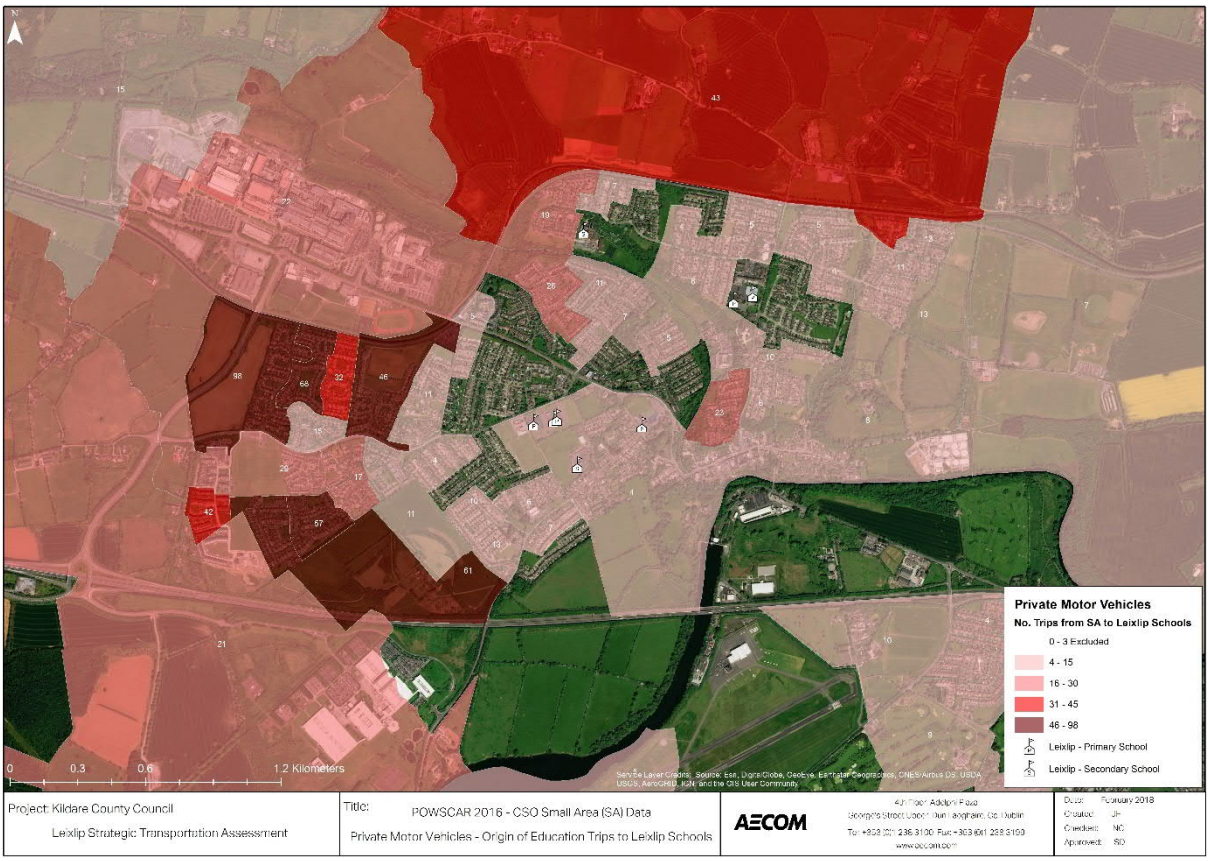


Figure 2.21 – Number of trips from CSO Small Areas to Leixlip schools by private motor vehicles

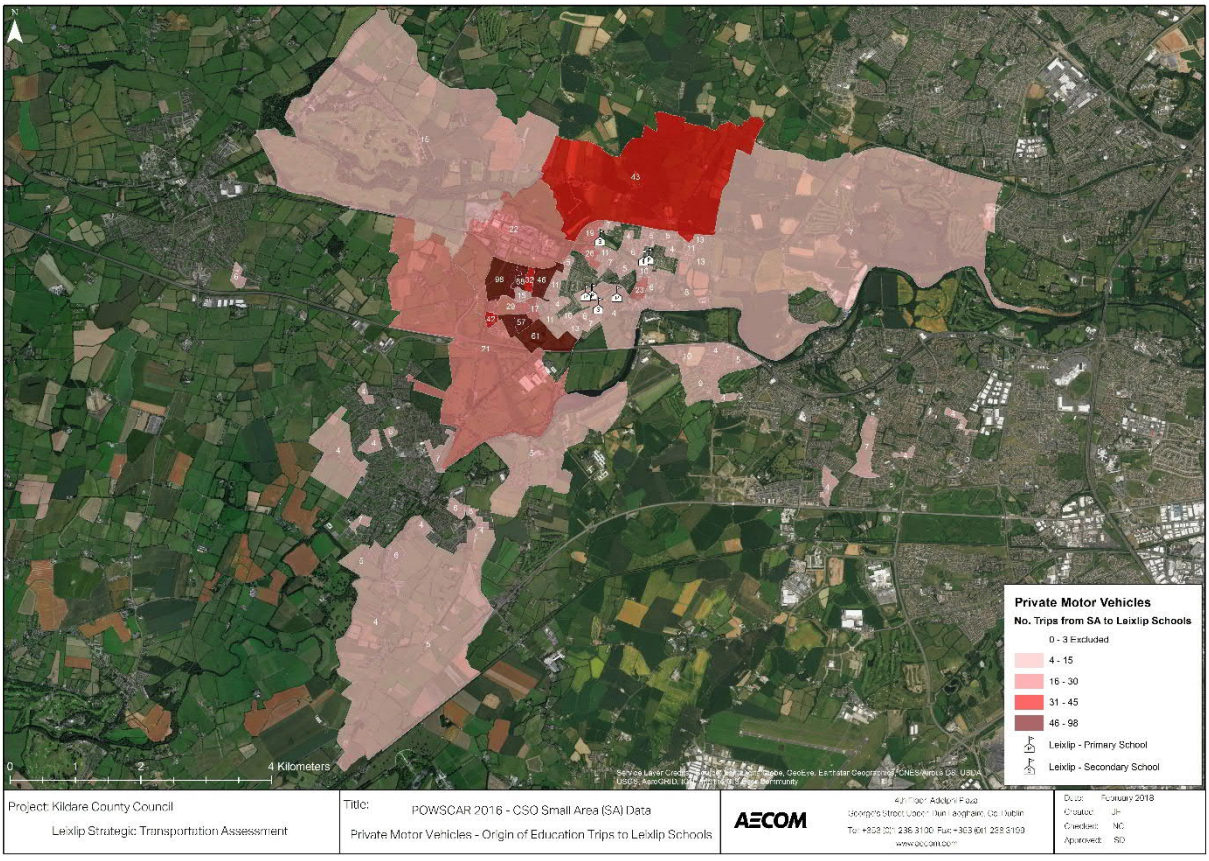


Figure 2.22 – Number of trips from CSO Small Areas to Leixlip schools by private motor vehicles

2.6 Active mode permeability

2.6.1 Permeability analysis

In order to assess permeability and walking catchments in Leixlip, an accurate path and road network was developed (Figure 2.23). The resulting path network was used to assess the walking distance catchment for key destinations in Leixlip.

Figure 2.23 – Leixlip road and path network developed for assessing permeability

2.6.2 Key permeability barriers

Leixlip town is bounded by the Royal Canal and the Sligo-Dublin railway line in the north and the M4 motorway in the south (Figure 2.24). At present, Leixlip's residential areas have not grown significantly outside these bounds. However, these barriers will become a significant permeability issue as the town expands beyond the Royal Canal, such as with the future Confey Urban Design Framework lands.

Within the town, permeability is restricted by the following issues shown in Figure 2.24:

- Spatial separation due the Rye Water and River Liffey which divide the town and have limited crossing points
- Single entrance housing estates (primarily along Green Lane) which have boundary walls causing longer trips for local services. This encourages car use for local trips which would otherwise be shorter and walkable.

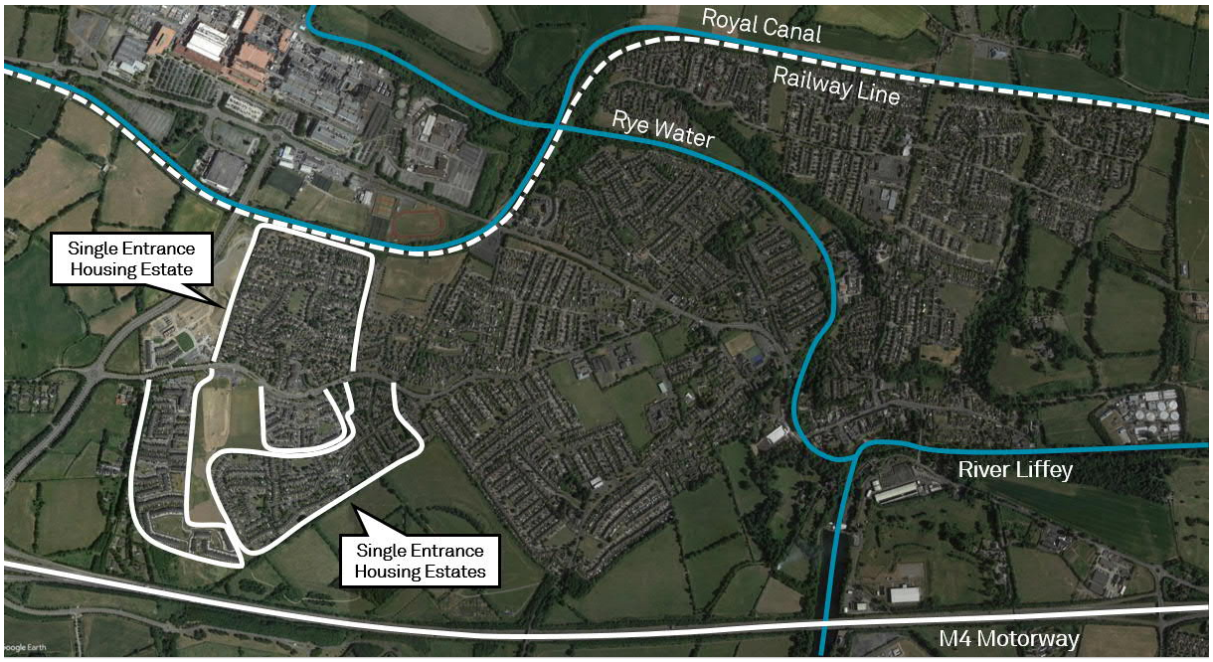


Figure 2.24 – Examples of barriers to permeability in Leixlip

2.6.3 Town centre access

Figure 2.25 shows the actual walking catchment for 1km trips to the Main Street. Furthermore, a circular 1km as-the-crow-flies circular catchment shows the theoretical catchment area that may be achieved if there were no permeability restrictions. The GeoDirectory (2018) database shows that 1,092 residential and 184 commercial properties are within 1km of the town centre on the existing path network. There is limited scope to expand the catchment area for town centre beyond possible improvements to improve access to the west of the Main Street.

Figure 2.25 – 1km walking distance catchment to Leixlip main street

2.6.4 School access

Figure 2.26 shows the actual walking catchment for 1km trips to Leixlip primary schools. Furthermore, a circular 1km circular catchment shows the theoretical catchment area if there were no restrictions to permeability. The GeoDirectory (2018) database shows that 4,032 residential properties are within 1km of a primary school on the existing path network. There are opportunities to create small catchment enhancements to the west and north-west of the town with permeability improvements.

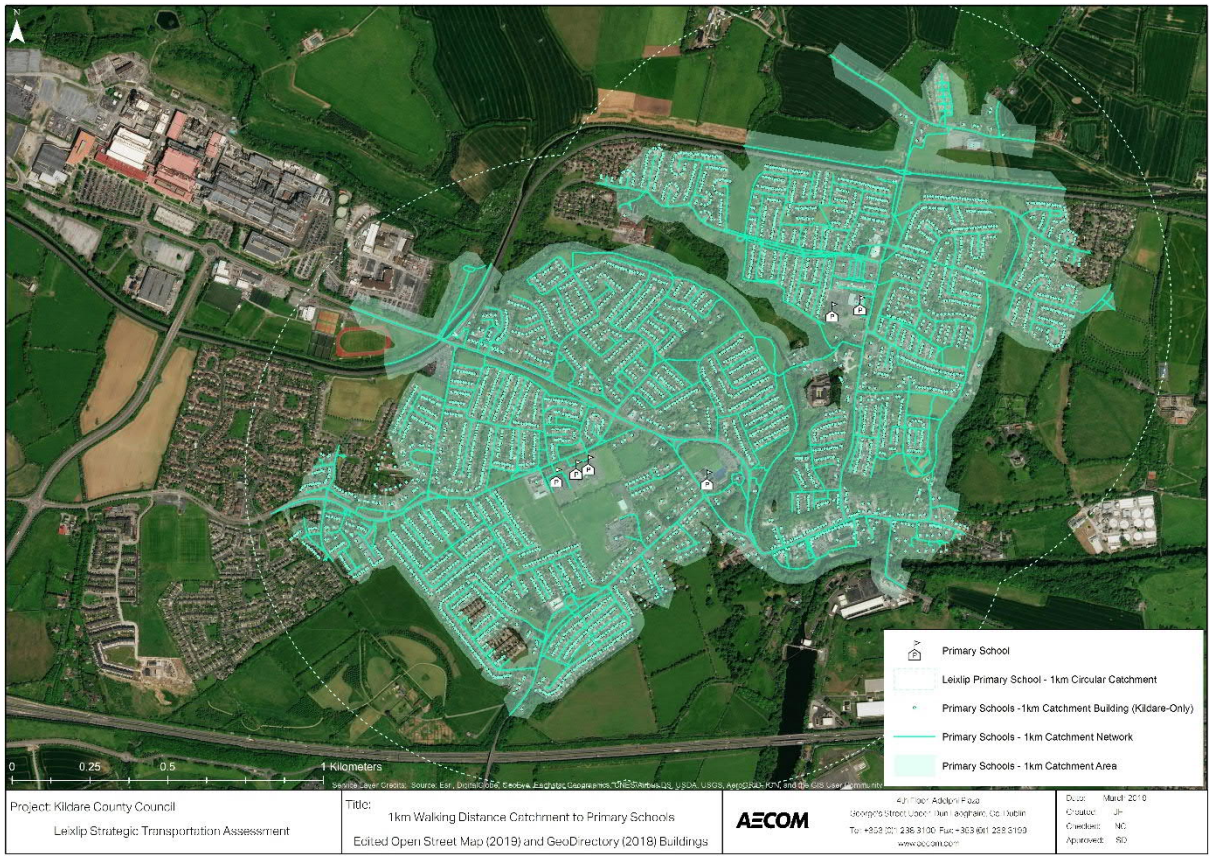


Figure 2.26 – 1km walking distance catchment to primary schools

Figure 2.27 shows the actual walking catchment for 1km trips to Leixlip secondary schools. Similarly, a circular 1km circular catchment shows the theoretical catchment area if there were no restrictions to permeability. The GeoDirectory (2018) database shows that 1,902 residential properties are within 1km of a primary school on the existing path network. The current catchment area for secondary schools is severely constrained by the lack of crossing point over the Rye Water near Confey Community School and the lack of direct path to Green Lane from Colaiste Chiarain. The existing catchment for secondary schools may be improved with suitable permeability enhancements.

Figure 2.27 – 1km walking distance catchment to secondary schools

2.6.5 Public transport access

Figure 2.28 shows the actual walking catchment for 1km trips to each of the Leixlip train stations. Furthermore, a circular 1km as-the-crow-flies circular catchment shows the theoretical catchment area if there were no restrictions to permeability. The GeoDirectory (2018) database shows that the current building catchment is as follows:

Confey Train Station: 1,437 residential and 34 commercial properties

Louisa Bridge Train Station: 1,327 residential and 39 commercial properties

Access to both of the stations could be improved to expand the existing catchment, particularly to the north and west of Confey station and to the west of Louisa Bridge station.

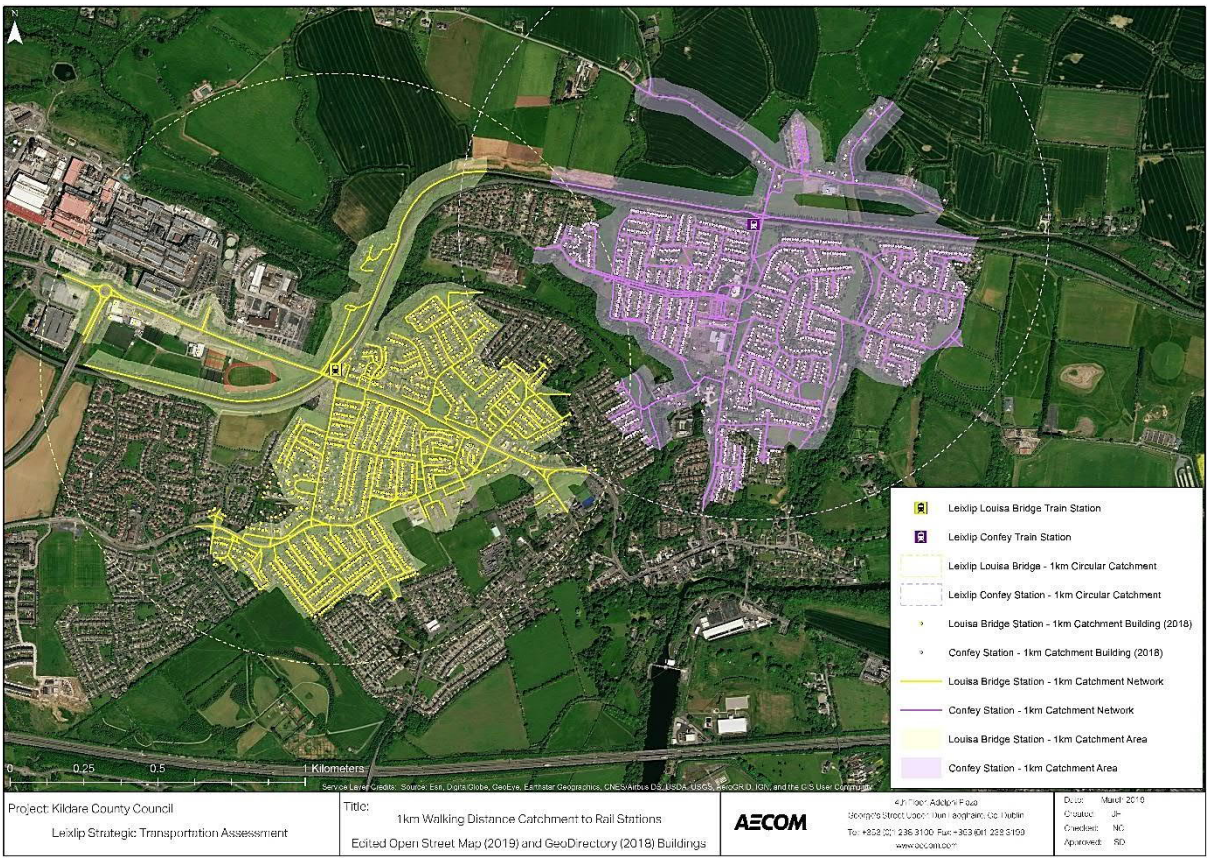


Figure 2.28 – 1km walking distance catchment to train stations

Figure 2.29 shows the actual walking catchment for 500 metre trips to Leixlip bus stops. Furthermore, a circular 500m circular catchment shows the theoretical catchment area if there were no permeability restrictions. The GeoDirectory (2018) database shows that 4,294 residential and 248 commercial properties are within 500m of a bus stop on the existing path network. The coverage of the existing bus network is reasonably good with opportunities for small permeability improvements. However, it is important to note that the frequency of bus services varies considerably and the 66e service on Green Lane, which forms a substantial amount of this catchment area, provides limited commuting opportunity and provides a very limited public transport service.

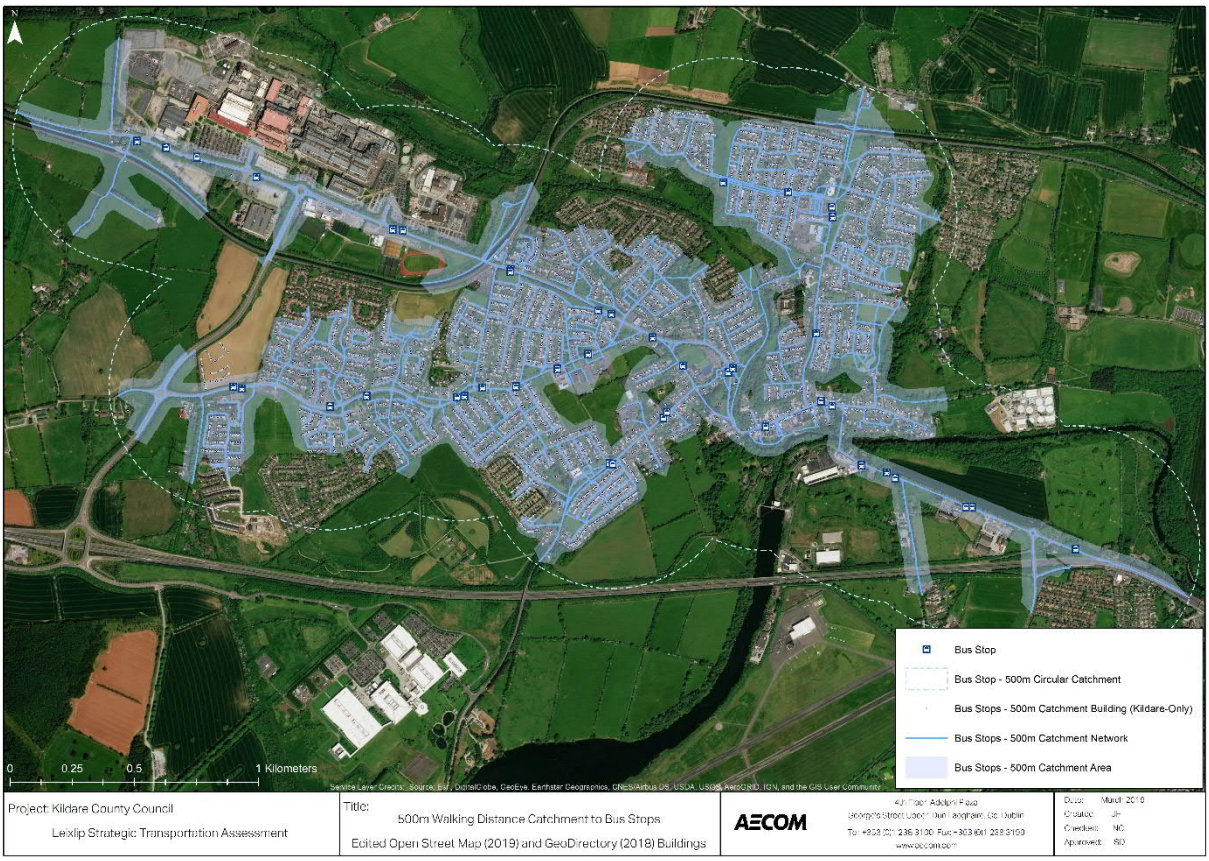


Figure 2.29 – 500 metre walking distance catchment to bus stops

2.7 Planning assessment

A desk-based review of existing planning considerations and active planning applications within the study area was undertaken to identify any plans which may impact on the route option selection and design process. Any planning applications which present an opportunity or constraint to the route options are discussed in Section 5.

2.8 Architectural, Archaeological and Cultural Heritage

Figure 2.30 – Record of protected structures (Leixlip wide, provided by Kildare County Council)

The Built Heritage and Archaeology Maps (Figure 2.30 and Figure 2.31), illustrate that there is a high density of protected structures within the town centre (along Main Street). Outside of the town centre, the number of protected structures is relatively low, with many of which located in agricultural land. Main Street is also identified as an Architectural Conservation Area (ACA) and a zone of archaeological potential; any upgrades/alterations to Main Street would need to take cognisance of the protected archaeological and architectural heritage

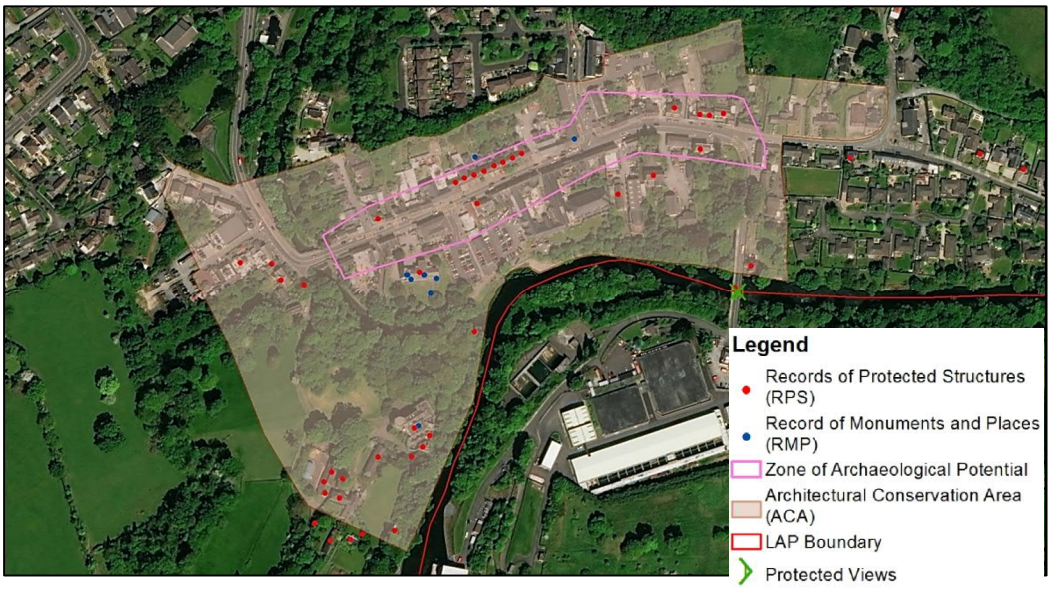


Figure 2.31 – Record of protected structures (Leixlip town, provided by Kildare County Council)

2.9 Social inclusion and impact

A desk-based review of socio-economic context was carried out within the study area. The socio-economic context was established by determining the relative affluence or disadvantage of the geographical area. A map of the 2016 Pobal HP Deprivation Index is shown in Figure 2.32. This index provides a method of measuring the relative affluence or disadvantage of a particular geographical area based on data compiled from various census responses.

As illustrated in Figure 2.32, the study area primarily includes areas considered marginally above and marginally below average, as well as a small number of affluent areas and disadvantaged areas, as per the Pobal Deprivation Index.

