National Investment Framework for Transport in Ireland

Prepared by the Department of Transport
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Foreword

The population of Ireland will grow to almost 5.7 million people by 2040. To ensure our transport system can manage the demands that this growth brings, we must plan today for how we will invest in the coming years and decades. That is the purpose of the National Investment Framework for Transport in Ireland.

Recognising the interdependence of transport and spatial planning, this framework will support investment that helps us to realise compact growth. We will encourage transport-led development to realise the greatest benefits from our transport infrastructure. We will optimise existing infrastructure to make active travel and public transport attractive choices that are accessible to all, creating more liveable and sustainable urban communities.

This Government is committed to radically reducing Ireland’s greenhouse gas emissions over the next decade. This framework prioritises investment in decarbonisation and the most environmentally sustainable transport modes. This will include the development of cycle networks throughout the country, the delivery of major new public transport, the widespread deployment of low-emission vehicles, and improving sustainable mobility outside our towns and cities.

We recognise the significant value embedded in the existing transport system. To fully realise the benefits of historical investment, we will protect and renew transport infrastructure across the network to ensure accessibility, connectivity and safety.

To facilitate regional rebalancing, we will ensure that investment supports population and employment growth outside of Dublin and prioritise investment that enhances connectivity on our interurban network and to our ports and airports, facilitating the movement of both people and goods in communities all around Ireland.

To invest sustainably, we have established Hierarchies which prioritise environmentally sustainable and proportional solutions to a given transport need or opportunity. In combination, these Hierarchies will ensure that we tackle the right problems with the right solutions.

The COVID-19 pandemic has highlighted the vulnerability of the transport sector to shocks to travel demand and behaviour. Planning under uncertainty is considered in this framework, and we will prioritise this area for further analysis to ensure the robustness of our investment.

This framework is the result of a significant programme of work undertaken by the Department. It draws on an extensive array of supporting research, refined through public and stakeholder consultation. The analytical foundations of the framework combined with contributions from across Government, industry, academia, and from members of the public forms a strong evidence base that will underpin future transport investment. The adoption of this strategic approach to transport investment will ensure that our future expenditure delivers a high-quality transport system, which enables the wider benefits that transport brings and is fully aligned with our spatial targets and climate change commitments.

Hildegarde Naughton TD, Minister of State at the Department of Transport with special responsibility for International and Road Transport and Logistics

Eamon Ryan TD, Minister for Transport
The population of Ireland is projected to grow by approximately one million people by 2040. The National Planning Framework is the government's long-term spatial strategy for accommodating this growth in a sustainable manner and making Ireland a better country for all its people. The ten National Strategic Outcomes represent the priorities of the National Planning Framework, and include objectives relating to compact growth in our cities, enhanced accessibility, strengthened rural communities, sustainable mobility, and decarbonisation. The transport system will therefore be a key enabler of the National Planning Framework over the coming decades.

Alongside this, the Climate Action Plan establishes a pathway to half our national greenhouse gas emissions within the next decade. The transport sector accounts for one-fifth of our national greenhouse gas emissions and delivering our decarbonisation commitments will require breaking the link between transport activity and emissions and a fundamental transformation in how we travel.

The National Investment Framework for Transport in Ireland (NIFTI) is the Department of Transport’s framework for prioritising future investment in the land transport network to support the delivery of the National Strategic Outcomes. Through our investment we will contribute to Ireland’s decarbonisation efforts, support vibrant and successful communities, deliver a high-performing transport system, and promote a strong and balanced economy.

To better understand the specific transport challenges to realising the National Strategic Outcomes, a wide range of supporting analysis was conducted for NIFTI which considered the context for this framework, protection and renewal of the existing network, and possible constraints and bottlenecks given potential future investment and projected population growth and distribution.

The projected population growth between now and 2040 is likely to result in a significant increase in travel demand, while the objective of delivering compact growth will place additional strain on our urban transport networks. It is therefore clear that more will need to be done, beyond the investment set out in the National Development Plan, for the transport network to facilitate the realisation of the National Planning Framework by 2040.