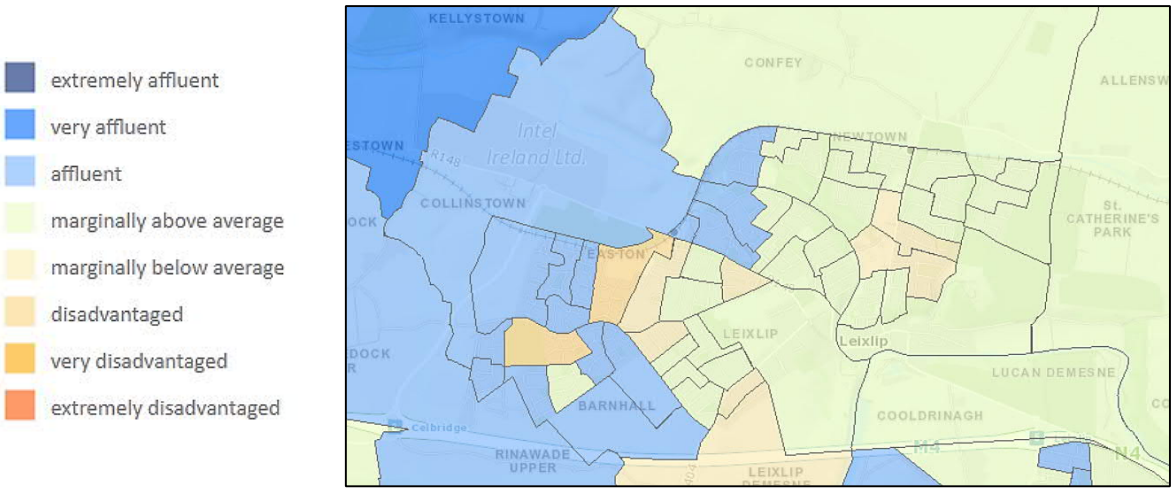


Figure 2.32 – Pobal HP deprivation index for the study area

2.9.1 Road collison history

The Road Safety Authority (RSA) database of personal injury accidents was examined to establish existing safety issues along the routes being assessed. The database provides accident records for the period 2005 to 2014 in terms of location, year, road user type involved (pedestrian, car, cyclist, motorcyclist, bus etc.) circumstances and severity of collision (minor, serious or fatal). The following Figure 2.33 indicates the location of incidents involving pedestrians and cyclists in Leixlip.

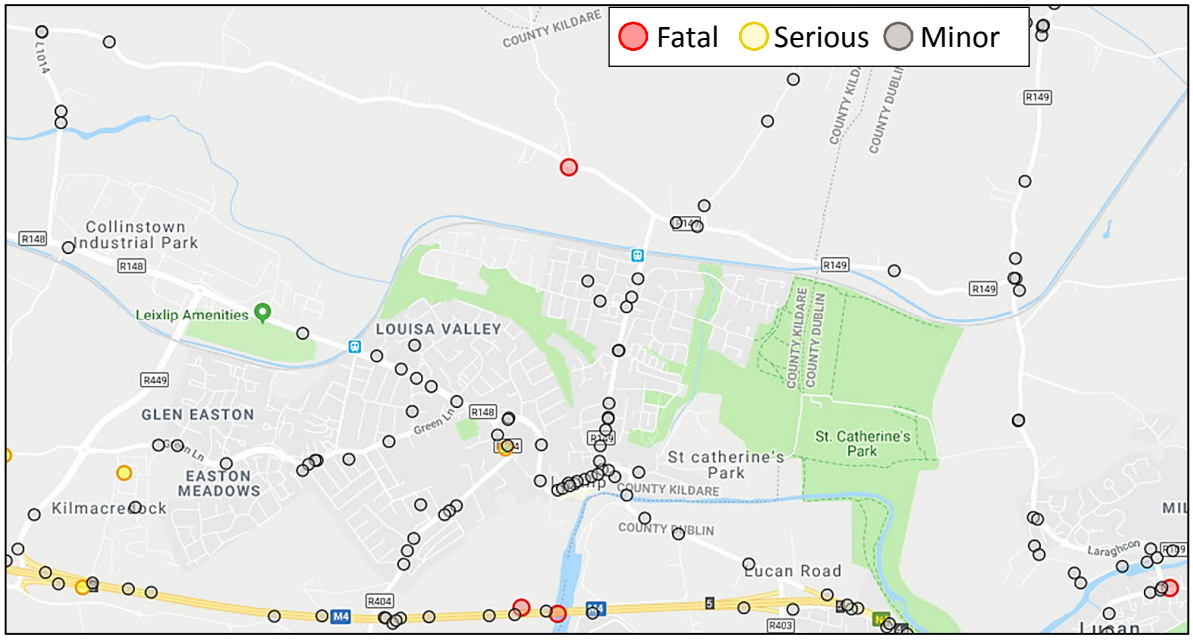


Figure 2.33 – RSA road collision history map of pedestrian and cyclist incidents

2.9.1.1 Collision statistics

The large majority of collisions occurred along Station Road, Captain's Hill, Green Lane, Celbridge Road and Main Street (Town Centre).

- 23 minor incidents occurred in the town centre along Main Street, the majority involved cars and pedestrians.
- Nine collisions occurred along Station Road (all minor incidents) between the town centre and Intel, none of which involved a pedestrian or a cyclist.
- 11 collisions occurred on Captain's Hill (all minor) between Leixlip Confey Station and the Town Centre, several of which involved pedestrians and cyclists.
- A total of 10 incidents occurred along Green Lane, with three head-on conflicts at the Easton Road/Green Lane Junction. 4 other incidents involved a vehicular collision with a pedestrian.
- A total of nine incidents on Celbridge Road, including eight minor collisions and one serious collision resulting in two casualties. Four of the minor collisions involved a vehicle and a pedestrian.

3. Consultation and key stakeholders

During the initiation of the STA several key stakeholders were identified – these are groups with significant influence over the acceptability and support for (or opposition to), transport schemes around Leixlip. Key stakeholder were identified approximately as follows:

- Surrounding local authorities
- Department of Housing, Planning and Local Government (DHPLG)
- Transport Infrastructure Ireland (TII) and National Transport Authority (NTA)
- Department of Transport, Tourism and Sport (DTTaS)
- Other consultants and school groups.

The following sub-sections outline the overall feedback from stakeholders

3.1 Meeting of surrounding local authorities

Leixlip lies in the north-east of County Kildare, at the confluence with the following local authority boundaries:

- Meath County Council
- Fingal County Council
- South Dublin County Council.

The Confey UDF lands are particularly close to Fingal's administrative area, meaning that any eastward interventions may impact the adjoining Fingal County Council authority, any interventions to the south-east (including any interface with the M4 or in the vicinity of St. Catherine's Park) would impact on South Dublin County Council's administrative area, and any northerly interventions may affect Meath County Council.

Due to potential options' interactions, a meeting was hosted by Kildare County Council for the four councils' Directors of Services for planning and roads team on 23 Jan 2019.

This meeting was primarily to raise awareness of the Leixlip LAP Ministerial Direction and associated STA, and to inform the surrounding councils of the issues and proposed methodology being employed in assessing the Confey UDF lands. Furthermore, to collectively understand the long-term strategic transport and planning requirements of the region. Finally, the meeting minutes would act as a precursor to TII and NTA discussions, taking into account views of the local authorities.

3.2 Meeting with the Department of Housing, Planning and Local Government

A meeting was undertaken between Kildare County Council and DHPLG staff on 1 Feb 2019, the purpose of the meeting was to address the needs of the Ministerial Direction (the required revision of the Leixlip LAP). Thereafter the DHPLG was informed of AECOM's engagement in providing strategic transportation support for the LAP.

AECOM was initially requested to approach the DHPLG, but after discussion with Kildare County Council, a meeting was not considered necessary.

3.3 Meeting with Transport Infrastructure Ireland and the National Transport Authority

Two meetings were held between Kildare County Council, TII and the NTA, on 1 Feb 2019 and 12 Feb 2019. The former was a director-level meeting between Kildare County Council's Directors of Services for Planning and Transportation, and TII and NTA senior staff. This meeting paved the way for a technical meeting, with the following noted:

1. Recognition that the rail line to Maynooth is being proposed for a new Dart line within the lifetime of the next Local Area Plan and Local Area Plans in the area should reflect development potential of this upgrade.
2. Confey Bridge requires upgrading for access and for bus movements to include turning facilities.
3. The prospect of moving the Louisa Station to Collinstown and its implications for the routing of the R449 and the provision of a strategic Park & Ride facility at this location should be reflected in the Plan.
4. The issue of a bus priority through Leixlip and the rationalisation of bus movements and services in this general area requires an objective to secure better and more efficient bus connectivity.
5. Recognition of the need to build resilience between the N3 and N4 and reference the study already conducted in relation to the N4 and N7 so as to ensure optimum transport arrangements and resilience of routes.

The second more technical meeting was held between Kildare County Council planning staff, senior TII and NTA staff and AECOM project manager. The need for the LAP was presented alongside indicative connective options to serve the Confey UDF lands. The options most favoured by those present were orientated to sustainable travel, noting that Confey is ideally located to maximise travel by rail towards Dublin and Maynooth for commuting, and that BusConnects will increasingly improve bus connectivity to Celbridge particularly. An indicative route from Confey to the M4 via the east of St. Catherine's Park was mooted as being difficult to achieve for a number of technical and socials reasons, and would do little to support sustainable travel.

Active mode improvements were anticipated by all present, such that Confey remains well-connected with the town centre, and that a balanced approach should be taken to the development needs and that road infrastructure only supports latent vehicular traffic demand.

3.4 Department of Transport, Tourism and Sport, other consultants and school groups.

A meeting was undertaken with DTTaS on 28 Feb 2019 attended by Kildare County Council planners and AECOM project manager. The session acted primarily as an early notification of potential Leixlip interventions. A similar presentation was made to DTTaS staff, as to the four councils, TII and NTA.

Feedback was received from DTTaS at a more strategic level, with more focus being put onto the funding of schemes and costed delivery of Confey lands (noting that Project Ireland 2040 National Development Plan funding has been completed for its initial period).

AECOM were also in contact with two other consultants supporting the LAP revision – ARUP and HRA Planning. ARUP are understood to have undertaken the strategic environmental assessment (SEA) and the Natura Impact Report, which is important regarding bridge crossings over Natura 2000 sites or Special Areas of Conservation. HRA Planning are undertaking a social infrastructure audit (SIA).

Attempts were made to receive available school travel plans and applicable school travel information from the council and Department of Education and Skills (DES). School travel plans were not readily available, and a limited amount of information provided via the DES. The relative absence of Leixlip schools' information (and sensitives surrounding some school travel data), was well offset with census (POWSCAR) catchment and modal data.

4. Assessment methodology

4.1 Introduction

This section of the report presents the methodology used for the assessment of potentially viable route options identified within the study area.

An MCA is carried out separately for road, active modes and bus and rail intervention. These groupings allow fair assessments to be undertaken against similar types of infrastructure. Numeric scores are discouraged on such assessments and therefore a thematic (colouring) applied.

4.2 Route options assessment

The 'Common Appraisal Framework for Transport Projects and Programmes' (CAF) published by the Department of Transport, Tourism and Sport (DTTAS), March 2016, requires schemes to undergo an MCA using the following criteria:

- Economy
- Integration
- Accessibility and Social Inclusion
- Safety
- Environment
- Physical Activity.

An appreciation of constraints and opportunities within the Leixlip town as well as the defined project objectives, led to the establishment of project-specific MCA sub-criteria for road options. These were tailored to have commonality with the CAF and specificity for Leixlip.

Table 4.1 presents a summary of the MCA criteria and sub-criteria used as part of the MCA process.

Table 4.1 – MCA criteria

MCA criteria	Assessment sub-criteria
Economy	1.a. Economic performance (qualitative capital cost & anticipated returned benefits – akin to a qualitative BCR)
	1.b. Road traffic performance (reliability / journey time)
Integration	2.a. Integration with local objectives and policies
	2.b. Land use integration
Accessibility and Social Inclusion	3.a. Accessibility to key trip attractors (education/health/commercial/employment)
	3.b. Social inclusion and improvement for deprived geographic areas
	3.c. Accessibility / interchange with other modes of transport
Safety	4.a. Road user safety – perceived safety issues and anticipated safety future performance (number of junctions, road collision history)
Environment	5.a. Impact on the natural environment (air, noise, landscape, bio, water)
	5.b. Impact on the built environment (landscape and visual, cultural heritage)
Physical Activity	6.a. Level of improvement for walking and cycling mode shares, and enhancement of recreational activity.

The presence of three sub-criteria for Accessibility and Social Inclusion, and two sub-criteria for each of Integration and Economy, provide a natural weighting to these CAF criteria supporting the specific STA objectives.

4.2.1 Assessment criteria

The following criteria have been considered and discussed as part of the MCA, leading to the recommendation of the most feasible interventions.

4.2.1.1 Economy

Economic performance – At this early stage of the route options assessment it is not possibly to accurately quantify capital costs and anticipated returned benefits. The cost comparison is based primarily on the length of each route option, complexity of terrain and the number of new intersections / junction upgrades required. The strategic transport model has assisted the responses of this criterion.

Road traffic performance – The accompanying strategic modelling has been used to determine the expected road performance (for vehicular trips). Considerations in this sub-criteria include the amount of delay along a route, average journey speed and indicatively the use case (for example, considering whether each option would serve a wide spectrum of the local community throughout the day, or a narrow section of the community for peak commuting only).

4.2.1.2 Integration

Integration with local objectives and policies – This criterion examines the extent to which route options would integrate with objectives and policies (assessed in section 1.5)

Land use integration –Alignment, integration or otherwise with current or proposed developments

4.2.1.3 Accessibility and Social Inclusion

Accessibility to key trip attractors (education / health / commercial / employment) – This assessment criterion identifies key trip attractors located along each route option which would generate significant demand for the route. For the purposes of this assessment the following land-uses have been considered as key trip attractors:

- Education (schools and universities)
- Commercial centres (shopping centres, town centres etc.)
- Healthcare (hospitals)
- Leisure (sport stadiums, theatres, cinemas etc.)
- Employment (business parks, large office developments etc.)

Social inclusion and improvement for deprived geographic areas – The possible impact of the route options on deprived geographic areas, including RAPID (Revitalising Areas by Planning, Investment and Development) areas and the Pobal Deprivation Index, was investigated.

Accessibility interchange with other modes of transport – This criterion examines the extent to which route options would integrate with other transport routes and modes i.e. provide a link to existing bus stops and rail stations.

4.2.1.4 Safety

Route user safety – For the purposes of comparing route options, the number of junctions as well as the road collision history along each route has been used as a proxy for road safety assessment (and in the absence of reliable predictive models). The number of junctions is effectively a measure of the number of potential conflicts on the route and therefore a measure of the potential for a collision. Actual and perceived safety are considered in this criterion.

4.2.1.5 Environment

The scope and methodology for the environmental assessment was established by considering what environmental aspects are likely to be impacted and are therefore of importance in evaluating the route options. These have been considered in the given STA context (i.e. for transportation schemes), appreciating a wider SEA and Natura Impact Report is being undertaken externally for the broader LAP revision.

Impact on the natural environment – At a macro level, potential considerations on flora and fauna, biodiversity, noise, water and landscaping along each route option were assessed.

Impact on the built environment – Potential archaeological and architectural heritage considerations along each route option were made.

4.2.1.6 Physical Activity

The level of improvement required for walking and cycling mode shares and enhancement of recreational activity was examined for each route option.

4.2.2 Route options assessment summary table

A route options summary table, in CAF format has been prepared which collates and summarises the impact of route options under each of the assessment criterion. A seven-point scale has been applied as in Project Appraisal Balance Sheet (PABS) assessments.

Given that most impacts are qualitative at this strategic stage, each criteria is scored based on the extent to which it would offer a positive or negative impact **comparatively against all other options**. For illustrative purposes, this seven-point scale is colour coded as presented in Table 4.2 with advantageous routes graded to 'dark green' and disadvantaged routes graded to 'dark red'.

Table 4.2 – Route options colour coded ranking scale

Colour	Description
	Major or highly positive
	Moderately positive
	Minor or slightly positive
	Not significant or neutral
	Minor or slightly negative
	Moderately negative
	Major or highly negative

At the end of the route options assessment, an overall MCA table is provided, bringing together each of the individual criterion assessments.

All criteria are considered in undertaking the assessment and a lower ranking on one criterion, for example, will not necessarily mean that the route is not suitable.

5. Road options assessment

5.1 Introduction

The aim of the road options assessment was to identify new routes to improve access from the Confey development lands to the west and east of Leixlip town. Complementary improvements within Leixlip were also proposed, but not assessed for development traffic relief. A list of route options were developed, illustrated below, based on client and stakeholder consultation, strategic model feedback, knowledge of the existing topography site visits and expectant corridors suited to road development.

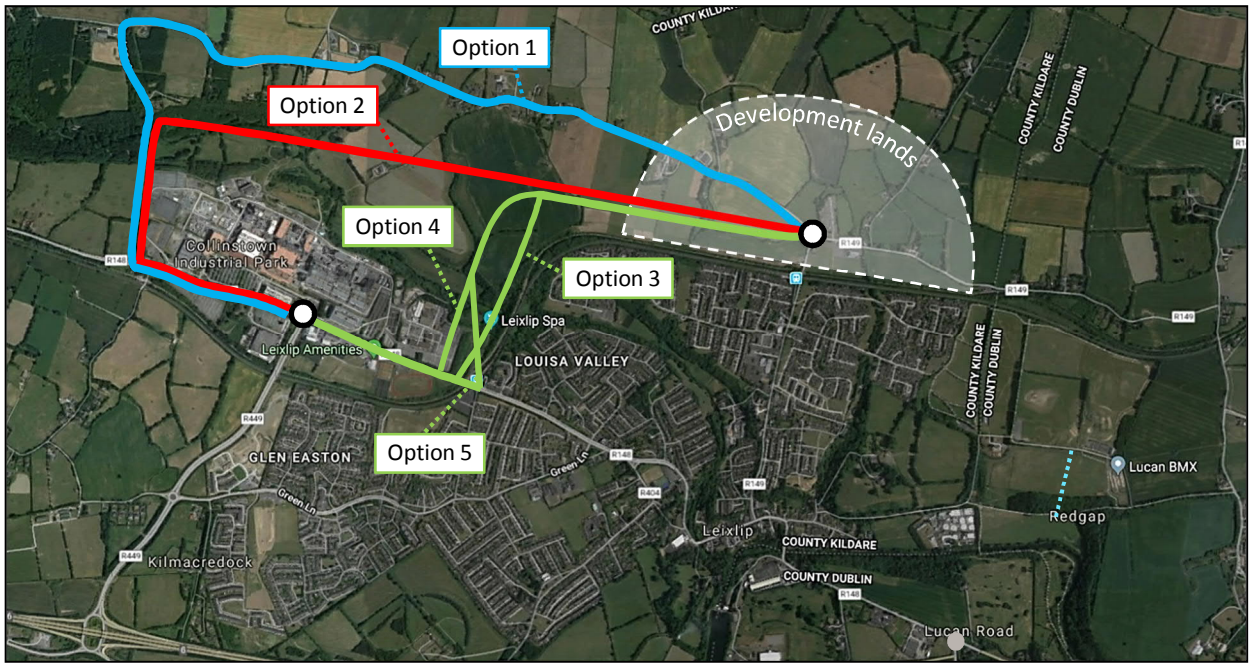


Figure 5.1 – Route options to connect Confey to the west of Leixlip

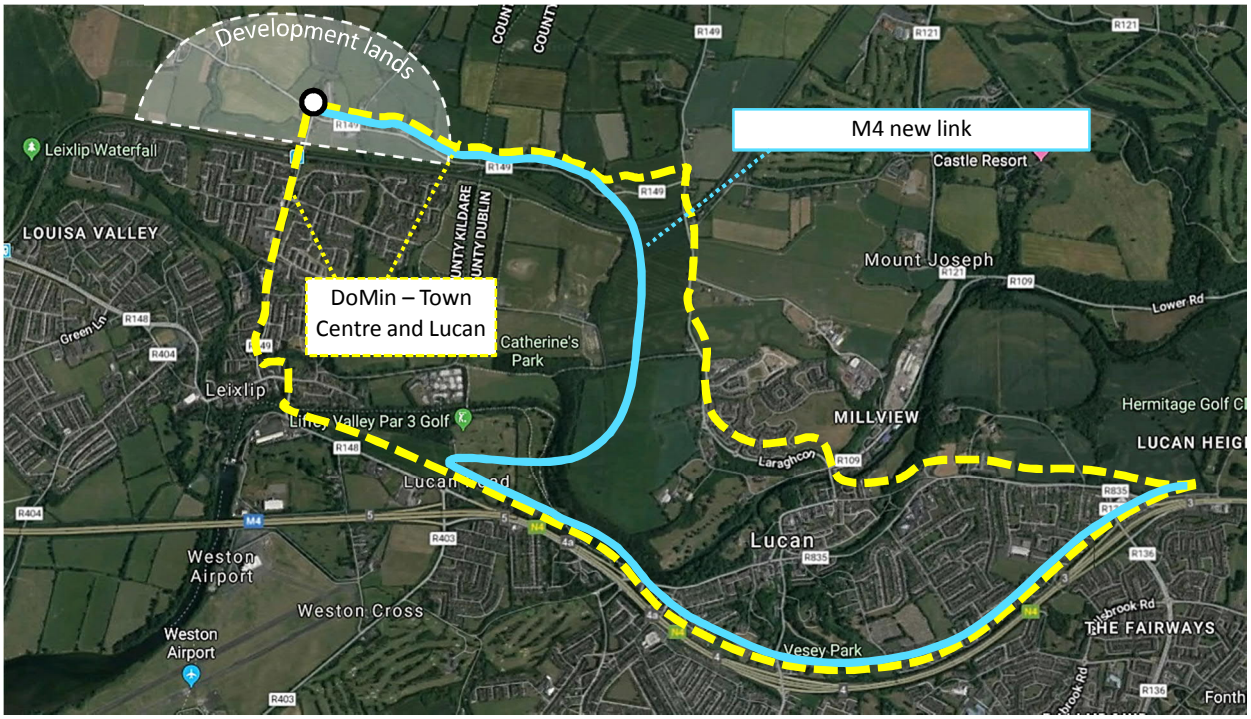


Figure 5.2 – Route Options to connect Confey to the east of Leixlip

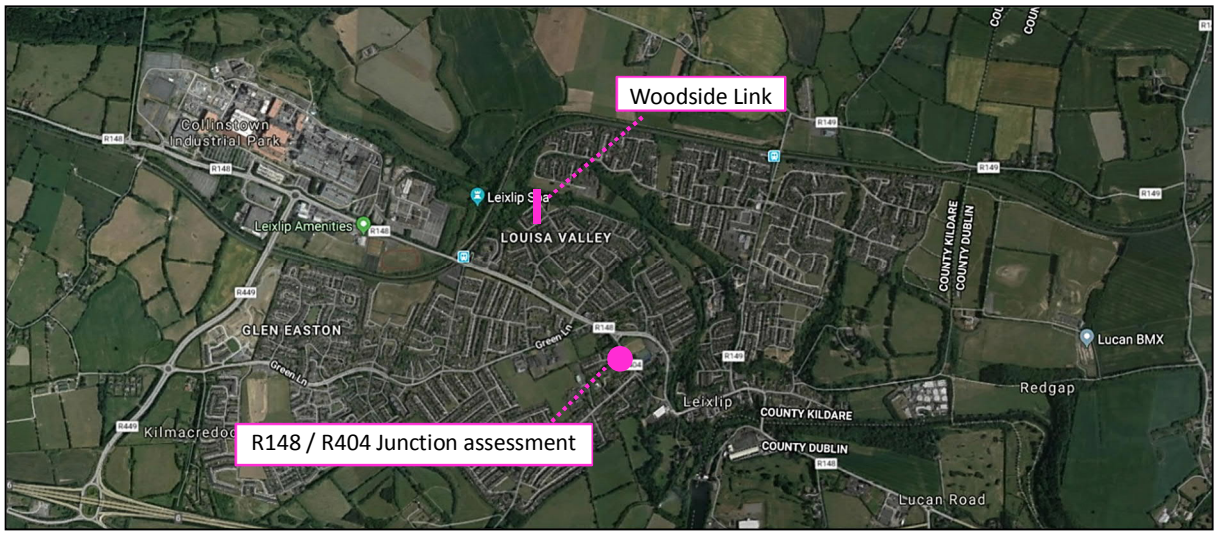


Figure 5.3 – Complementary road improvments (requiring local assessment)

Two complementary road options have been identified in the course of developing the STA:

1. R148 / R404 junction assessment – The STA has observed lengthening travel times in the northbound direction through the town to 2025 under many scenarios. Celbridge Road delays may be expected to increase, particularly for right-turn manoeuvres onto the R148. A local assessment of potential options may benefit northbound travel times and avoid rat-running through nearby residential areas. Some of the anticipated delays to turning manoeuvres would remain applicable in a case with a Barnhall Road link (see Section 5.1.1).
2. Woodside Link – Captain's Hill is the only viable north-south road link for many in the town and already exhibits high congestion levels throughout much of the day. A new road link approximately from Woodside to the south of Rye Water (Rocking Avenue or similar) would alleviate some congestion through the town centre and improve overall network resilience.

The strategic nature of this study may not fully address the local (residential and environmental specific) concerns adequately, and therefore further study may be beneficial at a local level.

5.1.1 Barnhall Road link

A proposed public road link has been considered in this STA, running parallel to (and south of) the M4, approximately between M4 J6 and R404 Celbridge Road.

The purpose of the link would be to alleviate some of the existing congestion issues in the west of Leixlip, and providing a secondary connection between Leixlip's town centre and westerly motorway junction.

The link is expected to deliver the greatest benefits for schemes which would increase traffic onto the R148 and / or Green Lane, such as Options 3, 4 and 5 (of Figure 5.1). By way of managing the efficiency of strategic model runs (and their interpretation), this link was provided as a comparator with Options 3, 4 and 5, where the R148 would be expected to become increasingly congested.

Providing a public road link in the form of the Barnhall Road link would have positive benefits for Leixlip, most notably when demand increases (as background growth and also appreciating the KDAs being progressed in the vicinity of the R449.)

5.2 Road options description

5.2.1 Route options to connect Confey to the west of Lexilip

5.2.1.1 Route option 1

Figure 5.4 – Route option 1

Route option 1 would connect the Confey development lands to the R148 (west of Intel) via the L1015 and L1014. The existing infrastructure along this route would need to be upgraded in order to cater for an increased traffic demand. Particularly along the L1014, the existing Kellystown Bridge over the Rye Water would need to be widened or replaced; it currently operates as an unsignalised shuttle system. The carriageway width along the L1014 is narrow with overhanging trees on both sides of the road reducing visibility.

Figure 5.5 – Existing road infrastructure along the L1015

Figure 5.6 – Existing road infrastructure along the L1014

5.2.1.2 Route option 2

Figure 5.7 – Route option 2

Figure 5.8 – Route option 2

Route option 2 would connect the Confey development lands to the R148 (west of Intel) via a new, direct road south of the L1015 which would join the L1014 adjacent to Kellystown Bridge. This route option would offer a shorter journey time but would require more land acquisition with likely environmental constraints. In addition, a new junction would be required to connect the new road to the L1014.

5.2.1.3 Route options 3, 4, and 5

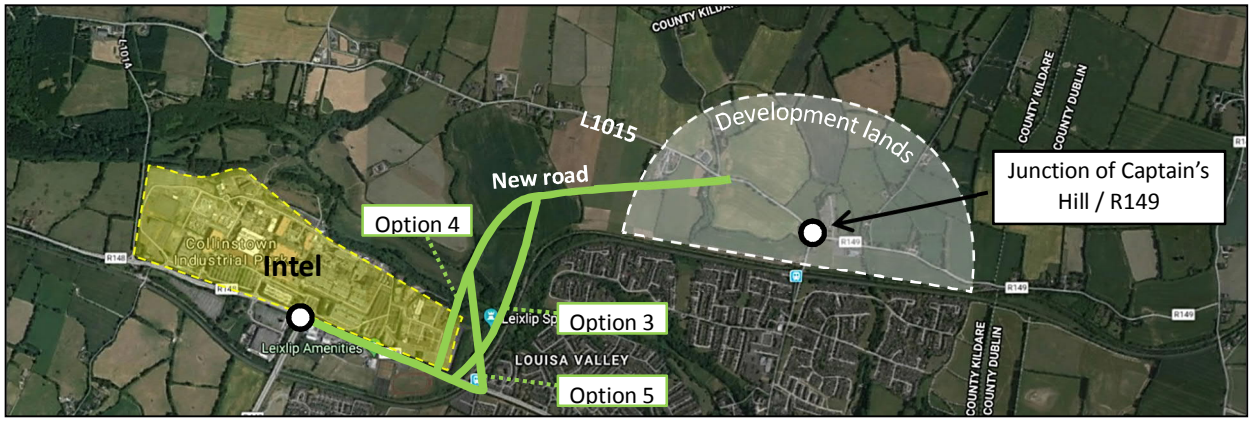


Figure 5.9 – Route options 3, 4 and 5

Figure 5.10 – Route options 3, 4 and 5

Route option 3, 4 and 5 would all connect the Confey development lands to the R148 (east of Intel) via a new, more direct road south of the R149 and parallel to the Royal Canal. Each of these route options would have to traverse the Rye Water northeast of Intel. Modelling suggests that the R148 section becomes a bottleneck and would need capacity improvements for any of these options to progress successfully – the assessment assumes such an improvement would be in-place.

Route option 3 would travel close to the Royal Canal and have a high environmental impact; cognisance would have to be taken of the protected monument (Leixlip Spa) and Wildlife Park (Leixlip waterfall) in close proximity to this route option. This option has been presented given the decreased concerns of land ownership of Route option 4.

Route option 4 would pass via the eastern carpark of Intel to join the R149 at a new junction or roundabout. Though difficulty may arise in acquiring necessary land, this route option would have the least environmental impact.

Route option 5 would require a new bridge across the Royal Canal and railway. This route option would avoid impact on Leixlip Spa, Leixlip waterfall and Intel site but would have environmental consequences and visual impacts, as well as significant infrastructure costs i.e. the construction of a new junction at Station Road / Accommodation Road as well as a new bridge across the Royal Canal and railway.

5.2.2 Route options to connect Confey to the east of Lexilip

5.2.2.1 Do Minimum – Town centre and Lucan

Figure 5.11 – DoMin – Town centre and Lucan

This route option comprises two existing routes to connect Confey development lands to junction 3 of the N4 in Lucan; via the town centre or the R149 / Clonee Road. As both routes have existing road infrastructure, they are considered as one overall route option for the purpose of this assessment.

The existing infrastructure along Captain's Hill consists of a single traffic lane in each direction with a footpath on the east side of the road only, separated by a grass verge.

Captain's Hill is on a steep incline in the north direction. Boundary walls border the road along much of its length. Widening Captain's Hill would involve significant land acquisition costs and possible demise to local heritage.

Cope Bridge has only one traffic lane and operates as a signalised shuttle system. There are no dedicated cycle facilities and a footpath is provided on the eastern side of the road only. The existing bridge has the capacity to cater for only limited increases in traffic volumes generated from Confey development lands.

Two bridge options are proposed to improve the capacity of Cope Bridge; Route options 6 and 7. For the purpose of the MCA assessment, the Do Minimum Town centre and Lucan route option was assessed based on the existing infrastructure over the bridge.

The eastern connection towards Lucan (along the R149 and L3005) would require only minor, localised improvements to junctions, footpaths, and particular isolated points of poor alignment.

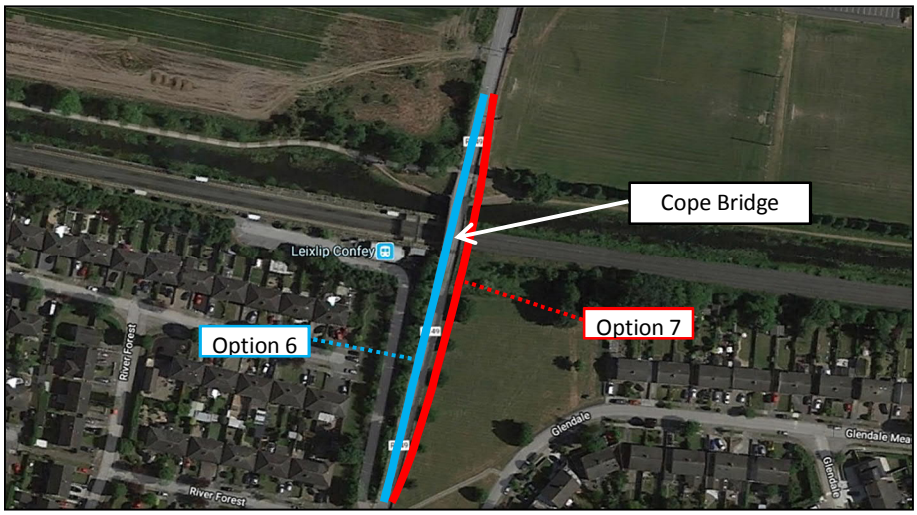


Figure 5.12 – Route options over Cope Bridge

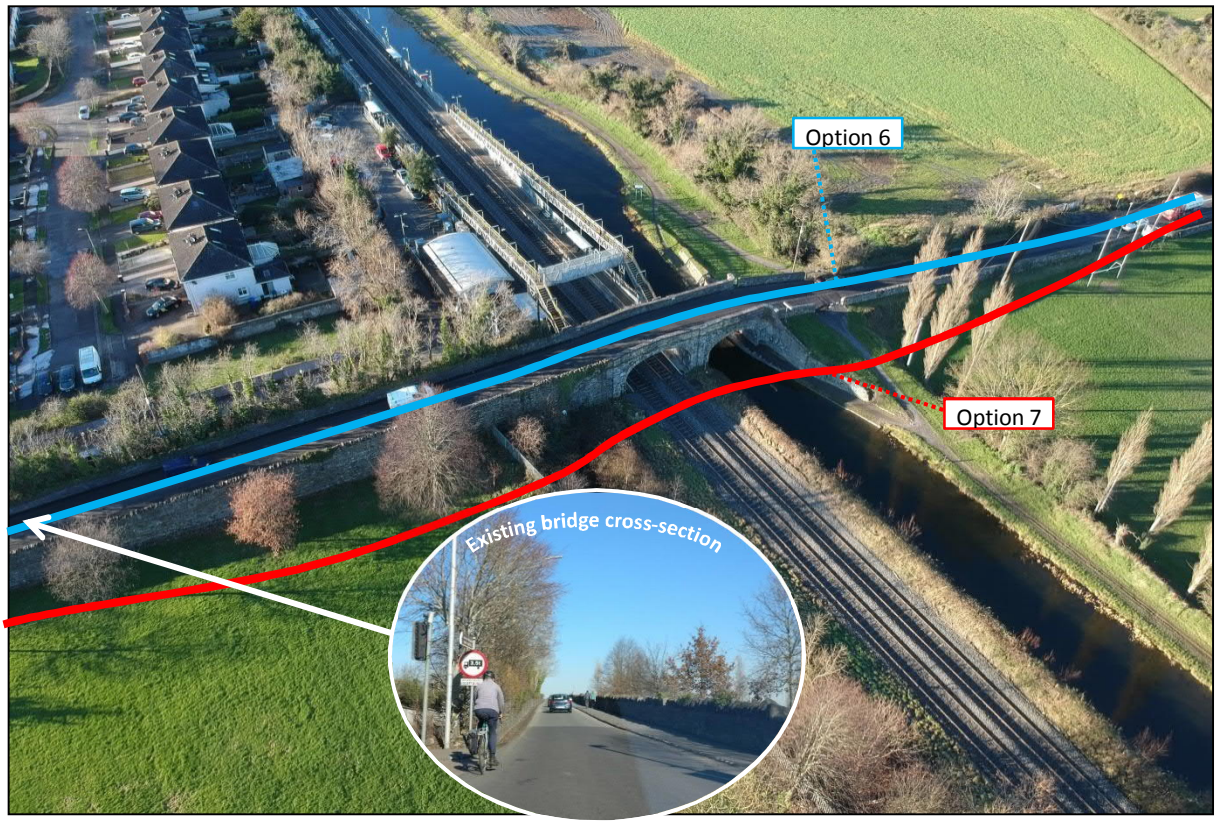


Figure 5.13 – Route options 6 and 7 for Cope Bridge

Route option 6 proposes to replace the existing bridge with a new one which would provide two traffic lanes and necessary pedestrian and cyclist facilities. Route option 6 would improve the bridge capacity and road access from the Confey development lands to Leixlip town. This route option would also improve pedestrian and cyclist facilities and future proof the area for future rail upgrades. One of the main constraints of widening the bridge is the potential impact on adjacent lands, including Leixlip Confey Railway Station, the GAA grounds (Confey Football Club) and Glendale green.

Route option 7 would provide a new bridge, adjacent to and east of the existing bridge. The new bridge would be a single lane to cater for southbound traffic (towards Leixlip) while the existing bridge would remain for northbound traffic only (out of Leixlip town). Any new bridge would need sufficient width for pedestrian and cyclist facilities. Constructing a new, single lane bridge would reduce the amount of new infrastructure required in comparison with Route option 6. However, Route option 7 would have a bigger impact on the GAA grounds and Glendale green than Route option 6 and hence, would have greater potential for issues with land owners.

Route options 6 and 7 would both require significant works in a relatively confined space for construction activities. Route option 6 (bridge replacement) would further require an appropriate temporary route to be in place during construction.

5.2.2.2 M4 Link

Figure 5.14 – M4 Link

This route option would propose a new link between junction 5 on the M4 and the R149. The exact route of the new link is not defined though it is suggested that this option would extend eastward from junction 5 on the M4 through the lands east of Leixlip, crossing the River Liffey and tying into the R149. This indicative route is proposed to minimise the possible impacts on St. Catherine's Park, but is noted to pass via Fingal and South Dublin counties' administrative areas.

This route option proposes to upgrade to part of the R149 (between the development lands and the M4 link's northern tie-in). This would involve widening the road to provide necessary pedestrian and cyclist facilities. Land acquisition would be required from agricultural land with mature trees noted either side of the road.

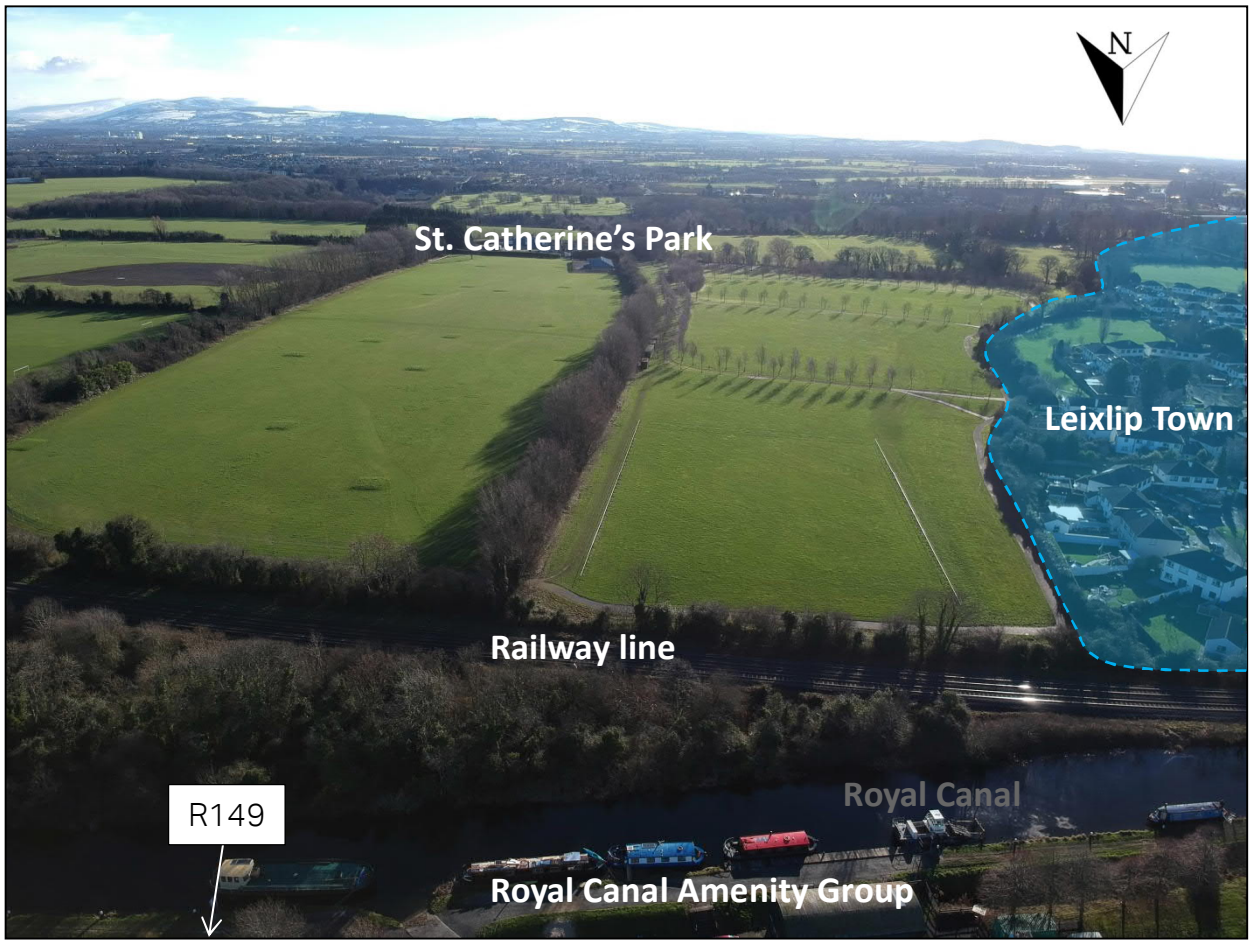


Figure 5.15 – Lands west of Leixlip town (looking south)

5.2.3 Indicative costing of route options

The following Table 5.1 provides indicative costs for construction of each of the route options.

Cost estimates are based on conceptual, strategic routes only, and without specific knowledge of ground or environmental conditions, or specific requirements such as deck widths. Bridges would require specific costing, particularly those crossing difficult topography around Leixlip.

Table 5.1 – Indicative cost estimates of route options

Route option	Route length (km)	Bridges	Indicative cost
Route option 1 To west, L1015 minor improvements	4.4	2 x (100m span, 15m deck width)	€10M
Route option 2 To west, new route, L1015 alternative	3.7	2 x (100m span, 15m deck width)	€15M
Route options 3 & 4 To west, new route adjacent to canal (Route option 5 more costly)	2.2	2 x (100m span, 15m deck width) 1 x (150m span, 15m deck width)	€20M
DoMin – Town centre and Lucan To east via R149 and L3005, and via Captiain's Hill	3.6	2 x (100m span, 15m deck width)	€15M
M4 Link To east, new route east of St. Catherine's Park	1.9	3 x (100m span, 15m deck width) 1 x (200m span, 15m deck width)	€25M

Each option has been costed with improvements to Cope and Kellystown bridges included (as undertaken during the strategic modelling exercise), therefore a minimum of two bridges are proposed in each case. Property acquisition and temporary works would be additional to the indicative construction costs.

5.2.4 Undertaking the multi-criteria analysis

With the route options presented, two MCAs were undertaken (one for each of the western route options and eastern route options). Routes to the west and east provide benefits for different trip directions, and would not have a common origin and destination point, therefore two MCA tables are provided.

Table 5.2 and Table 5.3 are shown subsequently and provide a description against each option's sub-criterion. As discussed before, such an MCA discourages numeric scoring and therefore a colour is provided as per Table 4.2.

Table 5.2 – Route options to connect Confey to the west of Leixlip

Route Assessment Considerations	Criteria	Economy		Safety	Environment		Accessibility and Social Inclusion			Integration		Physical Activity
	Sub-criteria	1.a. Economic performance	1.b. Road performance	2.a. Road user safety	3.a. Impact on natural environment	3.b. Impact on built environment	4.a. Accessibility to key trip attractors	4.b. Social inclusion and improvement for deprived geographic areas	4.c. Accessibility for the other transport modes	5.a. Integration with local objectives and policies	5.b. Land use integration	6.a. Level of improvement for walking and cycling mode shares
Do nothing		Not improving the existing road network would result in a poor economic performance in the future with increased traffic delays.	The existing infrastructure is not suitable for high traffic volumes from Confey development	Due to the lack of pedestrian and cycle facilities, the existing infrastructure is not considered as safe as the other route options.	No impact – the best option relatively.	No impact – the best option relatively.	Deteriorated access from Confey Development lands to Intel on R148 relevant to other options.	This route would serve areas considered affluent and marginally above average across the town.	There are no bus or rail services along this route.	Some disbenefit in achieving local policies	This route would not be a positive enabler for the expected land uses around the town.	Degradation of pedestrian and cycle access compared to other options
Road Option 1		The biggest cost associated with this option is the improvement / widening of Kellystown bridge. Land would also be required either side of the route, resulting in high land acquisition costs.	Upgrading existing infrastructure along this route is anticipated to improve road performance marginally.	There are very few junctions along this route considering its length. However, as there are a number of entrances to houses along this route, there is higher potential for collisions.	Trees and hedgerow either side of road would need to be cut back. This route would impact on the Rye Water due to upgrades to Kellystown Bridge, and potential for Valley / Carton SAC impacts – mitigation measures would be required.	The existing (Kellystown) bridge over the Rye Water would need to be widened. Significant upgrades would be required to the existing infrastructure along this route.	Slightly improved access from Confey Development lands to Intel on L1015.	This route would serve areas considered affluent and marginally above average across the town.	There are no bus or rail services along this route, nor expected opportunity in the future.	Improvement towards local land use policies	This route would primarily travel through land which is zoned for its purpose (road / transport)	Segregated pedestrian and cycling facilities would be achievable along this route with agricultural land acquisition, with the exception of Kellystown bridge.
Road Option 2		As the majority of this route option is through agricultural land, this option would have significant land acquisition costs as well as the high cost of improving / widening Kellystown bridge.	The new proposed road would offer a more direct route between Confey and Intel, with greater journey time savings than the existing route along the L1015.	There would be very few junctions along this route considering its length. The new road could be built to optimise facilities for all road users i.e. pedestrians, cyclists and motorists.	The new route would have a significant impact on agricultural land with likely environmental constraints. This route would impact on the Rye Water due to upgrades to Kellystown Bridge, and potential for Valley / Carton SAC impacts – mitigation measures would be required.	The existing (Kellystown) bridge over the Rye Water would need to be widened. Also, a new junction would be required to connect the road to the L1014 north of Kellystown bridge. Lesser impact on existing L1015 houses.	Slightly improved access from Confey Development lands to Intel on L1015	This route would serve areas considered affluent and marginally above average across the town.	There are no bus or rail services along this route, nor expected opportunity in the future.	Some disbenefit in achieving local policies (particularly for land use along the route length)	This route would integrate better with the surrounding land use environment well compared to Do nothing.	Segregated pedestrian and cycling facilities would be achievable along this route with agricultural land acquisition, with the exception of Kellystown bridge.

Route Assessment Considerations	Criteria	Economy		Safety	Environment		Accessibility and Social Inclusion			Integration		Physical Activity
	Sub-criteria	1.a. Economic performance	1.b. Road performance	2.a. Road user safety	3.a. Impact on natural environment	3.b. Impact on built environment	4.a. Accessibility to key trip attractors	4.b. Social inclusion and improvement for deprived geographic areas	4.c. Accessibility for the other transport modes	5.a. Integration with local objectives and policies	5.b. Land use integration	6.a. Level of improvement for walking and cycling mode shares
Road Option 3		There is no existing infrastructure along this route and so the main cost would be land acquisition from agricultural land, though there is less land acquisition required than route option 1 or 2.	In bypassing Leixlip town, the new road would offer a faster, alternative route between Confey and Louisa bridge / Intel with fewer junctions.	There would be very few junctions along this route considering its length. The new road could be built to optimise facilities for all road users i.e. pedestrians, cyclists and motorists.	The new route would have a significant impact on agricultural land with likely environmental constraints in the vicinity of the Royal Canal; in particular the SAC of Rye Water. However through mitigation and design, adverse impacts could be minimised.	This route would avoid impact on Intel's land but would require a new junction on the R148, west of Louisa bridge. This route has the potential to impact on Leixlip Spa, which is a protected monument and proposed Natural Heritage Area, and Leixlip Waterfall. There is also potential to impact on the greenway along the Royal Canal.	Improved access from Confey Development lands to Intel and general Leixlip township areas.	This route would serve areas considered affluent and marginally above average across the town.	This new road would provide a high-quality link between Confey Station and Louisa bridge railway station.	Some disbenefit in achieving local policies	This route would enable future land uses to be used as intended, and to unlock lands for future development to the north west of the town.	Segregated pedestrian and cycling facilities would be achievable along this route with agricultural land acquisition.
Road Option 4		The main cost for this route option would be land acquisition. Though most of the land would be agricultural, there would be significant costs for land acquisition Intel's carpark (if even permissible).	In bypassing Leixlip town, the new road would offer a faster, alternative route between Confey and Louisa bridge / Intel with fewer junctions.	There would be very few junctions along this route considering its length. The new road could be built to optimise facilities for all road users i.e. pedestrians, cyclists and motorists.	The new route would have a significant impact on agricultural land with likely environmental constraints, but would avoid the canal and Rye Water SAC.	This route would pass through Intel's carpark and would require a new junction on the R148, west of Louisa bridge.	Improved access from Confey Development lands to Intel and general Leixlip township areas.	This route would serve areas considered affluent and marginally above average across the town.	This new road would provide a high-quality link between Confey Station and Louisa bridge railway station.	Some disbenefit in achieving local policies	This route would enable future land uses to be used as intended, and to unlock lands for future development to the north west of the town.	Segregated pedestrian and cycling facilities would be achievable along this route with land acquisition from Intel and agricultural land.

Route Assessment Considerations	Criteria	Economy		Safety	Environment		Accessibility and Social Inclusion			Integration		Physical Activity
	Sub-criteria	1.a. Economic performance	1.b. Road performance	2.a. Road user safety	3.a. Impact on natural environment	3.b. Impact on built environment	4.a. Accessibility to key trip attractors	4.b. Social inclusion and improvement for deprived geographic areas	4.c. Accessibility for the other transport modes	5.a. Integration with local objectives and policies	5.b. Land use integration	6.a. Level of improvement for walking and cycling mode shares
Road Option 5		The main cost for this route option would be the construction of a new bridge north of Louisa bridge. In addition, there would be significant costs for land acquisition from agricultural land.	In bypassing Leixlip town, the new road would offer a faster, alternative route between Confey and Louisa bridge / Intel with fewer junctions.	There would be very few junctions along this route considering its length. The new road could be built to optimise facilities for all road users i.e. pedestrians, cyclists and motorists.	The new route would have a significant impact on agricultural land with likely environmental constraints, but would avoid the canal and Rye Water SAC.	This route would avoid impact on Intel's carpark but would require would a new bridge, north of Louisa bridge, and also a major junction upgrade at Accommodation Road / Station Road. There is also potential to impact on the greenway along the Royal Canal.	Improved access from Confey Development lands to Intel and general Leixlip township areas.	This route would serve areas considered affluent and marginally above average across the town.	This new road would provide a high-quality link between Confey Station and Louisa bridge railway station.	Some disbenefit in achieving local policies	This route would enable future land uses to be used as intended, and to unlock lands for future development to the north west of the town.	Segregated pedestrian and cycling facilities would be achievable along this route with agricultural land acquisition.

Table 5.3 – Route Options to connect Confey to the west of Leixlip town

Route Assessment Considerations	Criteria	Economy		Safety	Environment		Accessibility and Social Inclusion			Integration		Physical Activity
	Sub-criteria	1.a. Economic performance	1.b. Road performance	2.a. Road user safety	3.a. Impact on natural environment	3.b. Impact on built environment	4.a. Accessibility to key trip attractors	4.b. Social inclusion and improvement for deprived geographic areas	4.c. Accessibility for the other transport modes	5.a. Integration with local objectives and policies	5.b. Land use integration	6.a. Level of improvement for walking and cycling mode shares
Do Minimum – Town Centre and Lucan		Relatively low cost option, however, the expected benefits to vehicles and travel may be limited.	Upgrading existing infrastructure along this route is not anticipated to significantly improve journey times.	There are few junctions along this route considering its length, however, roads are rural in nature with poor legacy alignments.	Some trees and hedgerow either side of road would need to be cut back. Relatively this option has a very low impact compared to a direct M4 connection	Relatively few built structures affected, with expected improvement compared to a direct M4 connection.	Improved access from Confey Development lands to Lucan via existing routes and marginally improves access to the M3 and Meath.	This route would serve areas considered affluent and marginally above average across the town.	There are no bus or rail services along this route, but their application would be able to serve the wider Leixlip / Lucan and Ongar areas more suitably.	Minor improvement towards achieving policies and objectives	This route would primarily travel through land which is zoned for its purpose (road / transport), and has minor works outside of the Kildare County Area.	The route being compared to the east (form Confey to N4, J3) would be unlikely to facilitate walking and cycling in any comparable options.
M4 Link		This option would have significant costs (with a new bridge of the canal and railway, and secondly a very costly Liffey River crossing). Benefits may not be offset by the high costs.	The new proposed road would offer a more direct route between Confey and the M4, with greater journey time savings than the existing route along the R149.	There would be very few junctions along this route considering its length. The new road could be built to optimise facilities for all road users i.e. pedestrians, cyclists and motorists.	The new route would have a significant impact on agricultural land adjacent to St. Catherine's Park and likely high impact on the natural environment.	This route would affect serval existing roads and roundabouts (by M4 J5).	The route may be viewed as a development only link between Confey and the M4.	This route would serve areas considered affluent and marginally above average across the town.	There are no bus or rail services along this route – it would be highly viable for personal motor vehicle travel, and would not encourage sustainable travel.	Some disbenefit in achieving local policies	This route would traverse near St. Catherine's Park, but would require significant infrastructure works outside of the Kildare County area.	The route being compared to the east (form Confey to N4, J3) would be unlikely to facilitate walking and cycling in any comparable options.

Table 5.4 – Western Route options summary

Route Assessment Considerations	Criteria	Economy		Safety	Environment		Accessibility and Social Inclusion			Integration		Physical Activity		Combined Assessment Outcome
	Sub-criteria	1.a. Economic performance	1.b. Road performance	2.a. Road user safety	3.a. Impact on natural environment	3.b. Impact on built environment	4.a. Accessibility to key trip attractors	4.b. Social inclusion and improvement for deprived geographic areas	4.c. Accessibility for the other transport modes	5.a. Integration with local objectives and policies	5.b. Land use integration	6.a. Level of improvement for walking and cycling mode shares		
Do nothing														
Road Option 1														
Road Option 2														
Road Option 3														
Road Option 4														
Road Option 5														

Table 5.5 – Eastern Route options summary

Route Assessment Considerations	Criteria	Economy		Safety	Environment		Accessibility and Social Inclusion			Integration		Physical Activity		Combined Assessment Outcome
	Sub-criteria	1.a. Economic performance	1.b. Road performance	2.a. Road user safety	3.a. Impact on natural environment	3.b. Impact on built environment	4.a. Accessibility to key trip attractors	4.b. Social inclusion and improvement for deprived geographic areas	4.c. Accessibility for the other transport modes	5.a. Integration with local objectives and policies	5.b. Land use integration	6.a. Level of improvement for walking and cycling mode shares		
Do Minimum – Town Centre and Lucan														
M4 Link														

5.2.5 Preferred route option - west

The two MCA undertaken and summarised in Table 5.4 and Table 5.5 for the western and eastern routes respectively provide an indication of the preferred interventions for providing road connectivity to each side of the town.

The comparative nature of the MCAs pits all options against one another (including Do minimum options), allowing the preferred to be recognised.

The outcomes of the MCAs for each side of the town are as follows:

Western route option preference – Road option 4

Figure 5.16 – Route options 4

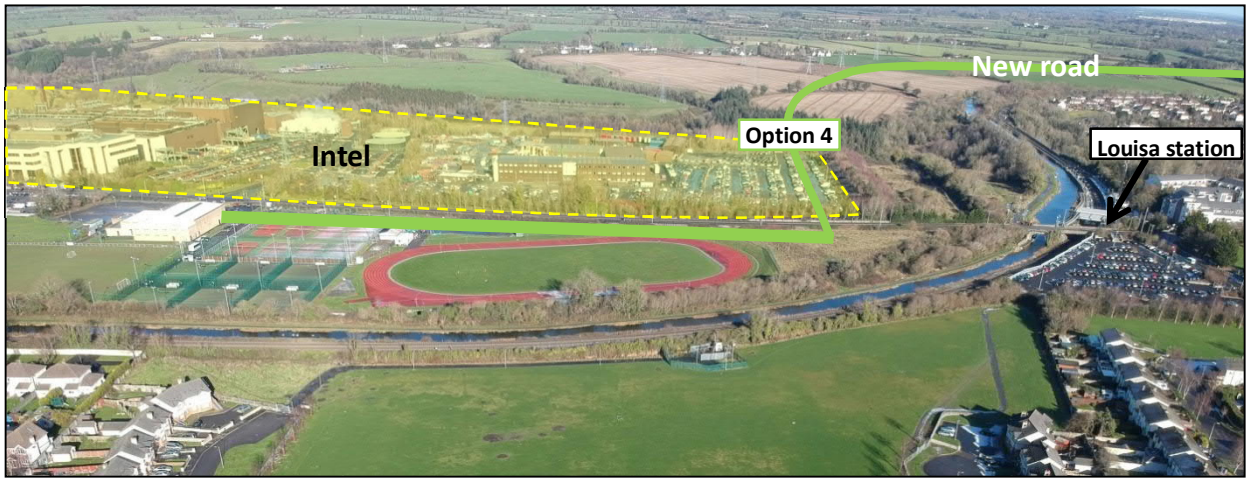


Figure 5.17 – Route options 4

Route option 4 would connect the Confey development lands to the R148 (east of Intel) via a new, road south of the R149 and parallel to the Royal Canal. The new route would be required to pass through the existing eastern carpark of Intel to join the R149 at a new junction or roundabout.

Further study may seek a compact junction options for the R148 time-in, and which avoids the Intel site.

In comparison with the other route options considered to connect Confey to the west of Leixlip town, Route option 4 would provide the optimum balance between economic performance, road user safety, environmental impacts, accessibility for other transport modes and to key trip attractors, and land use integration. With the exception of the Do Nothing option, this route has the least environmental impact (and joint scored with Route option 5).

5.2.5.1 Land use and integration issues of Options 3, 4 and 5.

Through consultation, moderate difficulties are expected in implementing Options 3, 4 and 5 as the land is not expected to be readily available to the council (being under Intel's control), nor a compact

intersection being feasible. However, Option 4 is highly desirable as a strategic transport link and therefore remains as the preferred within this assessment.

Where Option 4 is unable to progress the next best should progressed, Road option 1. This option seeks to immediately improve the L1015 route including Kellystown Bridge. Cope Bridge improvements would be anticipated within eastern route improvements (outlined in the following section).

5.2.6 Preferred route option - east

The preferred route option for the east of the town is an improvement of existing roads and facilities as in Figure 5.18.

Eastern route option preference – Do Minimum – Town centre and Lucan.

Figure 5.18 – DoMin – Town centre and Lucan

The Do Minimum Town centre and Lucan route option upgrades an existing route between Confey development lands and junction 3 of the N4 in Lucan; via both the town centre and R149 / Clonee Road. As both routes have existing road infrastructure, they have been considered as one overall route option.

As a Do Minimum option the corridors would seek improvements to their usability and safety, Minor, localised improvements to junctions, footpaths, cycling facilities would be implemented close to the Confey Masterplan area where active modes are increasingly expected. Moving eastward from Confey the existing road would be improved through minimal measures. This may include isolated improvements to particularly poorly (vertically and / or horizontally) aligned sections, appropriate vegetation removal or relocation to improve sight-lines, lining, signing and surfacing improvements.

In comparison with the M4 Link, the Do Minimum Town Centre and Lucan route option would provide a better balance between economic performance, environmental impacts, accessibility for other transport modes to key trip attractors and land use integration.

6. Active mode options

With the preferred route options having been determined prior, this section undertakes a similar MCA assessment for the active mode options. The aim of the active mode options assessment is to identify permeability measures and new paths which will improve access for non-motorised modes throughout Leixlip.

The sub-criteria developed for road-based interventions (Section 5) are less applicable to active modes and therefore the simplified six CAF criteria are used.

Furthermore, the expected cost estimates for wide-ranging active mode improvements will be significantly lower than road intervention options, leading to further evidence in supporting the six criteria assessment (and avoidance of the complexity of sub-criteria).

6.1 Active mode option grouping

For assessment purposes, these options have been grouped into five areas which serve a common purpose and will be assessed collectively:

- Area 1: Confey Station and Urban Design Framework Lands Access
- Area 2: Rye Water and school access
- Area 3: Louisa Bridge and Intel access
- Area 4: South-west Leixlip permeability
- Area 5: Town centre and school access

A list of active mode options was developed, illustrated in Figure 6.1, from analysis of map sources and site visits.

In addition to the assessment options, there are existing cycle routes and walking paths which require upgrades, these are shown in Figure 6.2 along with the active mode options. The cycling elements are derived from the GDA Cycle Network Plan, while the other upgrades involve either traffic calming or path improvements.

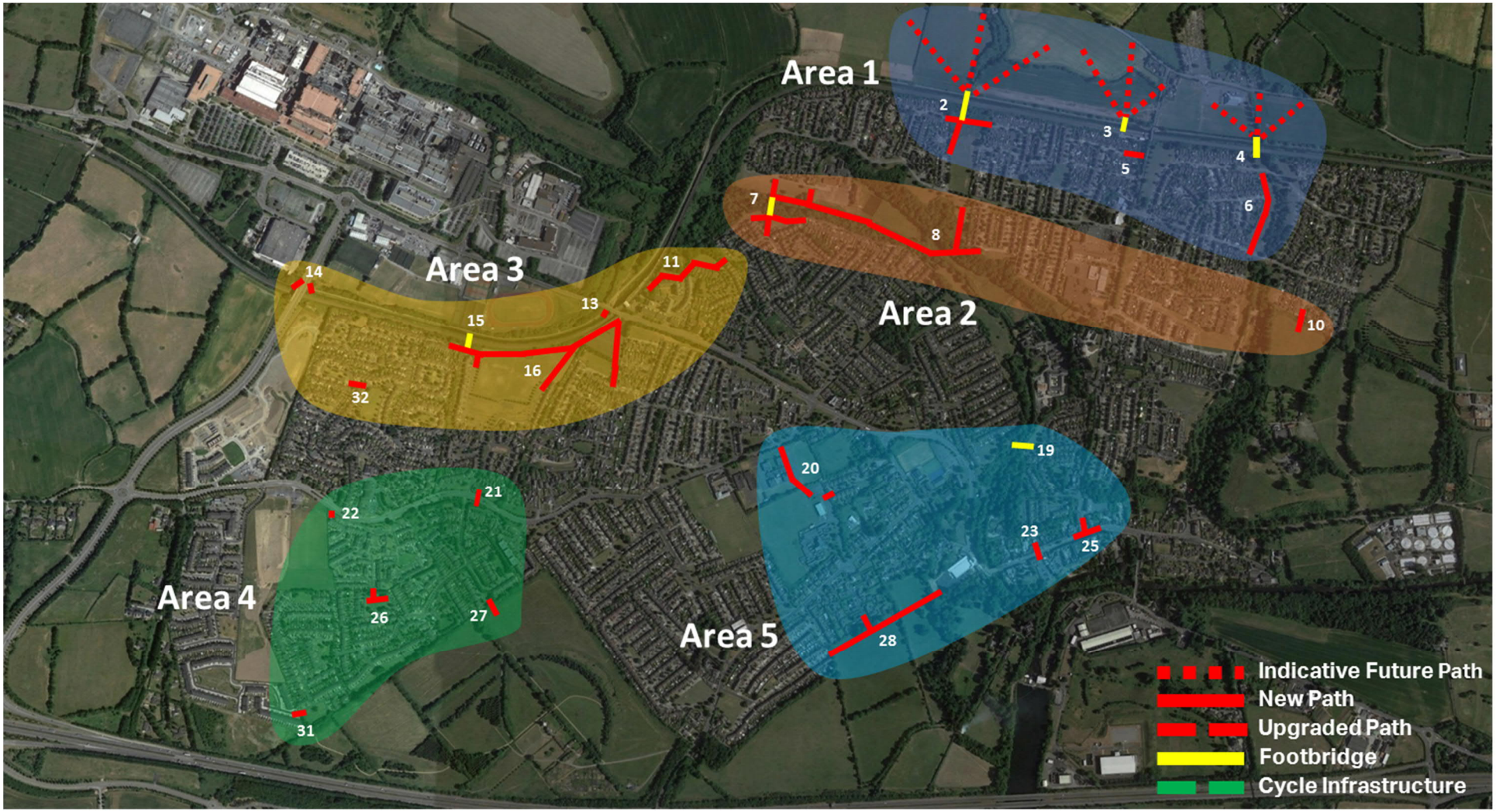


Figure 6.1 – Active mode strategy elements and grouping

Figure 6.2 – Active mode upgrades required to existing routes

The numeric identifier for each measure in Figure 6.1 and Figure 6.2 correspond to the numbers shown in the list of active mode options provided in Table 6.1.

Table 6.1 – List of ungrouped active mode options

Option	Short description	Area
Active Mode 01	Improvements to Royal Canal towpath to facilitate delivery of the Royal Canal Greenway	-
Active Mode 02	New footbridge over railway line to link to new development in the Confey Urban Design Framework lands/royal canal with paths to link 3 cul-de-	1
Active Mode 03	Create footbridge from northern platform of Confey Station to the towpath of the Royal Canal	1
Active Mode 04	New footbridge over railway line to link to new development in the Confey Urban Design Framework lands/royal canal to Glendale Meadows	1
Active Mode 05	Create short link through wall on nearby River Forrest cul-de-sac to existing Confey Station entrance	1
Active Mode 06	Links Glendale Meadows to Newtown Glendale on west side of stream and links to proposed footbridge over railway	1
Active Mode 07	Footbridge and paths to link Woodside, The Avenue and The Glen with Confey Community College	2
Active Mode 08	Path network linking River Forest to the footbridge and Confey Community College	2
Active Mode 09	Investigate and provide cycle facilities along this route and or traffic calming measures to reduce vehicle speeds and encourage cycling	-
Active Mode 10	Creates short link through wall at Glendale Meadows to link to Black Avenue KDA	2
Active Mode 11	Create path network to connect Louisa Bridge station with estates to the north-east (Station Road, Rockingham Avenue, The Walk)	3
Active Mode 12	Upgrade to existing path linking Ryevale Lawns with Station Road	-
Active Mode 13	Create southern link to Royal Canal greenway from R148	3
Active Mode 14	Create one or two links to Royal Canal tow path from R449	3
Active Mode 15	Footbridge linking Lough na mona Park with Royal Canal Greenway	3
Active Mode 16	Creation of path network to link Louisa Bridge with estates to the south-west at The View, Lough Na Mona Park (east and west) and Easton Park.	3
Active Mode 17	Investigate and provide cycle facilities along this route and or traffic calming measures to reduce vehicle speeds and encourage cycling	-
Active Mode 18	Footway improvements, cycle facilities, crossing facilities and traffic calming measures along this section of Green Lane	-
Active Mode 19	New footbridge to link residential areas of Rye River Park with Ryevale Lawns	5
Active Mode 20	Create path network to link primary and secondary schools with Green Lane, Celbridge Road, Knockaulin	5
Active Mode 21	Provide pedestrian crossing facilities to link the estate to the north and south of Green Lane and provide access towards Louisa Bridge Station	4
Active Mode 22	Create short link through wall at the west of Easton Lawns with Green Lane	4
Active Mode 23	New pedestrian crossing facility provided on Main Street - improve access to the town centre allows ease of movements to shops / facilities on either side of the busy road.	5
Active Mode 24	Upgrade of cyclist and pedestrian facilities at Old Hill road	N/A

Active Mode 25	Pedestrian crossing facilities provided on all arms of the signalised junction and urban realm improvements including - Footpath widening / reduced carriageways / junction tightening, car parking relocation outside BOI Captains Hill from perpendicular to parallel - creation of urban space, greening and seating	5
Active Mode 26	Create short path network between Rinawade Green - Rinawade Downs - Easton Row	4
Active Mode 27	Create link between Rinawade Grove and Wonderful Barn KDA.	4
Active Mode 28	Create path network to link Leixlip Park, Wogansfield and Aldi as well as linking with future development on Guinness lands	5
Active Mode 29	Investigate and provide cycle facilities along this route - this section does not have any cycle facilities - joins up GDA cycle Route LP1 - provides continuous cycle facilities from the west of Leixlip to Town Centre	-
Active Mode 30	Investigate and provide cycle facilities - GDA Cycle Route LP2	-
Active Mode 31	Create link between Beech Park and Rinawade Lawns	4
Active Mode 32	Create short link through wall between Glen Easton Gardens and Glen Easton Square	3

6.2 Active mode group description

6.2.1 Area 1 – Confey Station and Urban Design Framework lands access

The primary aim of Area 1 active mode measures (Figure 6.3) is to improve access to Confey Station and enhance north-south permeability between existing estates and the future Confey UDF lands to the north. The major infrastructure elements proposed are three new footbridges across the Royal Canal to link to the Confey UDF lands as well as the creation of a new southern access path to Confey Station. To support these measures, several new paths are proposed to eliminate cul-de-sacs and link surrounding areas with the footbridges.

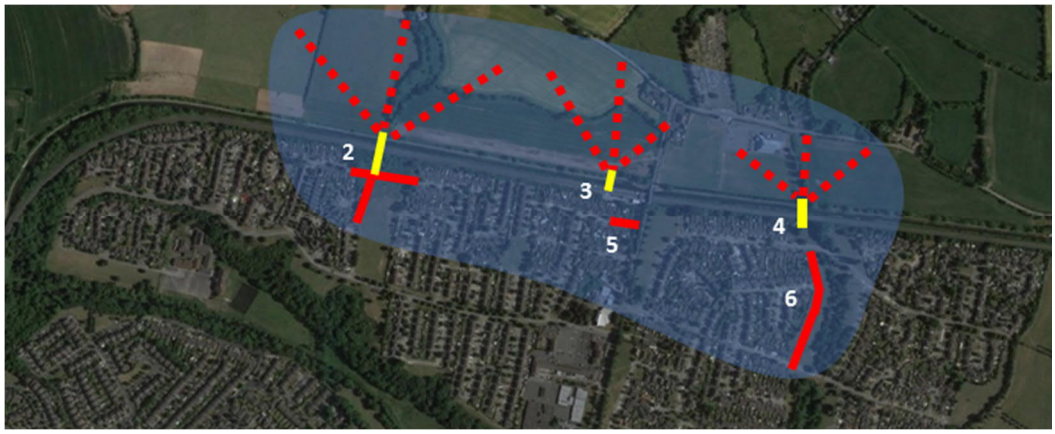


Figure 6.3 – Area 1 active mode options

6.2.2 Area 2 – Rye Water and school access

The primary intervention of Area 2 active mode measures (Figure 6.4) is the proposal of a footbridge over the Rye Water with associated paths to connect Confey Community College to nearby housing estates. Another measure connects the new development at Leixlip Manor to the San Carlo schools.

Figure 6.4 – Area 2 active mode options

6.2.3 Area 3 – Louisa Bridge and Intel access

The primary aim of the Area 3 active mode measures (Figure 6.5) is to expand access to the Louisa Bridge train station and to the Intel site for residents who live nearby but currently have poor access due to the structure of the path network. Louisa Bridge station access is greatly enhanced by the creation of a north-eastern and south-western path network to link to adjacent estates. The creation of a new footbridge provides direct access to the Royal Canal greenway and the construction of new links from the tow path to the road network allow for short walking distances to Intel and Louisa Bridge stations.

Figure 6.5 – Area 3 active mode options

6.2.4 Area 4 – South-west Leixlip permeability

The primary aim of Area 4 measures (Figure 6.6) is to eliminate long, circuitous journeys caused by walled housing estates which bar local access between adjacent estates or access to bus stops. Supporting measures include a path to link existing housing estates with new development sites to ensure that the additional permeability issues are avoided in the future.

Figure 6.6 – Area 4 active mode options

6.2.5 Area 5 – Town centre and school access

The primary aim of Area 5 measures (Figure 6.7) is to improve access to the town centre from nearby housing estates via a new footbridge and new paths to eliminate cul-de-sacs. Supporting measures improve safety at crossing points on Main Street and nearby junctions. In addition to this, a new path breaks up a moderately large block of low-permeability land at the GAA/school complex on Green Lane. In consultation with the GAA club and schools, paths may be developed to provide for north-south access through the block to allow for shorter trips to/from school.

Figure 6.7 – Area 5 active mode options

6.3 Active mode options assessment

The active mode option groups are assessed in Table 6.3's MCA. The MCA summarises the expected impacts and improvements of active mode option groups under each of the assessment criterion.

In light of the fact that many criteria are qualitative, each impact is scored based on the extent to which it would offer a positive or negative impact. For illustrative purposes, this seven-point scale is colour coded as presented in Table 6.2, with advantageous routes graded to 'dark green' and disadvantaged routes graded to 'dark red'.

Table 6.2 – Active mode options colour coded ranking scale

Colour	Description
	Major or highly positive
	Moderately positive
	Minor or slightly positive
	Not significant or neutral
	Minor or slightly negative
	Moderately negative
	Major or highly negative

Table 6.3 – Multi-criteria analysis of active mode option groups

	Economy	Safety	Environment	Accessibility and Social Inclusion	Integration	Physical Activity		Combined Assessment Outcome	Summary Justification
Do Nothing									Doing nothing for active modes is considered a poor outcome for transport throughout Leixlip. Directly it fails to enable improved access to many facilities, including the new Confey UDF lands, indirectly it will lead to increased private vehicle travel and poorer sustainability outcomes.
Area 1: Confey Station and Urban Design Framework Lands access									Measures will increase rail catchment through the creation of additional access points and integrating the future Confey Urban Design Framework lands with existing areas and the station. However, there will be substantial costs associated with the construction of three footbridges and possible impact on the canal environment.
Area 2: Rye Water and school access									The creation of a new footbridge will double the existing catchment for Confey Community College which is currently constrained. This will improve the modal share for walking and cycling to school by eliminating long, circular trips to enhance local accessibility along with the permeability link to the new Leixlip Manor development. The construction of a footbridge will incur moderate financial costs and impact on the natural and built environment. However, a suitable design which accounts for the SEA and NIR could mitigate the environmental impacts as much as possible.
Area 3: Louisa Bridge and Intel access									The creation of new paths greatly expands the walking catchment for Louisa Bridge station among existing residents to the north and south. The construction of a footbridge and additional canal access points provides shorter paths to Intel for workers at some financial cost and environmental impact. The elimination of existing cul-de-sacs in existing and future development reduces the need for long circuitous trips to greatly enhance accessibility in combination with other measures.
Area 4: South West Leixlip permeability									Elimination of single entrance walled housing estates will improve walking/cycling access for children travelling to school, accessing retail and bus services on Green Lane. Links with future developments will ensure that no new cul-de-sac estates are created to integrate neighbourhoods. Introduction of several permeability paths shortens journeys to the bus stop and services on Green Lane, however, the lack of regular bus service limits its positive economic impact. This greater integration will support the development of more frequent bus routes in the future.
Area 5: Town Centre and school access									New paths expand the catchment for the town centre to the west and traffic calming measures make the main street a safer environment for pedestrians at some financial cost. The construction of a footbridge would incur some financial and environmental impact. New paths through the school / GAA complex on Green Lane may allow for cross-trips by active modes across the site which enhances permeability in central Leixlip for limited economic cost. This would require consultation with schools and sports clubs.

6.4 Primary and supporting options

While all options presented in the active modes category are necessary to enhance access and movement for non-motorised modes throughout Leixlip, a distinction can be drawn between primary and supporting options:

- Primary options: These measures are fundamental to the effectiveness of active mode improvements in the town. Each option has a significant impact in the shortening trip distances and expanding the walking catchment to key services.
- Supporting options: These measures will improve the effectiveness of active modes by making travel more direct and convenient, but may have a lesser effect on catchment improvements. In combination with the essential options, the supporting options help to create a permeable town where walking and cycling offer a competitive alternative to private vehicle travel.

Table 6.4 – Categorisation of primary and supporting active modes options

Active mode group	Primary (option number references)	Supporting (option number references)
Area 1: Confey Station and UDF Lands Access	2, 3, 5	4, 6
Area 2: Rye Water and School Access	7, 8, 10	
Area 3: Louisa Bridge and Intel Access	11, 14, 15, 16, 32	13
Area 4: South West Leixlip Permeability	26, 27, 31	21, 22
Area 5: Town Centre Access	20, 28	19, 23, 25

Refer to Table 6.1 for option descriptions.

7. Permeability improvement

This section assesses the expansion of walking distance catchments in Leixlip with the implementation of the active mode options (Section 6). The analysis is conducted with a do-something path network which contains all of the proposed paths and footbridges. The impact is quantified using GeoDirectory (2018) residential and commercial address points in comparison with the existing (Do Nothing) situation. This assessment only considers existing buildings in 2018 and does not account for future development KDA sites which will substantially increase the number of homes in the catchments.

7.1 Expanded public transport catchment

Figure 7.1 shows the expansion of the catchment with the implementation of the active modes options in blue with the existing catchment area in white. As the existing catchment area was quite extensive, the increase is slight with gains primarily due to connecting paths through impermeable blocks. Overall, there has been a 1.8% increase in the residential catchment for bus services, representing an increase of 77 homes.

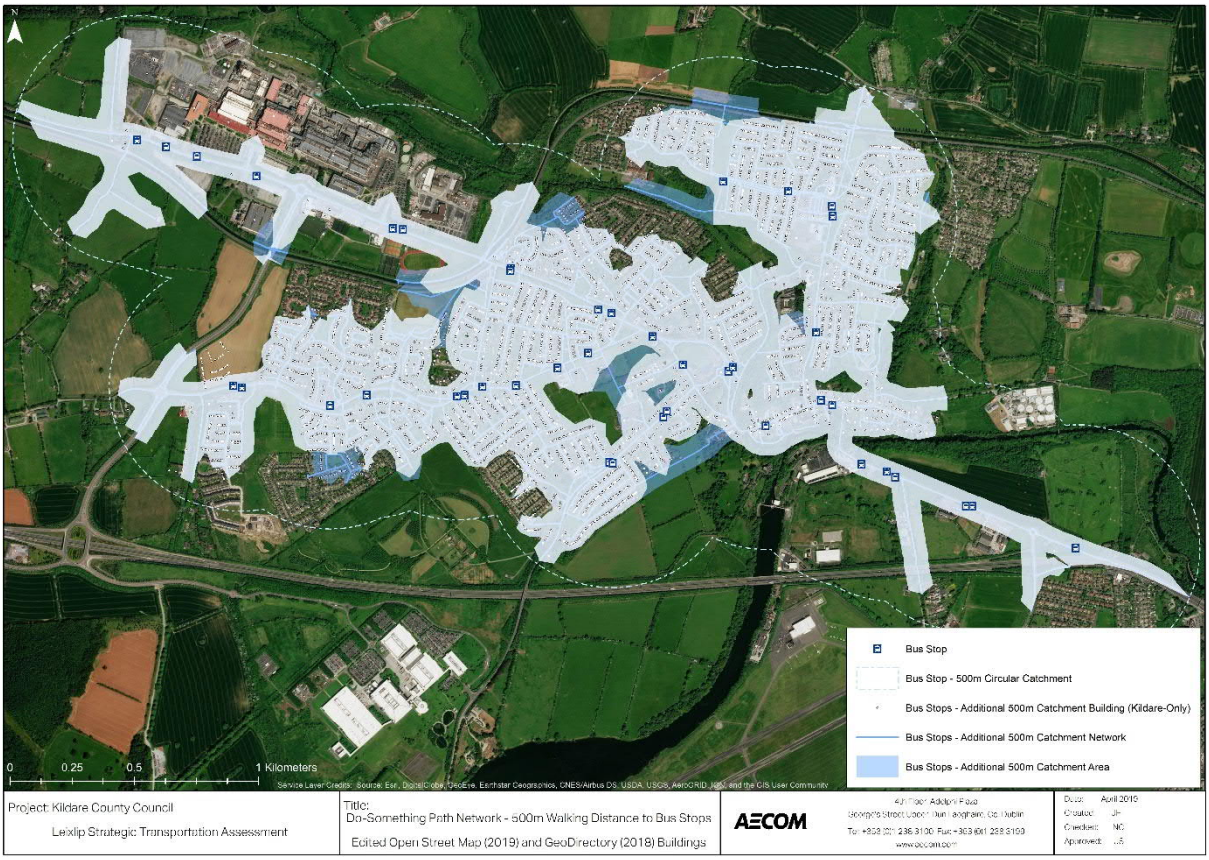


Figure 7.1 – Access improvement to bus stops with active mode options

Figure 7.2 shows the expansion of the catchment with the implementation of the active modes options in yellow for Louisa Bridge station and purple for Confey station, and existing catchment areas for both stations in white.

In the case of Confey, the existing catchment was quite extensive and so there are only slight gains as most active modes options are aimed at improving future access to the Confey UDF lands.

In respect to Louisa Bridge station, there are significant improvements to the rail catchment to the north-east and south-west of station. The catchment expansion is shown numerically below:

- **Confey Station**: 65 residential (+4.5%) and 3 commercial units (+8.8%)

  Confey Station will also gain a new, extensive catchment from the Confey UDF lands.

- **Louisa Bridge Station**: 499 residential (+37.6%) and 2 commercial units (+5.1%)

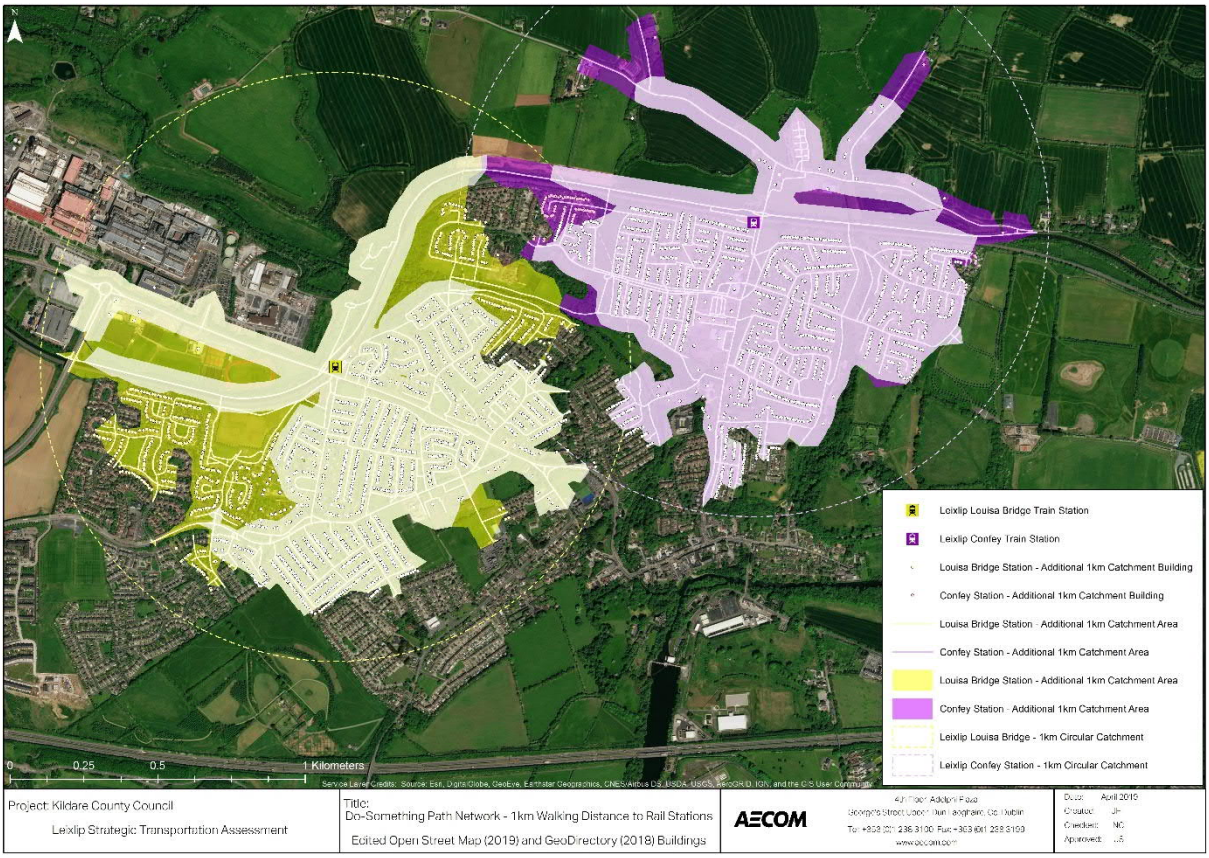


Figure 7.2 – Access improvement to Leixlip railway stations with active mode options

7.2 Expanded school catchment

Figure 7.3 shows the expansion of the primary school catchment with the implementation of the active modes options as green and the existing catchment area shown in white. As the primary schools are distributed around the town without significant permeability restrictions, the implementation of the strategy only results in a marginal increase in 28 homes (+0.7%) within the 1km catchment area.

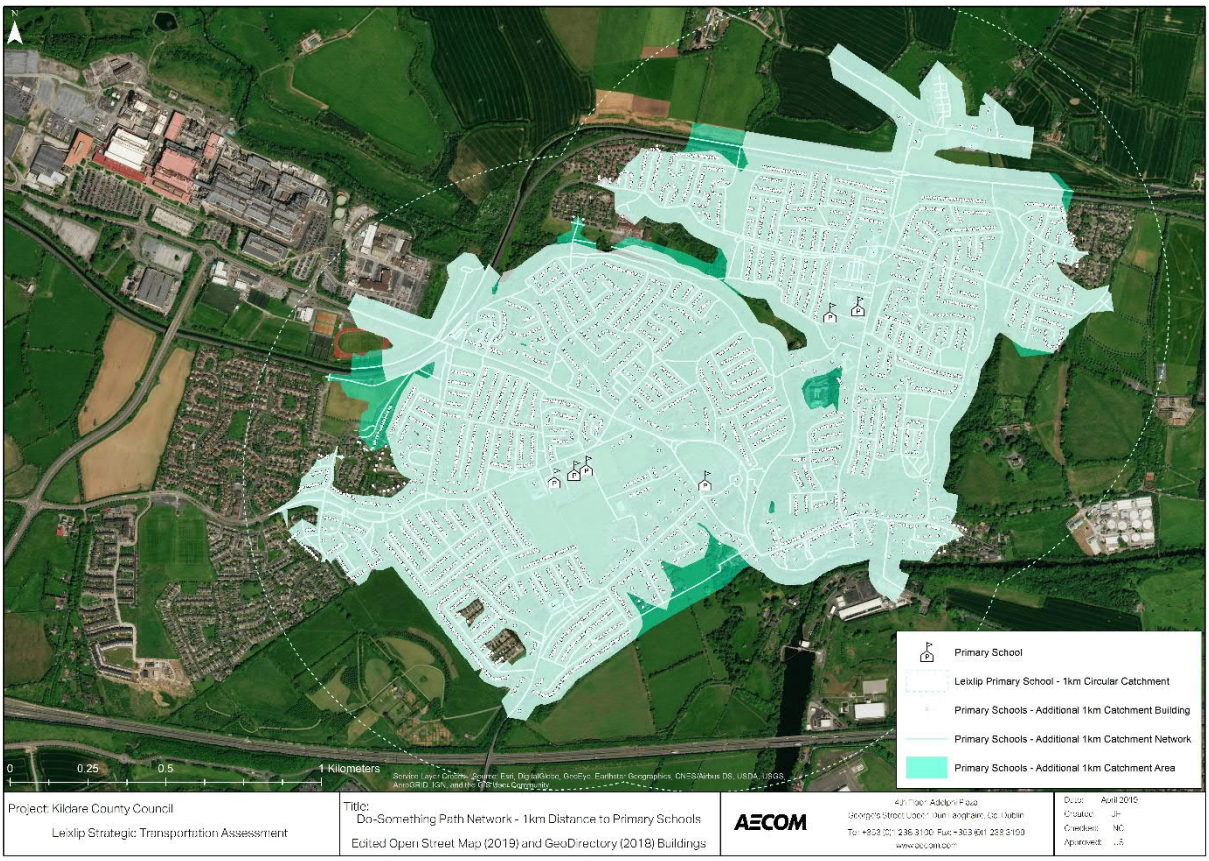


Figure 7.3 – Access improvement to primary schools with active mode options

Figure 7.4 shows the expansion of the secondary school catchment with the implementation of the active modes options in orange with the existing catchment area shown in white.

As the existing access to Confey Community College is greatly constrained by the lack of footbridge over the Rye Water, the implementation of the active modes strategy has a major impact on the catchment area for secondary schools. The number of homes within a 1km walk of a secondary school increases by 820 homes (+43.1%), substantially increasing the catchment area around the town.

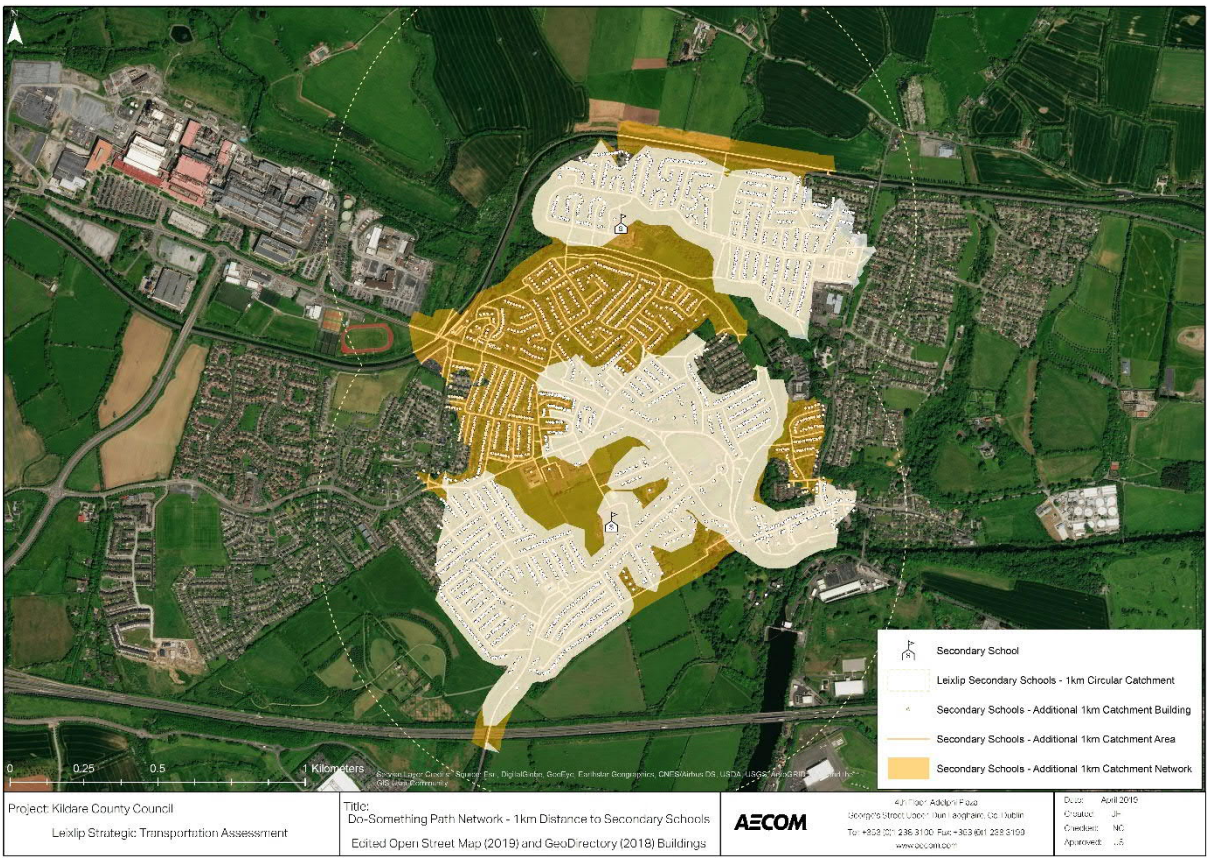


Figure 7.4 – Access improvement to secondary schools with active mode options

7.3 Expanded town centre catchment

Figure 7.5 shows the expansion of the town centre catchment with the implementation of the active modes options in orange with the existing catchment shown in white. As there were limited options with which to expand the existing town centre catchment, the only major gains are to the west with the creation of a formalised path linking the Aldi street-frontage with estates to the west. This results in an increase of 122 homes (+11.8%) within 1km of the town centre.

Figure 7.5 – Access improvement to town centre with active mode options

7.4 Summary of permeability enhancements

Table 7.1 compares the increase in residential and commercial units between the existing path network and the do-something strategy path network. The greatest overall impact from the active modes strategy is in relation to secondary schools, followed by Louisa Bridge train station and the town centre.

Table 7.1 – Summary of catchment expansion for key destinations

Catchment	Existing path network		Future path network		Difference		% Increase	
	R. Units	C. Units	R. Units	C. Units	R. Units	C. Units	R. Units	C. Units
Rail - Confey 1km	1,437	34	1,502	37	65	3	4.5%	8.8%
Rail - Louisa Bridge 1km	1,327	39	1,826	41	499	2	37.6%	5.1%
Bus - Stop 500m	4,294	248	4,371	248	77	0	1.8%	0.0%
School - Primary 1km	4,032	212	4,060	212	28	0	0.7%	0.0%
School - Secondary 1km	1,902	155	2,722	172	820	17	43.1%	11.0%
Town Centre - 1km	1,092	184	1,214	184	122	0	11.2%	0.0%

As covered in Section 7.1, Confey will be expected to gain an extensive new catchment from the developed Confey UDF lands.

8. Public transport plan

This section assesses the rail and bus options considered as part of the STA. Rail and bus options are assessed separately, but follow a similar format as the previous modal assessments (route options and active modes).

8.1 Rail options description

The rail options are described in Table 8.1. The majority of options test station relocations, however two propose access improvements at the existing Confey Station.

Table 8.1 – Rail options considered in the STA

Rail option	Description
Rail - 1	Relocate Confey Station to the west of the existing station
Rail - 2	Relocate Confey Station to the east of the existing station
Rail - 3	Relocate Louisa Bridge Station to the west of the existing station
Rail - 4	Relocate Louisa Bridge Station to the east of the existing station
Rail - 5	Provide new Confey Station access to the east of existing platform to link with Cope Bridge
Rail - 6	Provide new Confey Station access at the western end of existing platform linked to footbridge across Royal Canal to connect with Confey UDF lands
Rail - 7	Add a new station by Collinstown and maintain existing stations
Rail - 8	Add a new station by Collinstown and close Confey Station
Rail - 9	Add a new station by Collinstown and close Louisa Bridge Station

The rail options described in Table 8.1 are located as in Figure 8.1.

Figure 8.1 – Location of rail options

8.2 Rail options assessment

The rail options are assessed in Table 8.3 is provided in a similar CAF assessment format as previous chapters – these will be used to summarise the impact of each rail options under each assessment criterion. Each criterion is assessed on the extent to which it would offer a positive or negative impact

against all other options. For illustrative purposes, this seven-point scale is colour coded as presented in Table 8.2, with advantageous routes graded to 'dark green' and disadvantaged routes graded to 'dark red'.

Table 8.2 – Rail options colour coded ranking scale

Colour	Description
	Major or highly positive
	Moderately positive
	Minor or slightly positive
	Not significant or neutral
	Minor or slightly negative
	Moderately negative
	Major or highly negative

Table 8.3 – Multi-criteria analysis of rail options

Option	Economy	Safety	Environment	Accessibility and Social Inclusion	Integration	Physical Activity		Combined Assessment Outcome	Summary Justification
Do Nothing									No changes from existing would be economically and environmentally advantageous (relatively), but deliver no tangible benefits.
Rail 1: Confey West									Relocating Confey station to the west reduces the existing GeoDirectory catchment by 598 residential homes and 2 commercial buildings. Furthermore, demolition of the existing infrastructure to rebuild the station to the west would impact on the local environment and incur significant financial cost.
Rail 2: Confey East									Relocating Confey station to the east significantly reduces the catchment area as the station would be located near to parkland rather than residential estates. Furthermore, demolition of the existing infrastructure to rebuild the station to the east would impact on the local environment, such as impacting on the Royal Canal SAC, and incur significant financial cost.
Rail 3: Louisa Bridge West									Relocating Louisa Bridge station to the west reduces the existing GeoDirectory catchment by 774 residential homes and 10 commercial buildings. Furthermore, demolition of the existing infrastructure to rebuild the station to the west would impact on the local environment and incur significant financial cost.
Rail 4: Louisa Bridge East									Relocating Louisa Bridge station to the east would result in a similar catchment area to the existing station but would overlap with the Confey station catchment at the expense of losing coverage in the south-west. Furthermore, demolition of the existing infrastructure to rebuild the station to the east would impact on the local environment and incur significant financial cost.
Rail 5: Eastern Confey Pedestrian Access									Providing access to Confey station from Cope Bridge would substantially increase the northern catchment area on existing paths and improve access from the future Confey UDF lands. This option is tested as part of the active modes strategy and resulted in a notable expansion in the station catchment area.
Rail 6: Western Confey Pedestrian Access									Providing access to the west of Confey station, over the Royal Canal, would substantially increase the northern catchment area and improve access from the future Confey UDF lands. This was tested as part of the active modes options and resulted in an expanded station catchment area.
Rail 7: Collinstown (Plus Existing)									An additional station at Collinstown would only increase the total rail catchment for existing buildings in Leixlip by 23 residential homes and 22 commercial units at considerable financial and environmental cost. While this site could be used for a future rail-oriented development site, this is not yet necessary as there are multiple rail-accessible sites which can be developed in Leixlip. Accessibility and social inclusion would benefit from three stations, but would come at high financial and environmental cost.
Rail 8: Collinstown (close Confey)									Providing Collinstown Station and closing Confey would result in the loss of 1,471 buildings from the total Leixlip rail catchment for the addition of 45 buildings at Collinstown.
Rail 9: Collinstown (close Louisa Bridge)									Providing Collinstown Station and closing Louisa Bridge would result in the loss of 1,366 buildings from the total Leixlip rail catchment for the addition of 45 buildings at Collinstown.

8.3 Preferred rail options

On the basis of the results in Table 8.3, it is determined that options 5 and 6 should be progressed as they expand access to the existing train station for limited cost. All other options were determined to a have detrimental effect on rail travel in Leixlip or had an unacceptable level of financial and environmental impact. Very few towns have two rail stations and so Leixlip is well placed to build significant levels of rail patronage in the town without need for extensive rail infrastructure investment. Instead, the focus in Leixlip should be on improving existing access to both stations and ensuring that all future development provides efficient routes for walkers and cyclists to access rail. The location of the Confey UDF lands is well suited to maximising rail patronage, particularly for commuting trips to Dublin or other towns on the line westward.

8.4 Bus options description

The bus options are described in Table 8.4 and have been assessed in a similar manner as the previous assessments.

Table 8.4 – Bus options cosidered in the STA

Bus option	Description
Bus - 1	Bus priority (rush-call) for town centre signalised junction (R148 / R149)
Bus - 2	Bus gates on both approaches to existing Cope Bridge prior to the construction of a new two-way bridge, seeking to advance stop lines as far as practical to achieve improved signal operation.
Bus - 3	Merge 66e and 66 bus services and rerouting via Green Lane (prior to BusConnects implementation) to provide a commutable public transport service between Green Lane and Maynooth. Also to maintaining such a bus service from Green Lane westward given the KDA developments.

The bus options described in Table 8.4 are located in the areas shown in Table 8.2.

Figure 8.2 – Location of bus options

Bus options 1 and 2 will improve bus priority in the town to provide an advantage against travel by private car. Option 3 suggests a service improvement (with some associated infrastructure expected), to the

residents of Green Lane who currently do not have a regular bus service throughout the day. At present, nearby residents only have access to an infrequent 66e route from 9.30am to 3.30pm on weekdays and a small number of peak-only Xpresso services. GIS analysis of census data has shown that car dependency is particularly high along Green Lane and this reflects the lack of public transport alternative in the local area. Option 3 resolves this situation by diverting the 66 route via Green Lane before continuing to serve Intel, instead of travelling via Station Road as it does currently which is rail-accessible and served by other bus routes.

8.5 Bus options assessment

The bus options are assessed in Table 8.5 in a CAF format which collates and summarises the impact of rail option groups under each of the assessment criterion. In light of the fact that most impacts are qualitative, each impact is scored based on the extent to which it would offer a positive or negative impact against all others. For illustrative purposes, this seven-point scale is colour coded as presented in Table 8.5, with advantageous routes graded to 'dark green' and disadvantaged routes graded to 'dark red'.

Table 8.5 – Bus options colour coded ranking scale

Colour	Description
	Major or highly positive
	Moderately positive
	Minor or slightly positive
	Not significant or neutral
	Minor or slightly negative
	Moderately negative
	Major or highly negative

Table 8.6 – Multi-Criteria Analysis of bus options

Option	Economy	Safety	Environment	Accessibility and Social Inclusion	Integration	Physical Activity		Combined Assessment Outcome	Summary Justification
Do Nothing									Failing to implement any of the bus options results in a poor expected outcome. Several comparable options are low cost and / or low impact. It is recommended that some bus improvements are implemented, particularly with expected BusConnects opportunities
Bus 1: Town Centre Signal Priority									The addition of signal priority in the town centre will increase public transport accessibility and allow for greater integration between bus routes and those accessing buses. Improved service will attract more passengers and create economic benefits. Integration is considered difficult as the junction is already congested for many periods throughout the day.
Bus 2: Bus Gate on Cope Bridge									The addition of a bus gate on Cope Bridge will increase public transport accessibility and allow for greater integration between bus routes. Improved service will attract more passengers and create economic benefits. However, the construction of bus gate infrastructure will have a modest impact on the built environment.
Bus 3: 66 via Green Lane									The provision of a regular 66 bus service on Green Lane will greatly improve access to a frequent public transport services in west Leixlip. This will promote modal shift, reduce collisions, increase bus patronage and provide for public transport integration with other bus routes and rail. This option is vital to service this quickly developing area and reduce car dependency.

8.6 Preferred bus options

On the basis of the results in Table 8.6, it was determined that Bus options 1, 2 and 3 be progressed (and option 2 being in-place only as long as Cope Bridge remains single-lane).

The bus priority measures at the town centre junction (R148/R149) would improve the operation of bus services throughout the town, however, this would come at the partial expense of other modes including walking (crossing movements), cycling and private vehicle travel. Advantages may be achieved from bus priority through the main Leixlip town centre junction where BusConnects' new routes support increase connectivity, however, the limited existing capacity and space would require specific further consideration.

Rerouting the 66 via Green Lane would greatly expand the catchment for frequent public transport services to this rapidly developing area. This will be essential to reducing car dependency as residents along Green Lane do not currently have a weekend or all-day bus service. As this area is furthest from the town centre for active modes, and has few local services, the provision of a frequent bus route is essential to provide a viable sustainable travel alternative to the private car for these residents.

9. Phasing Matrix (recommendations of the STA)

Completion of the MCAs has allowed a prioritised list of schemes to be developed – these are provided as a phasing matrix overleaf.

The phasing matrix acts as the recommendations derived from this STA.

From top to bottom the matrix has been reordered and summarised as follows:

- Active Mode Area 1 through 5 – In consultation with Kildare County Council throughout the development of this STA, and with feedback from several stakeholders, active mode improvements are seen as essential in delivering on the study objectives. Active modes will deliver well for the emerging Confey development, such that it remains connected and an integral part of the town (i.e. not being interpreted or treated as its own isolated township). Active modes will provide some alleviation of congestion for Confey, and will give some longevity to Cope Bridge before requiring replacement. Importantly, Cope Bridge (in its single-lane form) will anecdotally act as a throttle or barrier to excessive vehicular growth and may promote more sustainable travel.
- Rail (Options 5 and 6) – Two rail options are recommended in this STA for progression being the connectivity improvements at Confey Station. The intended pedestrian connections from the eastern and western ends of the existing platforms to Cope Bridge, and Confey UDF lands respectively.
- Bus (Options 1 to 3) – The three bus options are put forward as being positive for improving transportation in Leixlip. The town centre may reasonably be considered lacking in bus accessibility and use. BusConnects will enhance Leixlip's bus services and therefore the minimal but reasonable proposed improvements to bus infrastructure should be pursued. The bus options present some local challenges (notably the required space to implement a Cope Bridge bus gate and limited remaining capacity of the town centre signals).
- Road options – The phasing matrix indicates the elements (or components) required to create the overall route options (presented in Section 5). Some of the Road options may be combined to create a route option, or in the case of Cope Bridge and Kellystown Bridge, will be common across several route option tests.

  The elemental road options in the phasing matrix may or may not be progressed depending on the year and level of development, although commentary is provided for each.

9.1 Phasing timeline

The benefit of the phasing matrix is that it provides progressive recommendations for infrastructure development over several years, or as the expected number of residential units are developed at Confey. Traffic modelling was undertaken for different future route option scenarios and levels of development – this is reflected in the matrix.

It is recommended that the level of transport infrastructure developed be proportionate to the need, and without undue burden on existing facilities or residents of Leixlip. An over or under-provision of infrastructure should be avoided with the phased approach, and ultimately support a sustainable Confey development.

Level of development: All KDAs, plus no. of Units Provided at Confey (residential units):			500	800	1200	1500	2500	
Year (expected completion)			2023	2023	2023	2025	2025	Comments
Intervention								
Type	Location	Description						
Active Modes - Area 1	Confey Station and UDF Lands Access	Three footbridges across Royal Canal to improve north-south accessibility between Leixlip and future Confey UDF area. New northern and southern access to Confey station. Supporting paths eliminate cul-de-sacs and link to new footbridges.	✓	✓	✓	✓	✓	Required as Confey UDF lands are developed
Active Modes - Area 2	Rye Water and school access	A new footbridge over the Rye Water with associated paths to connect Confey Community College with surrounding estates. A new path links existing estates to new development in Black Avenue.	✓	✓	✓	✓	✓	Required as Confey UDF lands are developed
Active Modes - Area 3	Louisa Bridge and Intel access	Creation of extensive path network to the north east and south west of Louisa Bridge station to expand catchment area. Creation of one footbridge over Royal Canal from housing estates in the west and improved access from the canal path to the Intel site to encourage the use of active modes to work.	✓	✓	✓	✓	✓	Required as Confey UDF lands are developed
Active Modes - Area 4	South west Leixlip permeability	Creation of numerous permeability paths and links to improvement movement between existing estates and future development at the Wonderful Barn KDA. Access to Green Lane and a crossing point are also provided.	Permeability improvements expected to be an on-going exercise across existing residential areas. All new development sites should seek to maximise permeability by design					Measures support improved bus services in this area
Active Modes - Area 5	Town Centre and school access	A mixture of new paths, a footbridge and short permeability links to integrate areas to the north and west with the town centre along with improving the pedestrian experience on the main street.	✓	✓	✓	✓	✓	Required as Confey UDF lands are developed
Rail	Confey Station	Provide additional walking and cycling bridges in the vicinity of Confey Station, with direct access onto Confey railway platforms	Eastern access	Eastern access	Eastern access	Eastern access and western footbridge	Eastern access and western footbridge	Eastern access to Cope bridge should be provided first, then western from the proposed footbridge developed along with Confey UDF.
Bus	Service improvements and Confey connection	Through consultation with public transport providers, improve access to bus services in Confey through the provision of turning locations and appropriately located stops with direct walking and cycle access. Bus stops, services and frequencies should promote sustainable travel to Celbridge, Blanchardstown and other areas of employment less accessible by rail	✓	✓	✓	✓	✓	
Bus	Route 66 Re-Routing Via Green Lane	Through consultation with public transport authorities and providers to deliver rerouting of 66 bus route via Green Lane to provide a viable public transport alternative to the private car. This area currently only has an off-peak weekday services yet residential areas are expanding.	✓	✓	✓	✓	✓	
Road & Bus	Cope Bridge - Bus Gate	Provide a bus gate, or other urban design mechanisms which prioritise sustainable travel movements over car-based trips for both approaches to Cope Bridge (where buses service Confey UDF area)	Optional	Preferred*	Preferred*	N/A**	N/A**	* Where buses serve Confey UDF and the one-lane Cope Bridge remains ** two-way bridge expected to be in-place
Road & Bus	Junction R148 / R149 (Main St / Captain's Hill)	Improvement of town centre signals, seeking to maximise capacity for expected future use (including a review of parking and town centre pedestrian accessibility and enable future functionality for bus priority)	✓	✓	✓	✓	✓	This junction is known to be physically constrained, with existing congestion issues prevalent
Road	Junction L1014 / 1015	Assess and improve function and safety of the junction (alignments and sight-lines)	✓	✓	✓	✓	✓	
Road	Cope Bridge - 2 way	Cope Bridge replaced to permit unsignalised, two-way travel (in consultation with Iarnród Éireann)	Optional	Preferred	Preferred	✓	✓	Care should be taken in planning construction activities, such that a temporary alternative route remains available for Confey residents and users of both bridges.
Road	Kellystown Lane Bridge - 2 way	Kellystown Lane (L1014) bridge replaced to permit unsignalised, two-way vehicular travel. May be direct or parallel replacement (depending on conservation status)	×	×	×	Optional - Kellystown lane route not under particular pressure due to circuitous nature of the route. The central-west link would be preferred as a more direct access		
Road	Captain's Hill	Seek to improve on-going vehicle accessibility (alongside applicable walking and cycling improvements), to improve movements as a key access route to Confey	Preferred			✓	✓	
Road	Canal corridor 'central-west' link	In continued consultation with land owners and environmental stakeholders, assess the viability of creating this link (requiring a compact junction between Intel entrance and Louisa Bridge Station)	×	×	×	Preferred - Of western Leixlip routes this is expected as most suitable for traffic connectivity. Additional, focused analysis of route option is desired with improvements to the R148 also being necessary to improve the capacity, particularly with consideration of 2500 residential units at Confey		
Road	Eastern link to Lucan	Improve existing R149 (Confey Road) east of the Confey UDF lands, connecting to L3005. Priority of existing junctions changed to facilitate this improved Confey link	✓	✓	✓	✓	✓	Eastern Link and Ongar are outside Kildare and will be pursued in conjunction with Fingal County Council.
Road	Minor improvements to Ongar	Undertake minor improvements between Confey UDF lands and Ongar	Undertaken minor works improvements between Confey and Ongar to cater for the expectant limited rural traffic increase					
Road	M4 Link	Provide a new link road from Confey to M4 J5 to the east of St. Catherine's Park	×					A new road link may have concerns from stakeholders, possible conflicts with St. Catherine's Park, requires two significant bridge spans and is expected to be significant cost. While such a link may become increasingly warranted at a later date as development occurs, by 2025 it is not favoured.
Road	Woodside to Rockingham Ave link	Provide a vehicular link between Woodside and Rockinham Avenue (or another appropriate street south of Rye Water)	Preferred - This route is expected as required where a western or central-western route is not progressed. A pedestrian and cycle link is critical in this location (listed within Active Modes)					This link may expect some local resistance, however, it may alleviate the moderate-to-high levels of congestion expected in the town centre.
Road	Barnhall Road link	Provide a new public road link between M4 J6 and Celbridge Road (R404)	Optional – Would serve for general improvements to traffic flows throughout western Leixlip		Required if Canal Corridor is progressed to alleviate R148 congestion issues			

10. Conclusion

On completion of the STA, a number of infrastructure and service interventions have been identified to progress (Sections 9). These have been developed with the input of many stakeholders and thorough the support of technical analyses, such as traffic modelling and catchment analyses in-line with best-practice.

Multi-criteria analyses were undertaken on each mode independently to assess the needs of different user groups and yielded sets of options which may be combined to form an overall package for Leixlip's transport improvement. Each MCA has developed a logical set of options, and importantly sifts-out options which would result in weak transport benefits.

The study and optioneering process has taken cognisance of many local considerations, including the historic nature of many sites across the town, the built and natural environment, the unique topography of Leixlip and expected enhancements like DART Expansion and BusConnects.

Confey UDF is particularly well suited for development, perhaps in preference to other KDAs, due to its proximity to Confey Station and ability to increase the levels of sustainable travel. The Confey UDF area will be immediately served by high-quality rail services from Confey station to Dublin, Maynooth and further afield, and may be imminently supported by new bus services and bus facilities as development of the area progresses.

The outcome of the study concludes that there are numerous ways to support the increased residential development of the coming years, most notably at Confey, but undoubtedly across the town as a whole.

10.1 Meeting the objectives of the Strategic Transport Assessment and Leixlip's transport needs

Three objectives were set at the outset of the STA. The STA is considered to have achieved the objectives such that transport will be improved across Leixlip, given the expected increases in housing, commercial development and travel demands. Moderated transport interventions have been proposed throughout the town to support the anticipated growth, notably with the proposals for differing active mode, public transport and road interventions.

A second STA objective was to ensure assets are used productively. This objective has been achieved by proposing a phased implementation plan which seeks to deliver transport assets and facilities commensurate with the level of development. This discourages an early over-provision of assets and enables key pedestrian links, public transport access improvements and road sections to be addressed in a reasoned order.

Sustainable travel has been a key focus throughout the assessment. Pedestrian links and footbridges have been proposed as key priorities for walking and cycling ahead of many road links, allowing for better access to the existing rail facilities from the current township. Leixlip will also benefit from future rail and bus improvements (DART expansion and BusConnects respectively), and therefore the active mode proposals throughout the existing townland will be positive now and into the future.

Confey rail station only achieves around half of its potential catchment currently, with fields and rural areas being prevalent north of the station. In the future, Leixlip (and particularly the Confey UDF area), are poised to cater for an increased number of residents within the town, Dublin Metropolitan Area and eastern region. The sustainability focused interventions of this STA will assist Confey UDF's access to the railway station and integration with the rest of the town, ultimately seeking to improve the sustainable travel mode share.

10.2 Next steps

The STA has been completed in response to the Ministerial Direction, and to inform the Leixlip LAP revision. Some difficulty was experienced throughout the study to deliver a singular road option for

Confey, noting a distinct difference in travel patterns of those expecting to travel west compared to east. Some further, increasingly detailed study may be appropriate (without the time constraints of the Ministerial Direction) to determine and refine the most appropriate direction of road improvement for Confey, or whether both eastern and western corridors remain appropriate (as assessed in this STA).

In closing this study, the strategic nature of the study is reiterated, and that next steps may consider some schemes in more detail (such as via the provision and approval of development TIAs). Examples of options needing more refined analysis may be those which seek to optimise existing signalised junctions, such as town centre signals (in an effort to increase overall capacity or bus priority), or where a bus gate may be provided on both Cope Bridge approaches.

In consultation with Kildare County Council, appropriate monitoring of the Confey UDF development may be appropriate. As the Confey community develops increasing insights may be gained from local study, for example, assessing actual trip rates of the UDF area, directionality of trips and integration with Leixlip Town Centre services. A greater understanding of local travel trends may allow for appropriate updating of staging / timing of interventions, with and appreciation of council financial planning, and early construction programming for large scale interventions such as bridge replacements.

Appendix A

A.1 Detailed Policy Review

10.2.1 Project Ireland 2040 – National Planning Framework

The recent Project Ireland 2040 – National Planning Framework (NPF), was published in February 2018. It is a high-level strategic planning framework to guide development and investment over the coming decades, and with particular reference to the high levels of population, housing and employment growth.

The NPF empowers each region to lead in the planning and development of their communities, containing a set of National Strategic Outcomes (NSOs) and key principles from which more detailed and refined plans will follow. The NSOs set out in the NPF are as follows:

- Compact Growth;
- Enhanced Regional Accessibility;
- Strengthened Rural Economies and Communities;
- High-Quality International Connectivity;
- Sustainable Mobility;
- A Strong Economy, supported by Enterprise, Innovation and Skills;
- Enhanced Amenities and Heritage;
- Transition to a Low Carbon and Climate Resilient Society;
- Sustainable Management of Water, Waste and other Environmental Resources; and
- Access to Quality Childcare, Education and Health Services.

Each of the NSOs must be prioritised when developing plans and infrastructure decisions in Kildare and are therefore of importance to Leixlip.

Leixlip is located in the Eastern & Midland Region which has experienced high levels of population growth in recent decades, at more than twice the national growth rate. A population of 2.58 million is forecast by 2040 in the region, 500,000 more than present.

Housing development should be primarily based on employment growth, accessibility by sustainable transport modes and quality of life (with the avoidance of unsustainable commuting trends).

Key future planning and development and place-making policy priorities for the Eastern Region which are relevant to Leixlip include:

- "Enabling the complementary development of large and county towns in the wider Greater Dublin Area and Midland areas on the key strategic and public transport routes in a regionally co-ordinated manner, with an enhanced emphasis on measures to promote self-sustaining economic and employment based development opportunities to match and catch-up on rapid phases of housing delivery in recent years."[9]
- "Building on the progress made in developing an integrated network of greenways, blueways and peatways, that will support the diversification of rural and regional economies and promote more sustainable forms of travel and activity based recreation utilising canal and former rail and other routes."[4]

Another one of the many applicable references and objectives from the document includes the NPF's National Policy Objective (NPO) 27:

[9] *Project Ireland 2040 – National Planning Framework, P35*

"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."[10]

10.2.2 Kildare County Development Plan 2017 – 2023

The Movement and Transport section (Section 6) of the Kildare CDP, aim is:

"To promote ease of movement within and access to County Kildare, by integrating sustainable land use planning with a high quality integrated transport system; to support improvements to the road, rail and public transport network, together with cycleway and pedestrian facilities and to provide for the sustainable development of aviation travel within the county in a manner which is consistent with the proper planning and sustainable development of the county."[11]

The CDP further identifies a number of policies that are relevant to the revision of the LAP as follows:

HU 1 – Seek to ensure that sufficient zoned land continues to be available at appropriate locations to fulfil the housing requirements of the county as set out in the Core Strategy.

SO1 – Support the sustainable long-term growth of the Metropolitan Area towns of Leixlip, Maynooth, Celbridge and Kilcock and zone additional lands, where appropriate, to meet the requirements of the Core Strategy and Settlement Hierarchy of this Plan.

SO2 – Carry out a strategic Land Use, Employment and Transportation Study of north east Kildare including the Metropolitan area towns of Leixlip (and Collinstown), Maynooth, Celbridge and Kilcock. The preparation of the study will have regard to existing and emerging local area plans. It is envisaged that the study will involve the participation of all strategic stakeholders, including the National Transportation Authority, adjoining local authorities (i.e. Meath, Fingal and South Dublin County Councils), the Regional Assembly, transportation providers, Waterways Ireland, Government Departments and Environmental Agencies.

SO12 – Investigate, in consultation with government departments, statutory agencies and stakeholders, options for the future growth of Leixlip, including the feasibility of developing a new residential district to the north of the Dublin – Sligo rail corridor. The Regional Planning Guidelines designate Leixlip as a Large Growth Town II within the metropolitan area of Dublin.

MO 8 – Examine the feasibility of delivering an overpass of the M4 to link the Wonderful Barn at Leixlip to Castletown Demesne in Celbridge in consultation with TII.

MTO2 – Prepare a Strategic Land Use and Transportation Study for:

(a) North East Kildare including the Metropolitan area towns of Leixlip, Maynooth, Celbridge and Kilcock; and

(b) The central towns of Naas, Newbridge, Kilcullen, Kildare Town and Clane;

In consultation with the NTA, DTTS, TII and other stakeholders to inform the strategic development of these areas and identify the roads and transportation infrastructure that is required to support the future development of these areas.

MTO 3 – Review and implement Integrated Transport Studies for Maynooth, Leixlip, Celbridge, Naas, Newbridge, Kildare and Athy in conjunction with the DTTS, TII and NTA and to prepare new Integrated Transport Studies for other towns, villages and settlements as required, to provide a framework to cater for the movement of pedestrians, cyclists, public transport and private vehicles.

RS 9 – Co-operate with adjoining authorities and other public authorities to secure new and/ or improved road infrastructure at towns bordering the county boundary including Blessington, Kilcock, Maynooth and Leixlip

[10] *Project Ireland 2040 – National Planning Framework, P82*
[11] *Kildare County Development Plan 2017 – 2023, P127*

In terms of improvements to the road network, the following regional roads have been identified for improvement:

- R148: County boundary at Leixlip to county boundary at Cloncurry via Maynooth and Kilcock
- R149: Leixlip to county boundary
- R404: Leixlip to Junction with the R403

10.2.3 The Leixlip LAP 2017 – 2023

The existing Local Area Plan 2017-2023 sought "to accommodate 10.2% of Kildare's allocated housing growth in Leixlip over the period 2017-2023 in accordance with the County Development Plan Core Strategy."

In order to achieve this, additional zoned land in Leixlip will be required cater for this level of growth. The existing LAP will need to be revised to address this.

The population of Leixlip is expected to increase by 27% (i.e. from 15,576 to 19,782) by 2023. Lands zoned for residential development under the current plan is not sufficient to cater for this level of growth. A revised LAP (2020-2026) is therefore required to ensure that additional lands are zoned for hosing in Leixlip in the interests of meeting the housing allocation requirement in the core strategy of the Kildare County Development Plan 2017-2013.

The LAP has identified approx. 39 hectares of undeveloped residentially zoned land located adjacent to established residential areas. In order to provide an adequate supply of housing over the Plan period, additional new housing lands needs to come forward for development during the lifetime of the Plan. Approx. 86 hectares of land has been identified at Confey, located to the north of the railway line, with the potential to accommodate a new residential district. An assessment of the residential units for the KDAs and for the Masterplan lands at Confey identified in the LAP are presented in Figure 10.1.

Location of Development	Quantum of Undeveloped Land (hectares approx.)	Estimated Residential Capacity (approx. no. of Units)	Density Range** (units per hectare)
Infill	2.3	60 - 80	30-35
KDA* 1 The Wonderful Barn	15	450 - 525	30-35
KDA 2 Easton	9	270 - 315	30-35
KDA 3 Leixlip Gate	13	390 - 455	30-35
Sub Total	*39.3*	1170 – 1380	30-35
Masterplan Lands at Confey	86	1500**	35
TOTAL	**125.3**	**2880**	**30-35**

* *Key Development Area*

** *Figures stated represent an estimate only. The density of development and number of units permissible will be determined at detailed design stage based on a full assessment of site characteristics and local sensitivities.*

Figure 10.1 – Extract of Leixlip LAP 2017-2023 Table 4.1 Residential Unit Assessment

The LAP identified KDAs in the town as follows:

- KDA1 The Wonderful Barn: New residential / open space and amenity at The Wonderful Barn north of the M4.
- KDA2 Easton: New residential lands / open space and amenity
- KDA3 Leixlip Gate: New residential lands / open space and amenity

The three KDAs and Confey Masterplan lands of Figure 10.1 are shown geographically in Figure 10.2, the zoning map of the existing Leixlip LAP.

Figure 10.2 – Leixlip LAP 2017-2025 zoning map (provided by Kildare County Council)

The primary zoning objectives within Leixlip town included existing residential, new residential and open space and amenity, while just outside of Leixlip town the primary zoning objectives were agriculture, new residential, industrial and warehousing (as provided in Figure 10.2, Leixlip zoning map). In a subsequent MCA, the following considerations were applicable:

- Existing residential - To protect and enhance the amenity of established residential communities and promote sustainable intensification.
- Open Space and Amenity - To protect and provide for open space, amenity and recreation provision.
- Agricultural - To retain and protect agricultural uses.
- New Residential – To provide for New Residential Development.
- Industrial and Warehousing – To provide for industry, manufacturing, distribution and warehousing.

Further to the planning areas discussed above, additional areas have been considered by the team during the preparation of this STA. These include the following:

- Collinstown Masterplan area – a business and enterprise area earmarked to Leixlip's western fringe
- The Black Avenue, Leixlip Manor – an expectant development of approximately 350-400 residential units.

KDA1 Wonderful Barn (Figure 10.3)

Expected residential units: 450-525

Access to the site will be via an improved access point on Celbridge Road which will also provide vehicular, cycle and pedestrian access / links to The Wonderful Barn. Pedestrian and cyclists permeability will be provided throughout while all roads and streets will be designed in accordance with DMURS. Planning applications for significant development on these lands shall be accompanied by a traffic impact assessment.

Figure 10.3 – KDA - Wonderful Barn

KDA 2 Easton (Figure 10.4)

Expected residential units: 270-315

Access to the site will be via an improved access point on Green Lane. Vehicular, pedestrian and cyclist permeability will be achieved throughout the KDA and pedestrian and cyclist access will be provided to the R449 to the west. Planning applications for significant development on these lands shall be accompanied by a traffic impact assessment that takes into consideration the development potential of Leixlip Gate KDA.

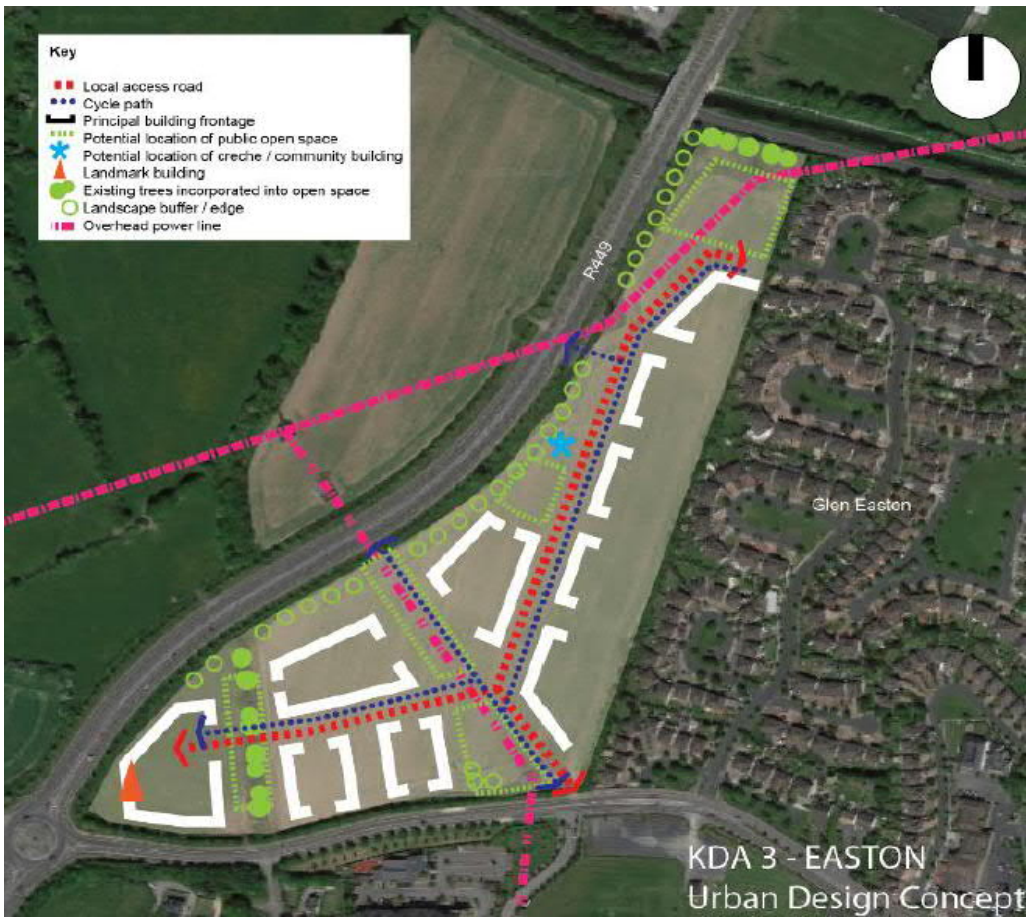


Figure 10.4 – KDA - Easton

KDA 3 Leixlip Gate (Figure 10.5)

Expected residential units: 390-455

Access to the site will be via Leixlip Gate and onto Green Lane.

Vehicular, pedestrian and cyclist permeability will be provided throughout the development area and pedestrian/cyclists access will be provided to the R449 to the west. Planning applications for significant development on these lands shall be accompanied by a traffic impact assessment that takes into consideration the development potential of Easton KDA.

Figure 10.5 – KDA – Leixlip Gate

Area subject to Masterplans

In addition to the KDAs identified in the LAP, there are two additional significant land banks in Leixlip, namely Collinstown and Confey. These present considerable opportunities for a new business and technology district at Collinstown, and a new residential and community district with supporting social infrastructure at Confey. Both are strategically located, in close proximity to the railway line and within minutes to the M4 motorway.

Both areas present significant opportunities for future development though careful consideration must be given to the overall design and transport opportunity afforded to these areas. Masterplans will therefore be developed for both locations over the plan period and beyond, embracing land use, transportation, infrastructure, urban design and implementation.

10.2.3.1 LAP policies and objectives

In relation to movement and transport the LAP aimed to:

To promote and facilitate a sustainable transport system for Leixlip that prioritises walking, cycling and public transport and provides an appropriate level of road infrastructure, road capacity and traffic management to support the future development of the town.[12]

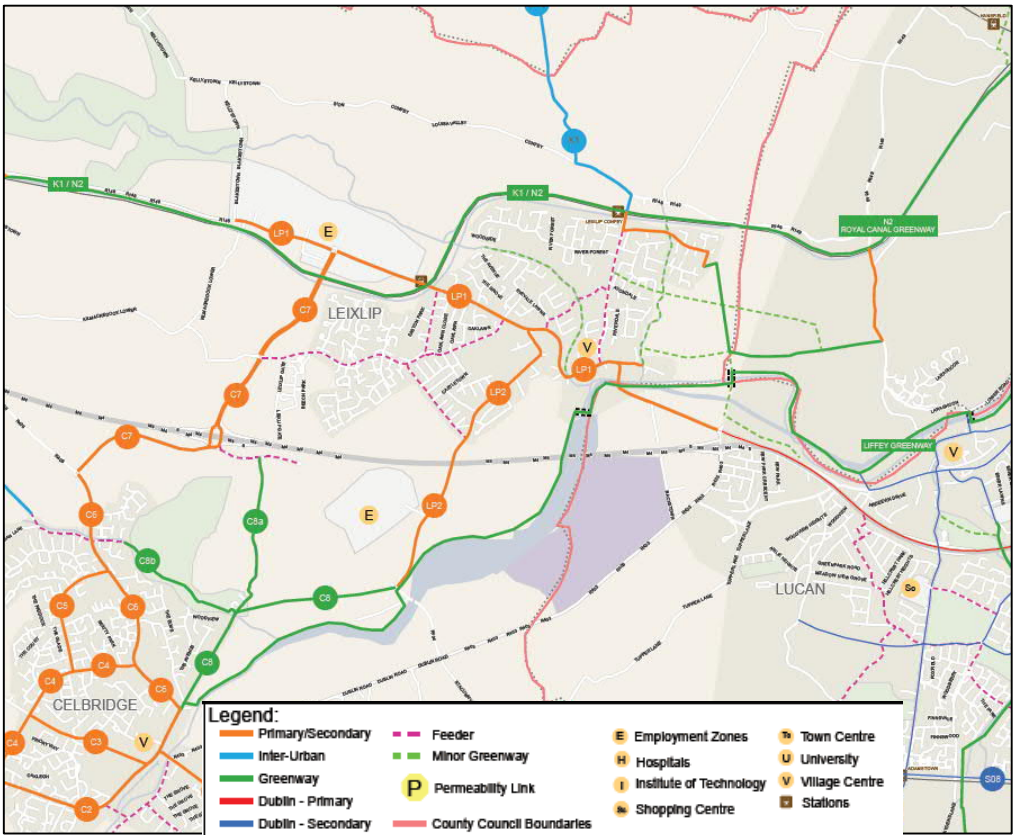
The following is an overview of the LAP policies relevant to transport implications that may arise from the revised LAP.

MT1 – Walking and Cycling – The objectives of the LAP support the delivery of a high quality, permeable and attractive pedestrian and cycle network in Leixlip that allow for multiple direct connections between exiting key destinations and nodes where high quality amenity / tourism facilities could be provided. The LAP supports:

- The upgrading of existing off-road pedestrian routes within the town to cater for pedestrians and cyclists;
- Opportunities for local permeability improvements that would provide more direct and safer pedestrian and cyclist access to schools, shops, public transport nodes, amenity areas and community facilities; and
- The removal of barriers such as boundary walls / hedges along existing or future desire lines.

Several notable MT LAP objectives are highlighted as follows:

[12] Leixlip Local Area Plan 2017-2023, Section 8, P39

LAP Objective	Description of objective
MTO1.3	To work with the National Transport Authority to implement the Great Dublin Area Cycle Network Plan proposals for Leixlip, including the North Kildare Cycleway (Dublin – Galway) subject to detailed engineering design and the mitigation measures presented in the SEA and Natura Impact Statement accompanying the NTA Plan. The key routes proposed for this sector of relevance to Leixlip are: • K1 Royal Canal Greenway (blue); • LP1 R148 Main Street and Maynooth Road to Intel Plant cycle route (orange); and • LP2 Barnhall Road to Celbridge via Castletown Demesne cycle route (orange).  Existing cycleways in Leixlip include the grade separated cycle path linking Castletown and Leixlip along the R449. Other cycle facilities along Station Road and sections of Green Lane (L5058) are immediately adjacent or incorporated into bus lanes. There are also informal cycle routes to Lucan via St Catherine's Park; and to Castletown via Parsonstown.

MTO1.4	To improve and maintain the following routes for use by both pedestrians and cyclists: i. Silleacháin Lane; ii. Distillery Lane; iii. Rye Valley to the Glen; and iv. Mill Lane to St Catherine's Park.
MTO1.6	To examine options for a new pedestrian and cycle link across the Rye River linking Confey Community College to Ryevale Lawns
MTO1.7	To facilitate pedestrian and cycle links from Green Lane to The Wonderful Barn through Easton Meadows and new residential development.
MTO1.8	To provide adequate, secure and dry bicycle parking facilities at appropriate locations at: i. In the town centre; and ii. Near heritage, community and amenity destinations.
MTO1.9	To ensure that the new pedestrian link between Captain's Hill and Mill Lane is carried out in accordance with the requirements of this Plan.
MTO1.10	To support delivery of a pedestrian and cycle overpass of the M4 to link The Wonderful Barn at Leixlip to Castletown Demesne in Celbridge in consultation with Transport Infrastructure Ireland.
MTO1.11	To improve access, security and safety along the Royal Canal towpath, including: i. Improved pedestrian access from Cope Bridge to the towpath; and ii. Improved car-parking facilities adjacent to Royal Canal entry points at Cope Bridge and Louisa Bridge

MT2 - Public Transport

The objective of the LAP is to promote the sustainable development of Leixlip by supporting and guiding the relevant national agencies in delivering improvements to the public transport network and to public transport service.

Key projects identified in the LAP include the following:

- DART Expansion Programme - includes the electrification of the Dublin-Sligo rail line from Connolly Station to Maynooth, together with the removal of level crossings and re-signalling.
- Electrification of the rail line is likely to have design implications for Confey Station and the replacement of Cope Bridge may be required. The provision of a new bridge structure has wider implications for the town in terms of improved vehicular, pedestrian and cyclist provision and capacity.

MT3 – Road and Street Network

The policy states that, "It is the policy of the Council to maintain, improve and extend the local road network in and around Leixlip to ensure a high standard of connectivity and safety for all road users."

Residential areas to the north of the town are located east and west of Captain's Hill and the R149 and to the south of the railway line and Royal Canal. People living in these areas must access the wider road network through the town centre or across Cope Bridge leading to congestion at these pinch points during peak times.

The LAP identifies the potential for significant development to the north of the Royal Canal and Cope Bridge (i.e. Confey), however improved access to this area as part of the future development of the strategic road network will be required to facilitate such development. In considering strategic access to potential future development lands, it is important to account for current constraints within the town, and where possible to incorporate measures to improve accessibility, particularly for the residential areas adjacent to Captain's Hill.

The LAP identifies the need for upgrades and new vehicular, pedestrian and cycle connections to improve the accessibility to existing residential estates accessed from Captain's Hill and to provide access to the planned new housing to the north of the Royal Canal and railway line. Improving vehicular circulation around the town will also provide additional route options which will enhance the attractiveness of the town centre and reduce congestion in the vicinity of the existing junction of Captain's Hill and Main Street.

Several notable MT3 LAP objectives are highlighted as follows:

LAP Objective	Description of objective
MTO3.2	To support the implementation of the following road improvement schemes, subject to the availability of funding and environmental and conservation requirements: i. The realignment of the R148 (Maynooth Road) at Collinstown in line with the approved Part 8. ii. The replacement/upgrading of Cope Bridge. iii. The improvement of the junction of Main Street and Mill Lane.
MTO3.3	To investigate the improvement of access to the masterplan lands at Collinstown including improved accessibility over the canal and railway line to facilitate permeability and connectivity.
MTO3.4	To investigate the feasibility of the following road improvement schemes, to include an investigation of alternatives: i. The realignment and improvement of the R149 (Confey Road) between the L1014 (Kellystown Lane) and the county border with Fingal. ii. The upgrading of the L1014 (Kellystown Lane) or an alternative north-south connection west of the R149. iii. The improvement of the intersection between R149 (Captains Hill) and R148 (Main St.). iv. The improvement of the intersection between R404 (Celbridge Road) and R148 (Main Street).
MTO3.5	To secure improved access to The Wonderful Barn from the R404 (Celbridge Road) as part of any future development at this location.

MTO3.6	To ensure that any significant new development takes place in proximity to public transport routes and can be adequately served by the road network.
MTO3.7	To provide traffic calming measures throughout the town of Leixlip, where necessary as funding allows and ensure that all new developments are designed to incorporate appropriate traffic calming measures.
MTO3.8	To investigate the provision of additional on-street and off-street public car parking in the town centre.
MTO3.12	To investigate the feasibility of a new link road from the Celbridge Road (R404) to the south of the M4 connecting to the M4 Leixlip/Celbridge Interchange in consultation with TII, NTA and other stakeholders.

Some of the proposed LAP links are shown in Figure 10.6.

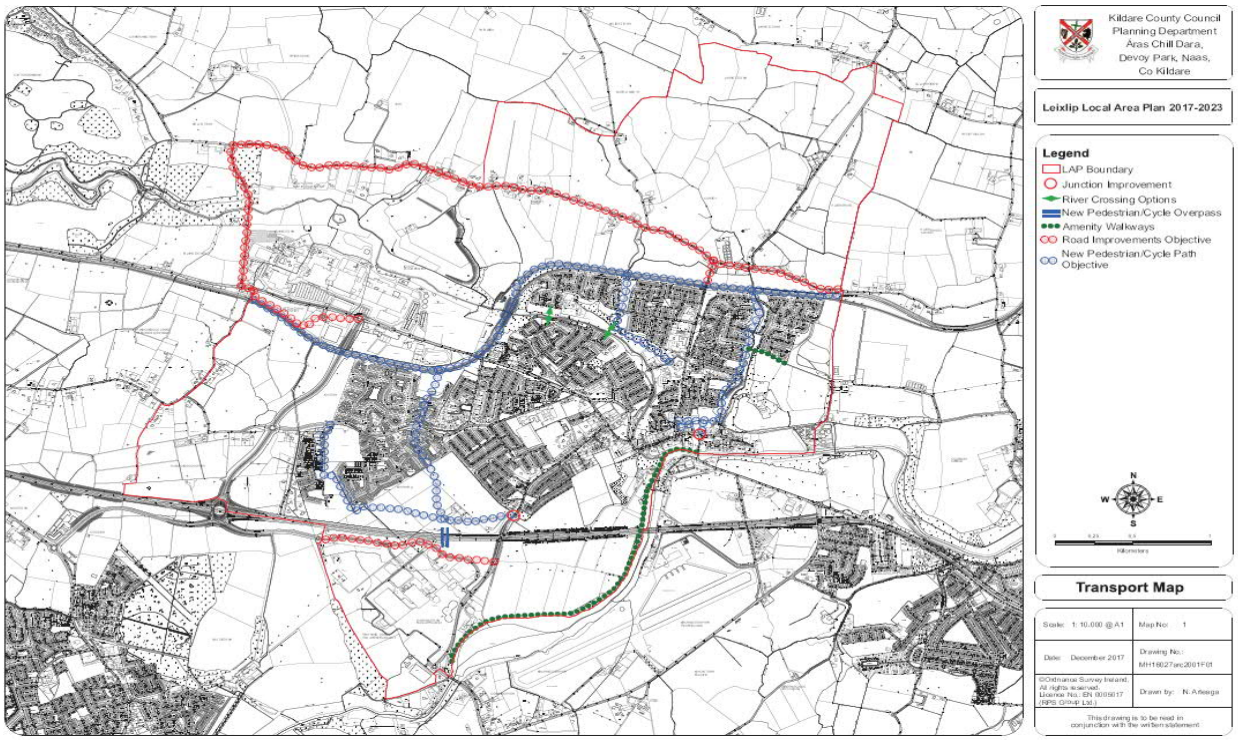


Figure 10.6 – Transport Map (Source: Leixlip LAP 2017-2023)

10.2.3.2 Community Facilities

Leixlip has a wide variety of existing community facilities and services and active community groups that provide an important support network to the residential population. An overview of some community facilities is provided in the following sub-sections.

10.2.3.3 Education

The following schools are present in Leixlip:

- Scoil San Carlo Schools – Two Catholic primary schools - Scoil San Carlo (Junior), and San Carlo Senior School, Confey, Leixlip
  - Junior School 282 pupils enrolled
  - Senior School numbers – 254 enrolled)
- Scoil Uí Dhálaigh, Catholic Primary School, Celbridge Road, Leixlip with 447 students enrolled (436 boys and 327 girls)
- Scoil Bhride, Catholic Primary School, Leixlip. 319 pupils
- Scoil Eoin Phoil, Catholic Primary School, Green Lane, Leixlip with, 317 pupils enrolled
- Scoil Mhuire – Catholic Primary School, Leixlip with 319 pupils
- Confey Community College, Inter Denominational Secondary School, Captain's Hill, Leixlip. This school has 763 pupils enrolled
- Coláiste Chiaráin (Leixlip Community College), Inter Denominational Schools - Secondary School, Leixlip. The Secondary school element has 713 students.

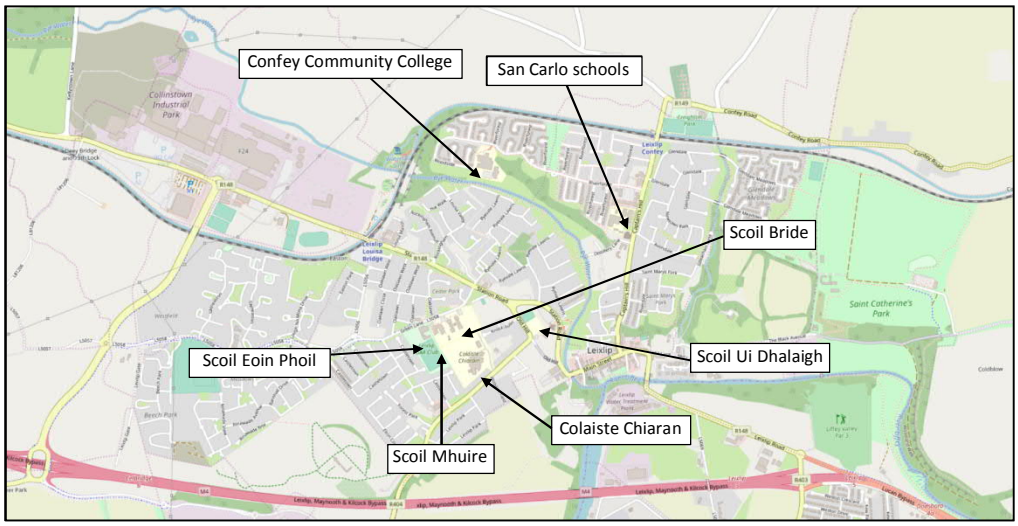


Figure 10.7 - Locations of schools in Leixlip

The Department of Education and Skills has no current proposals to extend existing schools or provide a new school in Leixlip. However, the revised population target for Leixlip may result in the need to ensure that sufficient lands are reserved to accommodate two additional primary schools and one post-primary school.

10.2.3.4 Childcare

Including existing full day care facilities, sessional, after-school, Montessori, Pre-School (Crèche) and Day Care facilities such as:

- Happy Days Preschool
- Leixlip Montessori Preschool
- Little Harvard Crèche
- Montessori School (situated at a number of locations)
- Green Lane Montessori and Afterschool Care
- Ryevale Montessori and Day Care
- 2 no. playschools within the grounds of San Carlo Schools site (Confey Montessori and Tiny Tots) and a playschool at Scoil Uí Dhálaigh.

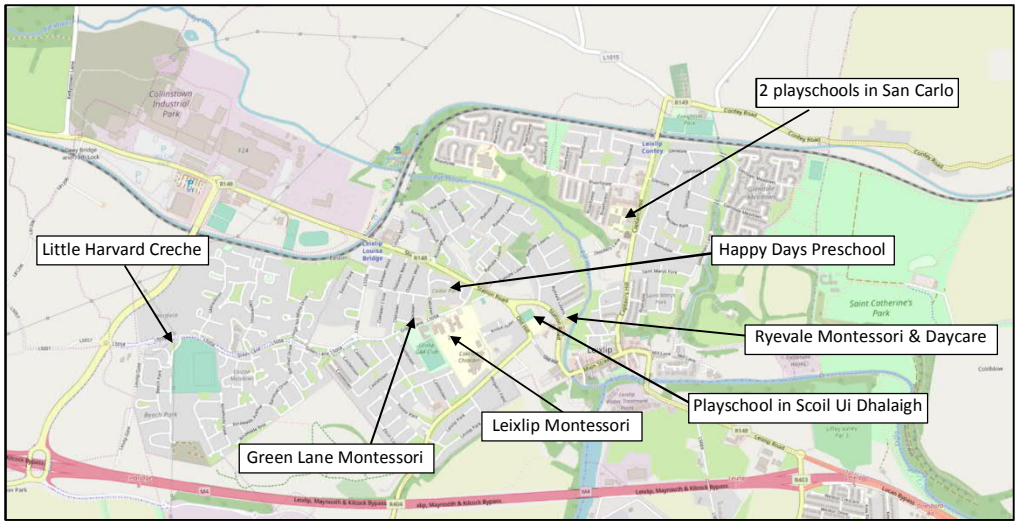


Figure 10.8 – Leixlip childcare facilities

10.2.3.5 Playgrounds, parks, healthcare and other community facilities

A number of further community facilities are located throughout the town, including the following:

- Playgrounds – Leixlip Amenities Playground and St. Catherine's Playground
- Parks – St. Catherine's Park and lands surrounding The Wonderful Barn
- Healthcare – Including (but not limited to): Leixlip Health Centre, Main Street, River Forest Medical Centre, Glen Easton Medical Centre, Leixlip Dental Centre, Riverforest Dental Clinic and Oaklawn Dental Clinic
- Churches and places of worship – St. Mary's Church of Ireland, Church of Our Lady's Nativity, St. Charles Borromeo Church Catholic Church and associated graveyard facilities
- Sports – Leixlip Amenities, Collinstown (opposite Intel), Leixlip GAA Club (includes pitches, a clubhouse, gym and hall ball facilities), Confey GAA Club, Barnhall Rugby Club, Liffey Celtics Basketball Club, Leixlip Tennis Club, Le Cheile Athletics Club, Salmon Leap Canoe Club and Leixlip and District Angling Association
- Other – Leixlip Garda Station and Leixlip ib. Leixlip Library, Captain's Hill.

Some of the main community facilities are provided in Figure 10.9

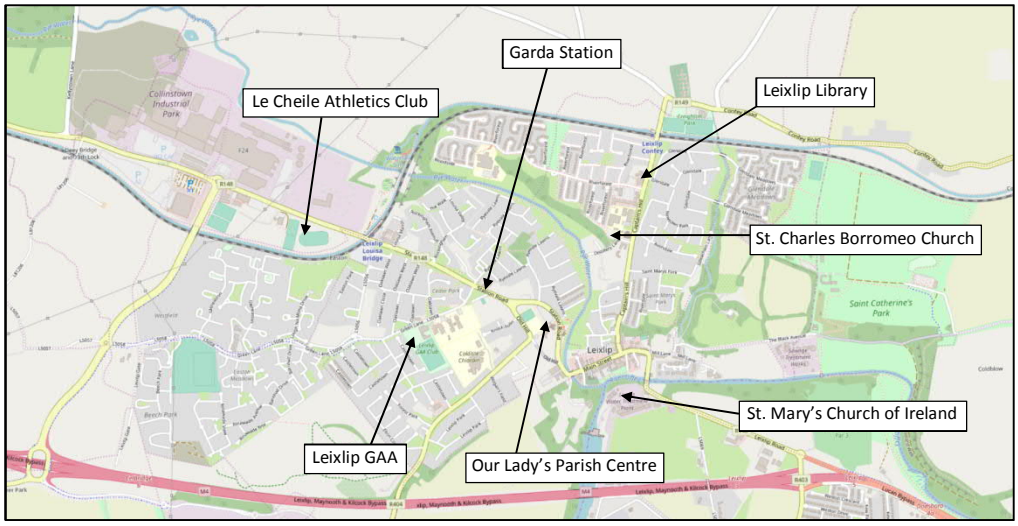


Figure 10.9 – Leixlip community facilities

10.2.4 South Dublin County Development Plan 2016-2022

The River Liffey forms the boundary between Kildare County Council and South Dublin County Council (SDCC), thus future schemes earmarked within the SDCC Development Plan 2016-2022 have been considered for a potential impact on Leixlip.

The SDCC Road objectives, contained within the SDCC Development Plan, have the potential to provide relief to existing routes and also facilitate the development of new lands. The "medium to long term" objectives outlined in the SDCC Development Plan include the following which maybe of relevance to Leixlip.

Western Dublin Orbital Route (north): This is a new high capacity road from Tootenhill to the Leixlip M4 interchange (with a provision to make a further connection to the N3 i.e. Ongar Link Road), see Figure 10.10.

The route's primary function is to provide a regional link between the N7 to N4. Any further connections, or a possible alternative route to the west of Leixlip and/or Celbridge will be determined in consultation with Kildare and Fingal County Councils, the National Roads Authority (Transport Infrastructure Ireland) and the National Transport Authority. The primary objective of SDCC in this regard shall be to protect the scenic Liffey Valley parklands and amenities at Lucan Demesne and St Catherine's Park, and to examine all possible engineering options for a future route so as to minimise the impact on the environment, landscape and amenities.

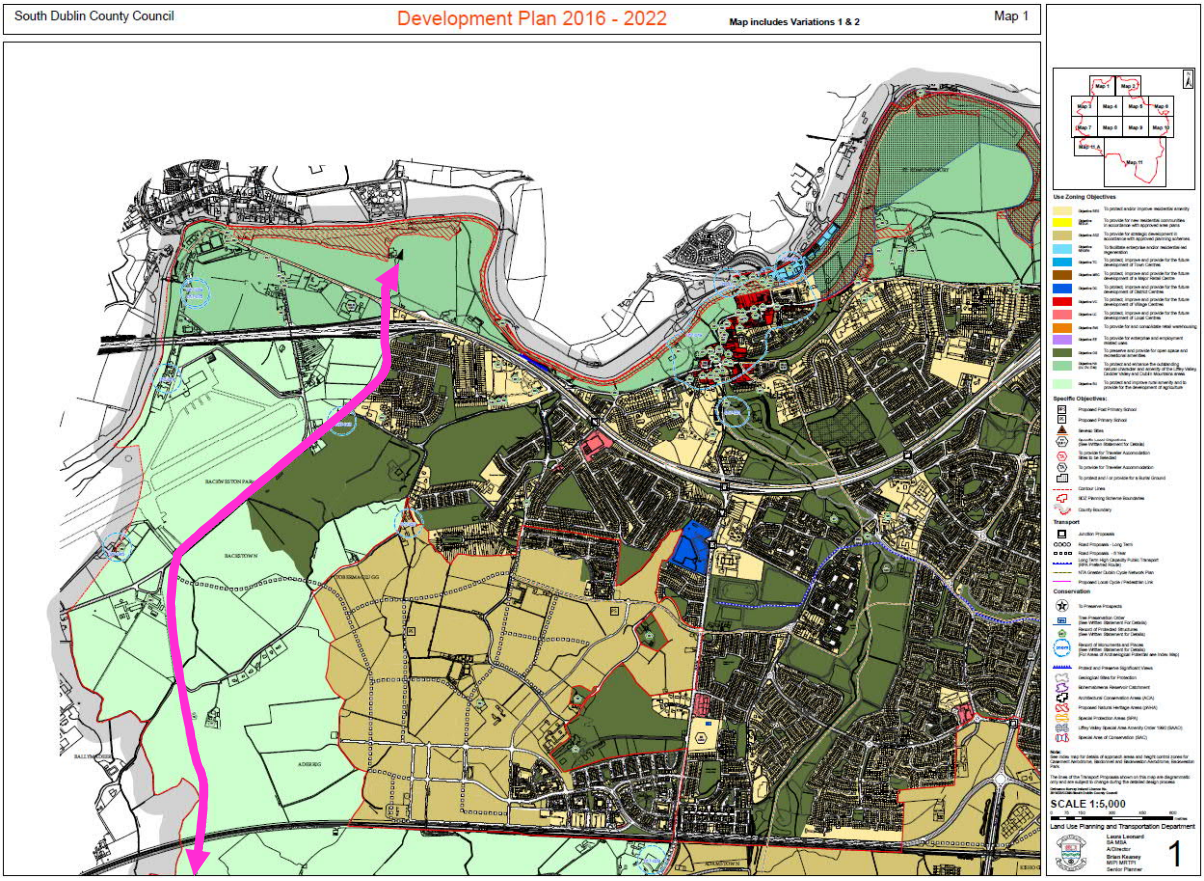


Figure 10.10 – SDCC Development Plan (Planning Map 1, with Western Orbital proposal highlighted in pink)

10.2.5 Fingal County Council Development Plan 2017-2023

The boundary between Co. Kildare and Fingal County Council (FCC) is located immediately to the east of Leixlip, passing through St. Catherine's Park. Like SDCC, future scheme within the FCC Development Plan may have impacts on Leixlip.

The N3-N4 link (Ongar to Barnhill) is a road objective within Fingal County Council's Development Plan. The scheme, set out in the FCC Development Plan, would provide a new quality road link from the N3 to the N4 and would involve the provision of a new bridge crossing of the River Liffey.

The road consists of a single carriageway link road commencing at the existing N4 Junction 5 (Leixlip) which then travels northwards (through St. Catherines Park to the east of Leixlip) providing an eastern bypass of Leixlip, travelling through Barnhill and connecting to the Ongar Distributor Road at Hansfield.

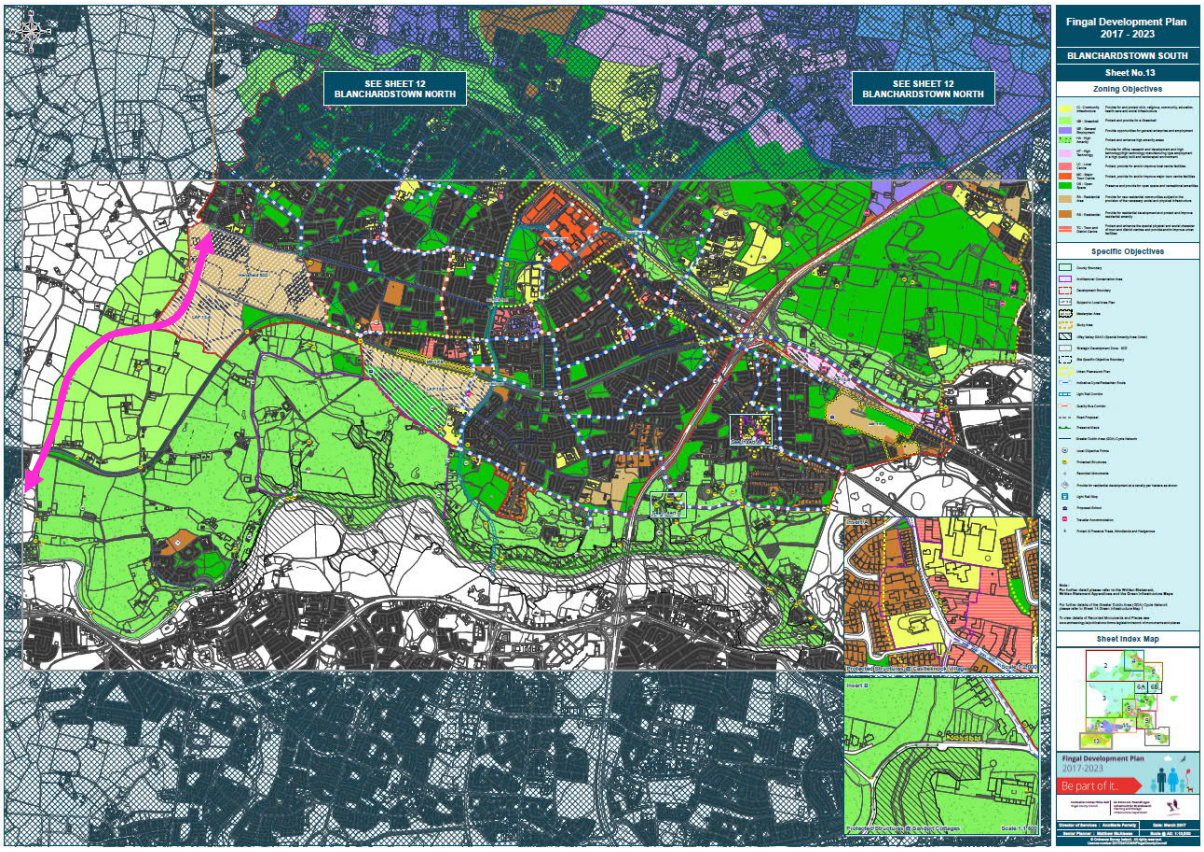


Figure 10.11 – FCC Development Plan (Planning Map 13, with N3–N4 Barnhill to Leixlip Interchange proposal highlighted in pink)

10.2.6 N4 / N7 Corridor Study

A prior corridor study of the N4-N7 was undertaken by AECOM (Feb 2017) which broadly aimed to:

- Gain an understanding of future conditions in the N4/N7 study area.
- Develop a strategy to ensure the capacity and operation of the National Roads network is protected through investment in local, regional and national roads.

This study assessed impacts of forecast growth in the SDCC administrative area on the road network up to a forecast year 2023. The study indicated that in general:

- There will be increases in congestion and delay at key junctions in the local road network and on key strategic roads including the M50, N4, N7 and N81.
- The National Road network will experience substantial increases in travel time and delay by 2023 with the M50 being worst affected.
- N4 and N7 are also affected albeit to a lesser (although still significant) extent.

A future 'Do Something' scenario consisting of a number of potential local road schemes was identified for the Study Area. The schemes identified were divided into two broad categories, namely:

5. Localised Junction Upgrades and
6. SDCC Road Objectives.

In addition to these schemes, two further scheme options were identified, whose delivery / implementation does not fall under the direct remit or control of SDCC but which are nonetheless expected to deliver significant benefits to the local and strategic road network:

7. Ongar Link Road (a N3/N4 link road)

8. M50 Demand Management Measures (multi point variable tolling on the M50)

The cumulative impact of the 'Do Something' measures results in significant positive impacts on the overall network performance, but do have some high expected trip numbers along the tested Ongar Link.

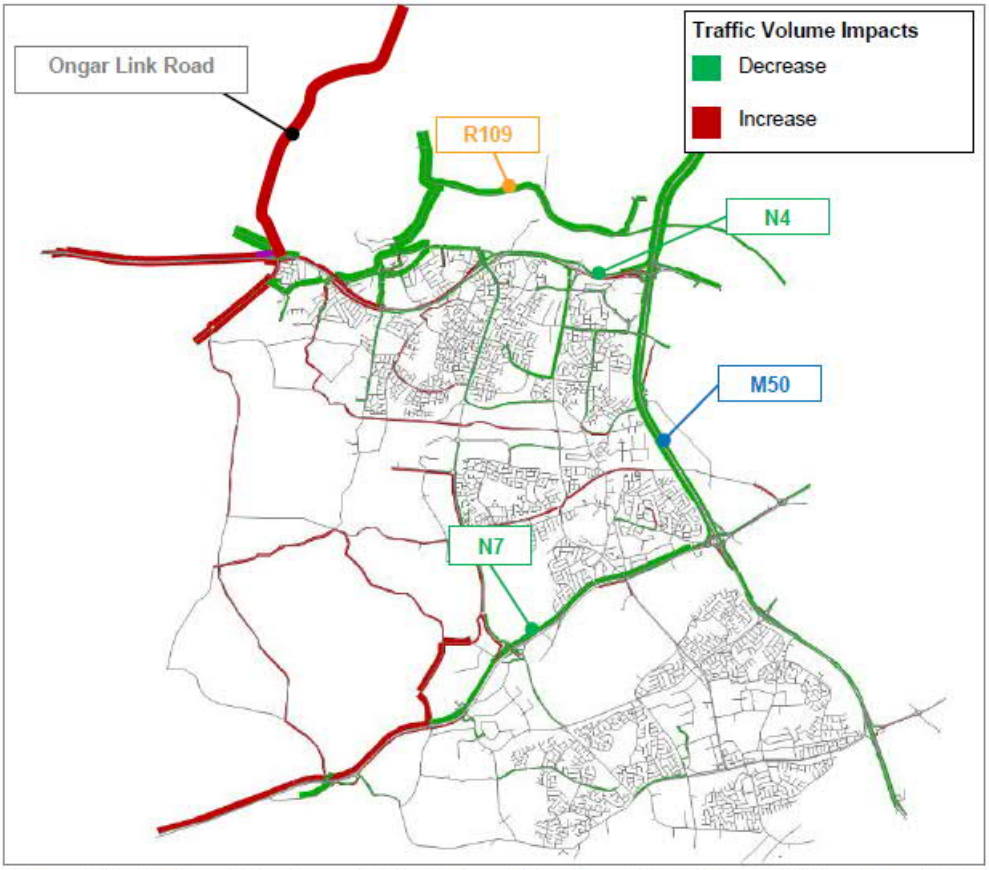


Figure 6.10: Do Something Scenario Vs Do Something Sensitivity A (Ongar Link) AM Peak 2023

Figure 10.12 - Reproduction of Figure 6.10 from N7-M4 study

The provision of the Ongar Link Road and the M50 Demand Management provide clear and significant improvements to the National Road network in 2023, but likely with impacts on local and regional roads.

10.2.7 The Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022

The Regional Planning Guidelines the Greater Dublin Area 2010-2020 (RPGs-GDA) provides an overall strategic context for the development plans of each local authority in the Greater Dublin Area (GDA) including population and housing targets, and also provide a framework for future investment in environmental services, transportation and other infrastructure.

The core principles of the RPGs-GDA relevant to Leixlip include:

- The Dublin and Mid-East Regions will be attractive, vibrant locations for industry, commerce, recreation and tourism and will be a major focus for economic growth within the state. In this regard, Maynooth, Leixlip and Naas have been identified as primary economic growth towns and as part of economic clusters with adjoining designated towns.
- Development in the GDA shall be directly related to investment in integrated high quality public transport services and focused on compact urban form. The key growth centres in the county are located on or in close proximity to quality public transport services, comprising Naas, Newbridge, Maynooth, Leixlip, Celbridge, Kilcock, Kildare, Monasterevin, Kilcullen and Athy.

- Development within the Metropolitan Area which includes the north east Kildare towns of Maynooth, Leixlip, Celbridge and Kilcock, will be consolidated to achieve a more compact urban form, allowing for the accommodation of a greater population than at present, with a much enhanced public transport system, with the expansion of the built up areas providing for well-designed urban environments linked to high quality public transport networks, enhancing the quality of life for residents and workers alike.

Many of the main transportation corridors linking the GDA to the rest of the country pass through Kildare. These include three motorway corridors, National Primary Routes and National Secondary Routes. Various regional and local routes also traverse the county together with four mainline railway passenger services.

The population of the county has increased from 186,335 in 2006 to 210,312 in 2011, representing a growth of 13%, the second highest in the state. Over a 20-year period (1991-2011), Kildare experienced a 71.5% increase in its population. The most recent increase in population can be explained by high levels of natural increase (birth rate) and a strong performance in net migration.

Maynooth municipal district (+19.2%) had the largest increase in population between 2006 and 2011. Celbridge - Leixlip municipal district had a modest increase of 7.7%, which is below the county average of 12.9%.

The RPGs-GDA identify two planning policy zones in the GDA:

- Metropolitan Area - which includes the north east Kildare towns of Maynooth, Leixlip, Celbridge and Kilcock
- Hinterland Area - includes the rest of Kildare

A minimum of 35% of overall growth is directed into the Metropolitan area (Maynooth, Celbridge, Leixlip and Kilcock) and the remaining 65% to the Hinterland area, as shown in Figure 10.13

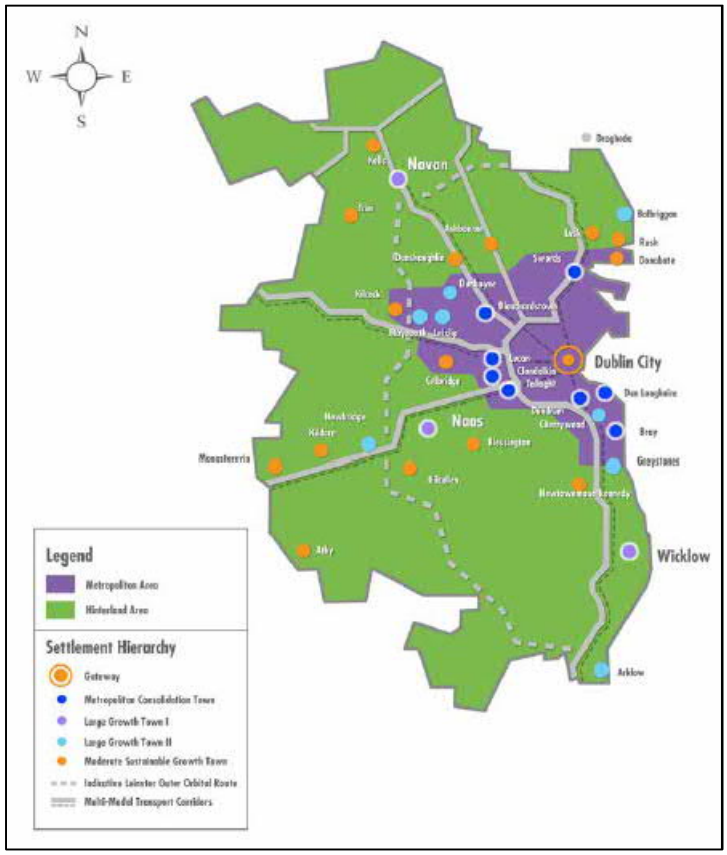


Figure 10.13 – Reproduction of the settlement strategy for the GDA (RPGs-GDA, Section 4.5)

The key objectives of Metropolitan Area are as are as follows:

- To ensure consolidation of urban centres

- Development of brownfield sites especially along public transport corridors
- The provision and facilitation of an integrated public transport system
- The achievement of a greater use of sustainable transport modes through the integration of land use and transportation planning.

10.2.8 Transport Strategy for the Greater Dublin Area 2016 to 2035

The Transport Strategy for the GDA 2016-2035 updates the Draft Transport Strategy for the GDA 2011- 2030. It aims to contribute to the economic, social and cultural progress of the GDA by providing for the efficient, effective and sustainable movement of people and goods.

The strategy outlines a suite of transportation objectives for the GDA including the provision of additional public transport facilities (heavy rail, light rail, bus and bus rapid transit facilities), cycling and walking infrastructure and road network measures up to 2035.

The priorities of the strategy include:

- To address urban congestion
- To protect the capacity of the strategic road network
- To reduce the share of trips undertaken by car and increase walking, cycling and public transport
- To provide a safe cycling network
- To enhance the pedestrian environment, in particular to overcome severance and increase permeability
- To consider all-day travel demand from all societal groups.

A number of infrastructure proposals relevant to Leixlip have been identified within the Strategy as follows:

10.2.8.1 National Roads

Reconfiguration of the N4 from its junction with the M50 as far as Leixlip including the rationalisation of accesses and to provide additional capacity at the Quarryvale junction.

10.2.8.2 Local & Regional Roads

Applicable local and regional road interventions are put forward in the Transport Strategy for the GDA 2016-2035 as follows:

- Enhancement of orbital movements, outside of the M50 C-Ring, between the N3, N4 and N7 National Roads, through the widening of existing roads and the development of new road links.
- Develop orbital roads around town centres accompanied by and facilitating enhanced public transport, cycling and pedestrian facilities in the relevant centre
- Develop appropriate road links to service development areas;
- Implementation of necessary upgrades to the regional and local road network.
- Enhancement of pedestrian and cycle safety through the provision of safer road junctions, improved pedestrian crossing facilities and the incorporation of appropriate cycle measures including signalised crossings where necessary.
- Implementing various junction improvements and local reconfigurations on the regional and local road network. Including:
- R148 County boundary at Leixlip to county boundary at Cloncurry via Maynooth and Kilcock
  - Leixlip to county boundary
  - Leixlip to Celbridge

10.2.8.3 Heavy Rail

Rail interventions require working towards completion of the DART Expansion programme to provide DART services to Hazelhatch on the Kildare Line (including a tunnel connection from Kildare line to link with the northern / south-eastern line).

10.2.9 Building on Recovery: Infrastructure and Capital Investment 2016-2020

On 29 September 2015 the Government announced its capital spending plan, entitled Building for Recovery 2016 – 2021. It represents an exchequer spend of €27 billion over six years. Key investments will be made in transport, education, health and enterprise.

Transport: The Department of Transport, Tourism and Sport is to receive the largest slice of the package, with approximately €10 billion allocated to it.

Metro North: The biggest single project in the Plan is the rapid transit system from Dublin City Centre to Dublin Airport and Swords. The project will cost an estimated €2.4 billion. Construction of the project is expected to commence in 2021 with a view to delivery by 2026/27. Almost 8.5km of the route (through Dublin to Dublin Airport and to the commuter town of Swords) will be tunneled with 8 overland and 6 underground stops.

DART Expansion programme: A multi-phase DART expansion programme will begin with the extension of the DART line to Balbriggan. The design and planning for the further phases, which include expansion of DART services to Maynooth in the west and Hazelhatch in the southwest, will also be progressed.

DART Underground PPP Project: This project has returned to feasibility stage, looking at a more cost-effective solution.

Roads: The roads programme will total €6 billion over seven years. €4.4 billion of the programme will be devoted to essential maintenance and strengthening works on the existing network, with a further €600m allocated to on-going development of the PPP roads pipeline. €860m will be targeted at progressing new priority roads projects.

Public Transport: €2.6 billion is to be invested in essential maintenance and asset renewal including:

- Bus fleet replacement and capacity enhancement
- Upgrading of Bus Corridors
- The completion of the Luas Cross City project in Dublin.

In order to grow, businesses need fast, efficient transport networks. In the decade up to 2008, Ireland addressed many of the infrastructural deficits that had been constraining economic growth. Large scale investments were made in our road network, public transport links and airport facilities. As Europe's fastest growing and most dynamic economy, it is essential that we preserve our competitiveness by building on these key investments.

In recognition of the fact that large transport projects have long lead-in times, the Government will provide a 7 year capital envelope to the Department of Transport, Tourism and Sport. A total of €10 billion will be available to the department over the period. By 2022, we will have doubled the level of annual investment in the transport area to €2 billion per annum.

10.2.10 Investing in Our Transport Future – A Strategic Framework for Investment in Land Transport

The Strategic Framework for Investment in Land Transport (SFILT) establishes -

- High level priorities for future investment in land transport; and
- Key principles, reflective of those priorities, to which transport investment proposals will be required to adhere.

Demand for transport in Ireland grew significantly between 1990 and 2008, and further growth is expected into the future where it's estimated that commuting trips will increase by 35% over current

levels by 2040. A minimum of 650,000 additional daily trips to and from work are expected to arise mainly on corridors within the principle cities. The existing transport system cannot cater for this increase and our main urban centres will suffer from severe congestion without appropriate intervention. It is therefore critical that adequate investment is provided so that we can provide for the travel needs of the future Irish workforce and maintain sustainable economic growth and competitiveness.

The document outlines a list of implementation priorities and actions as follows:

- Incorporating SFLIT Transport Priorities in Investment Plans
- Integrating Land Use and Transport Planning
- Identifying a Strategic Road Network
- Developing a New Rail Policy
- Maintaining a Key Role for Careful Project Appraisal
- Applying SFILT Research in Future Transport Policy Development

10.2.11 RSA Road Safety Strategy 2013-2020

This strategy sets out a target for reduction of road collision fatalities on Irish roads to 25 per million population or less by 2020 is required to close the gap between Ireland and the safest countries.

This means reducing deaths from 162 in 2012 to 124 or fewer by 2020. A provisional target for the reduction of serious injuries by 30% from 472 (2011) or fewer to 330 by 2020 or 61 per million population has also been set.

10.2.11.1 Fatal Collisions and Fatalities

Prior to the first strategy in 1997, the number of fatalities on Irish roads was 472. In 2012, there were 162 fatalities, representing a reduction of 65.7%.

The contributory factors to road traffic collisions are many and varied. When combined, as they do in nearly every collision, they create a very complex picture of what actually happened. These varied causation factors are often categorised as: human, environment, road and/or vehicle.

Statistics show that between 2007 and 2011:

- Single vehicle collisions accounted for 38% of all fatal collisions and 25% of all injury collisions.
- Head on collisions accounted for 19% of fatal collisions and 12% of injury collisions.
- Collisions involving pedestrians accounted for 22% of all fatal collisions and 17% of all injury collisions.

Four out of five of all fatal collisions were single vehicle, head-on or pedestrian collisions. This indicates that single vehicle, head-on conflict or pedestrian collision types are, on average, more severe than angle, rear-end or 'other' road collision types, which together accounted for 46% of injury collisions but only 21% of fatal collisions.

The contributory factors listed by An Garda Síochána on collision report forms between 2007 and 2011 showed that:

- Driver error accounted for 87% of all contributory factors identified in fatal collisions; pedestrian error accounted for 8%, road factors accounted for 2%, environment accounted for 1% and vehicle factors accounted for 1%.
- The highest number of fatalities occurred in early evening rush hours, *i.e.* between 6:00pm and 7:00pm.
- 333 people were killed in 301 fatal collisions between 9:00pm and 3:00am, the hours most strongly associated with drinking and driving; this period accounted for 26% of fatal collisions and 27% of fatalities.

- 175 people were killed between 12 midnight and 3:00am. Fatalities that occurred during these hours accounted for approximately 14% of all road collision fatalities between 2007 and 2011.

This analysis of road collision statistics shows that despite the gains made, there is a need for a continuing focus on vulnerable road users and on the traditional causal factors of alcohol consumption and speeding.

10.2.11.2 RSA Road Safety Strategy summarised

The various road safety interventions and targets set out in the Road Safety Strategy 2007—2012, coupled with an ever strengthening road safety culture, have resulted in a successful period in road safety for Ireland. Deaths and injuries are decreasing at a rate that is comparable with other best performing countries in the EU. There has been significant improvement in compliance by road users in respect of the main collision causation factors such as seatbelt wearing, speeding on some roads, and alcohol related offences. However, despite an overall reduction in road deaths, there is a need to focus on vulnerable road-users and causal factors where there are low levels of compliance and this will be a major focus of the Government Road Safety Strategy 2013—2020.

10.2.11.3 Detailed extract of the RSA Road Safety Strategy 2013-2020

The Consultation Process

Before identifying key actions, an effective road safety strategy must focus on the key challenges that need to be addressed in order to minimise road collisions and fatalities.

In order to identify these challenges, the Road Safety Authority embarked on a substantial consultation process, seeking input from all stakeholders.

Specific suggestions that have been taken up in the strategy include actions in relation to:

- The rationalisation of speed limits and signage on roads
- The targeting of high collision road sites for remedial treatment
- The introduction of graduated driving licences
- The use of in-vehicle and on-road technologies
- The improvement of enforcement methods
- The maintenance of the road network.

Given the success of the 2007—2012 Road Safety Strategy, one of the key challenges of the strategy is to prevent complacency and continue to progress the building of a national road safety culture. In addition, the European Union has adopted a target of halving the number of road deaths in the European Union by 2020, starting from 2010. This represents a much more ambitious target than previously adopted.

10.2.11.4 Detailed extract of the RSA Road Safety Strategy 2013-2020

Pedestrians

The attractiveness of walking depends strongly on the safety of the infrastructure provided. Collisions involving pedestrians account for 1 in 5 fatalities annually. Since many collisions involving pedestrians occur during the winter months and in rural areas, increased emphasis will be placed on encouraging the use of reflective materials.

Walking has many health benefits when practised safely and responsibly. However, pedestrians should also be made aware of the danger they can cause themselves and other road users when they consume alcohol and/or drugs. Studies estimate that two thirds of pedestrians killed on Irish roads (for which BAC level information is available) had consumed alcohol and of these, 50% were three times over the legal driving limit.

Particular attention should also be paid to providing accessibility to all roads, maintaining the safe condition of roads with adequate signage for pedestrians, supporting elderly people or people with

reduced mobility through additional aids such as acoustic aids or tactile paving, and gritting and cleaning paths and public areas.

10.2.11.5 Detailed extract of the RSA Road Safety Strategy 2013-2020

Cyclists

Cycling has become increasingly popular over the last decade and has many benefits including better health, a cleaner environment and less congestion. Government policy through the National Cycling Framework is to encourage and support cycling, with initiatives like the cycle to work scheme.

However, it should be remembered that collisions involving cyclists account for 1 in 25 road deaths annually and many collisions involving cyclists lead to serious head injuries. According to the latest observational study by the Road Safety Authority, nearly 50% of cyclists wear helmets, although there is no legal requirement to wear them.

Positive awareness raising for the wearing of helmets by all age groups, especially children, will be continued through the strategy to achieve a higher rate of compliance by cyclists. Wearing rates for reflective clothing among cyclists is 42%. Greater efforts will be taken to encourage cyclists to wear reflective clothing and to ensure bicycles are equipped with legally compliant lights and bells. Awareness campaigns will continue to inform road users who are protected by their vehicles and those who are not. This information will continue to be part of the learner driver training and testing procedures.

While the Safe Systems approach is applicable to vulnerable road users, these road users are still responsible for acting appropriately while on the road network. The Gardaí will continue to target aberrant behaviours on the part of cyclists, particularly improper use of footpaths, cycling the wrong way on roads and going through red lights.

Consideration will be given to extending the penalty points systems to cyclists where offences are relevant to safety. Cycle training is an issue that has received considerable focus as part of the public consultation process for this strategy. The roll out of a standardised cycling training programme in collaboration with schools as outlined in the National Cycling Policy Framework document will be commenced. It is expected that the implementation of separate cyclist and pedestrian facilities on certain low-volume National Secondary road schemes will also commence under the strategy.

10.2.11.6 Detailed extract of the RSA Road Safety Strategy 2013-2020

Vision and Values

In addition to continuing to implement successful road safety interventions, there is a need to maintain high levels of cooperation and co-ordination between the key stakeholders so as to ensure an integrated approach to improving road safety. Innovative measures and solutions are required into the future. Vehicle and road technologies will become increasingly important to road safety over the lifetime of this strategy. However, despite the opportunities offered by technology, human behaviour continues to be the most important focus for road safety policy.

Other better performing countries have adopted a Safe Systems approach to road safety and this Strategy has as its focus the principles of the Safe Systems approach. The Safe Systems approach recognises that even with an emphasis on prevention of road collisions, some collisions will occur and therefore the road system must be designed and maintained to take account of human error, the management of collision forces in vehicles to reduce injury and fatality risk, as well as reducing the contribution of careless driving to road collisions. The approach was originally developed in the Netherlands in the early 1990s and has seen many applications of the concept since then in Sweden, New Zealand, Switzerland, Norway and Australia. A recent report has highlighted the need for a phased approach to the introduction of the Safe Systems approach in Ireland, so that a consensus is established and stakeholders are fully engaged.

The Safe Systems approach to road safety is built on several key principles:

Human Behaviour — no matter how well we are trained and educated about responsible road use, people make and the road transport system needs to accommodate this.

Human Frailty — the finite capacity of the human body to withstand physical force before a serious injury or fatality can be expected is a core system design consideration.

Forgiving Systems — roads that we travel on, vehicles we travel in, speeds we travel at and the attitudes of road users to each other, need to be more forgiving of human error.

There is sometimes a mistaken view that the Safe Systems approach relates only to infrastructural engineering and not to anything else. This is not the case: the system relates to all the stakeholders who are involved in the road transport network. This includes those who enforce the law, those who educate, emergency and health agencies that operate within the system and, most importantly of all, those who use the system.

10.2.11.7 Detailed extract of the RSA Road Safety Strategy 2013-2020

Safer Roads

Responsible behaviour on the part of every individual driver is the basis for safety on the roads. However, since drivers are human and make mistakes, roads should be designed and operated in a manner that not only promotes safe driving and appropriate speed choice, but also mitigates the consequences of collisions.

There are very effective guidelines and manuals available, such as the NRA Design Manual for Roads and Bridges, and these need to be used to ensure there is a consistently safe network across the state.

10.2.11.8 Detailed extract of the RSA Road Safety Strategy 2013-2020

Safer Behaviour

Education and awareness campaigns encourage safe behaviour by targeting key high-risk behaviours such as speeding, impaired driving through alcohol, drugs and fatigue, mobile phone use and unsafe behaviour by and towards vulnerable road users.

Education in schools at all levels, pre-school, primary, secondary, further education and third level and in the community, provides the information that influences road users' decisions and continues to be a critical element in the State's approach to reducing fatalities and serious injuries.

Training, education and awareness of road safety are a necessity in the workplace

Traffic law enforcement plays a vital role in improving behaviour

10.2.11.9 Detailed extract of the RSA Road Safety Strategy 2013-2020

Safer Vehicles

Research has shown that if each motorist upgraded their vehicle to the safest model in its class, road deaths and injuries could be reduced by up to a third. Vehicles with higher safety ratings not only reduce the likelihood of collisions occurring but also reduce the severity of injuries.

Within the period of this strategy, all vehicles will be required to have an emergency kit in the vehicle. This emergency kit will contain at least first aid material, a high visibility vest and a breakdown triangle.

10.2.11.10 Detailed extract of the RSA Road Safety Strategy 2013-2020

Safer Speeds

Vehicle travel speeds affect both the risk and severity of collisions and subsequent injuries

Speed control is a vital part of the management of the road transport network. Infrastructure improvement, appropriate speed limits, pertinent signage and markings, vehicle engineering, enforcement, awareness/education, training and driving assistance technologies are all initiatives to make speeding levels more tolerable to human frailty, improve driver speed behaviour and make the transport system safer.

Use of technology such as Intelligent Speed Adaptation (ISA) should be encouraged

The automotive industry must be encouraged to enhance their vehicle design to include passive intelligent speed adaptation to assist drivers in their speed choices and prevent them mistakenly travelling in excess of the legal limit.

Against these challenges, we have set ambitious targets for further reducing deaths and serious injuries on our roads and bringing us in line with best performing countries in the EU and internationally.

This Strategy is based on three key areas of intervention:

- Education – measures relating to awareness raising, formal education and training to ensure that all road users have the appropriate attitudes, knowledge and skills to ensure safe road behaviour and to reduce the chance of committing errors.
- Engineering – measures relating to the design of roads and vehicles, the operation of the road system and the integration of land use and road planning to promote safe and forgiving spaces to ensure that Irish roads and the vehicles that use them maximise road user safety.
- Enforcement – measures for the prevention, policing and mitigation of the effect of collisions to ensure that road users behave in a safe manner and where collisions occur, that the impact on casualties is minimised.

10.2.11.11 Detailed extract of the RSA Road Safety Strategy 2013-2020

Engineering Measures

TII and the Local Authorities are charged with the provision of a safe, forgiving and efficient network of roads.

This Strategy contains measures aimed at improving the standards of Irish roads and implementing safety-focused remedial measures. While there is reduced emphasis on large scale road construction, there is an increased focus on value for money road improvements that will enhance the safety of the road system as a whole.

The very substantial investment already made in improving the National Route system is already paying dividends in terms of a reduction in collisions. The Strategy contains measures aimed at ensuring the safe operation of national, regional and local roads and the vehicles that use them.

10.2.12 Smarter Travel – A Sustainable Transport Future 2009 – 2020

Smarter Travel – A Sustainable Transport Future 2009 – 2020 (Smarter Travel) is the transport policy for Ireland that sets out how the vision of a sustainable travel and transport system can be achieved.

The Smarter Travel programme doesn't just set out a vision for better travel choices but also provides funding to provide information and improve facilities for cyclists, walkers and public transport users to make it easier for us to make the right choices.

The five key goals of this policy document are:

- To reduce overall travel demand
- To maximise the efficiency of the transport network
- To reduce reliance on fossil fuels
- To reduce transport emissions
- To improve accessibility to transport.

The aim by 2020 is ensure that:

- Future population and employment growth will predominantly take place in sustainable compact forms, which reduce the need to travel for employment and services
- 500,000 more people will take alternative means to commute to work to the extent that the total share of car commuting will drop from 65% to 45%
- Alternatives such as walking, cycling and public transport will be supported and provided to the extent that these will rise to 55% of total commuter journeys to work

- The total kilometres travelled by the car fleet in 2020 will not increase significantly from current levels
- A reduction will be achieved on the 2005 figure for greenhouse gas emissions from the transport sector.

Achieving sustainable transport will require a suite of actions (49 in total) that will have complementary impacts in terms of travel demand and emissions. They can be grouped into essentially four overarching ones:

- Actions to reduce distance travelled by private car and encourage smarter travel, including focusing population and employment growth predominantly in larger urban areas and the use of pricing mechanisms or fiscal measures to encourage behavioural change
- Actions aimed at 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
- Actions aimed at improving the fuel efficiency of motorised transport through improved fleet structure, energy efficient driving and alternative technologies, and
- Actions aimed at strengthening institutional arrangements to deliver the targets. It is important to underline that the targets and actions are relevant to both urban and rural living.

Smarter Travel (2009) requires greater priority to be given to the movement of pedestrians and cyclists in order to facilitate more sustainable travel patterns. This includes the reprioritisation of traffic signal timings (both new and existing) to favour pedestrians and cyclist instead of vehicles and to reduce pedestrian crossing distances:

- In areas where pedestrian activity is high (such as in Neighbourhoods and Centres) junctions may have to operate at saturation levels for short periods (i.e. above 93% during peak periods).
- Where junctions operate at or near saturation levels and they are frequented by bus services, priority measures should ensure services are not unduly delayed.
- Where longer periods of saturation occur, pedestrian cycle times may be extended. This should be done in preference to the implementation of staged/staggered crossings.

10.2.12.1 Cycling and Walking

Cycling and walking will be pivotal to achieving some of the goals in national health policies to promote physical activity. Facilities for cyclists and pedestrians must be safe and pleasant in order to encourage these more sustainable modes of transport.

The National Cycle Policy Framework will give effect to this vision. Among the issues it will address will be:

- The creation of traffic-free urban centres to facilitate cycling
- Investment in a national cycle network with urban networks given priority
- Cycle training for schoolchildren
- Integration of cycling with other transport modes, e.g. carriage for bicycles on public transport.

Smarter Travel seeks that urban walking networks are strengthened by increasing opportunities for walking and removing constraints as part of planning for more attractive public realms. It will also promote a wider rollout of Land Use and Transportation Strategies (LUTS-type strategies) with preparation of transport plans to complement their development plans.

10.2.13 Design Manual for Urban Roads & Streets (DMURS)

Street networks should be designed to maximise connectivity between destinations to promote higher levels of permeability and legibility for all users, in particular more sustainable forms of transport. This will allow people to move from place to place in a direct manner with greater route choice. Unless streets are designed to better facilitate and prioritise alternative modes of transport (to the car), the targets set out in Smarter Travel 2009-2010 will not be met.

The Design Manual for Urban Roads & Streets (DMURS) seeks to address street design within urban areas (i.e. cities, towns and villages). It sets out an integrated design approach. What this means is that the design must:

- Be influenced by the type of place in which the street is located
- Balance the needs of all users.

A further aim of this manual is to put well designed streets at the heart of sustainable communities. Well-designed streets can create connected physical, social and transport networks that promote real alternatives to car journeys, namely walking, cycling or public transport.

DMURS recognises the importance of assigning higher priority to pedestrians and cyclists, without unduly compromising vehicle movement, in order to create secure, connected places that work for all members of the community. Walking and cycling will improve health and well-being and will provide greater opportunities for interaction which promote neighbourliness and community growth.

The principles, approaches and standards set out in this Manual apply to the design of all urban roads and streets (that is streets and roads with a speed limit of 60 km/h or less), except:

- Motorways.
- In exceptional circumstances, certain urban roads and streets with the written consent of Sanctioning Authorities.

10.2.14 National Transport Authority Permeability Guidelines

Promoting walking and cycling as modes of transport is a key objective of the National Transport Authority (NTA), particularly for shorter length journeys. The lack of access through estate boundaries and the presence of cul-de-sacs renders the walk of cycle to schools or shops significantly longer than the straight-line distance (see Figure 10.14) and gives little choice to people other than to use their car. These short journeys add to congestion, increases travel costs and contributes to air and noise pollution as well as requiring additional car parking at each destination. Furthermore, the lack of permeability will discourage people from walking and cycling thus removing the potential for people to combine their trips to schools, shops, etc. with the health benefits of daily exercise.

Figure 10.14 - Pedestrian Route directness (source: NTA Permeability Guidelines)

Permeability - describes the extent to which an urban area permits the movement of people by walking or cycling. Permeability:

- Promotes local economic wellbeing - there are tangible local economic benefits to be gained from maintaining and creating pedestrian and cycle links in urban and suburban areas
- Benefits public transport
- Benefits health
- Benefits community and social capital.

The five needs of pedestrians and cyclists are as follows: safety, coherence, directness, attractiveness and comfort. These five features combine to provide a particular quality of service.

With this concept in mind, the key principles governing the creation and maintenance of connections in urban and suburban areas are as follows:

- Origins and destinations, such as schools and shops, should be linked in the most direct manner possible for pedestrians and cyclists
- Greater priority should be given to pedestrians and cyclists
- The physical design of links should be fit for purpose in terms of capacity and security
- Junctions in urban and suburban areas should cater for pedestrians and cyclists safely and conveniently.

It has been demonstrated that communities can benefit if direct access by walking and cycling is maintained to the following facilities and services in towns and cities:

- Bus and tram stops
- Rail stations
- Neighbourhood centres
- Local shops or services
- Health facilities
- Schools
- Supermarkets
- Sports grounds and leisure facilities
- Places of Work.