To cater for rising travel demand while decarbonising the transport sector, we will invest significantly in sustainable mobility. This will include major public transport schemes in our cities, improved access to sustainable mobility in our towns and rural areas, and major investment in cycling and walking throughout the country. We will seek to deploy sustainable solutions wherever they are feasible, including in rural areas that currently suffer from a lack of sustainable mobility provision. We will also decarbonise the sector by purchasing electric powered trains and buses and supporting the nationwide rollout of refuelling infrastructure for low-emission vehicles.

We will protect and renew our existing transport assets to deliver a network that is safe and accessible, safeguard the value of our past investment, and ensure that our infrastructure is resilient to the impacts of climate change, shifting travel patterns and evolving industrial and economic uses.

Beyond our cities, we will invest in our interurban and rural transport networks to deliver efficient and effective connectivity, including to our ports and airports. The COVID-19 pandemic has highlighted the vulnerability of transport planning when it comes to unanticipated shocks. We will therefore continue developing our transport planning tools to ensure that investment is robust to a range of future scenarios and is flexible to evolving travel patterns, network uses and behaviour.

To address the challenges identified in the supporting analysis, NIFTI establishes four Investment Priorities: Decarbonisation, Protection and Renewal, Mobility of People and Goods in Urban Areas, and Enhanced Regional and Rural
Connectivity. Future transport projects must align with these priorities to be considered for funding. Moreover, as the National Strategic Outcomes are embedded in NIFTI, future investment made in accordance with the priorities will support the delivery of the National Planning Framework over the coming decades.

Decarbonising the transport sector is an urgent priority in the context of our climate change targets. We will support sustainable mobility wherever it is feasible and encourage modal shift to these modes, namely active travel and public transport. This will include extending the reach of sustainable mobility in rural areas through investment in greenways, public transport and the strategic provision of integrated park and ride solutions. Where private transport remains necessary, our support for low-emission vehicles and associated infrastructure can help to decarbonise such trips.

Given its scale and value, protecting and renewing the existing transport system is also a foremost priority. Many of the challenges the network faces can be addressed, at least partially, through protection and renewal. Adequate maintenance of infrastructure is necessary to ensure safety and accessibility, make sustainable modes an attractive option, and deliver connectivity. In the coming years, ensuring the resilience of the most strategically important parts of the network and lifeline links is likely to be a particular focus of protection and renewal in the context of climate adaptation.

To facilitate compact and sustainable growth in our towns and cities, the mobility of people and goods in urban areas is another priority. We will support projects that reduce urban congestion, particularly sustainable mobility measures which also promote decarbonisation. We will prioritise the optimisation of existing infrastructure to give sustainable modes greater priority and the development of new sustainable mobility infrastructure.

Beyond the urban areas, we will enhance regional and rural connectivity across the network by addressing priority bottlenecks and constraints wherever they are identified. This includes ensuring that all parts of the country are well-served with access to our major ports and airports.

To deliver future investment in a sustainable manner, NIFTI promotes the most appropriate solution to a given problem or opportunity. The four NIFTI Investment Priorities, which identify what we will invest in, are supplemented by Modal and Intervention Hierarchies, which set out how we will undertake investment.

For a given problem, these Hierarchies establish the types of solutions that are preferred from both an environmental and cost-effectiveness perspective. The framework encourages the use of active travel and public transport ahead of solutions reliant on private transport. Maintenance or optimisation of existing assets, including through demand management, is also preferred to extensive enhancements or outright new infrastructure.

To ensure the Investment Priorities of NIFTI are applied at the project level, we will update our sectoral project appraisal guidance—the Common Appraisal Framework for Transport Projects and Programmes—to ensure that individual transport projects are consistent with this framework. Among other things, the updated guidance will require the production of strategic assessment reports and preliminary and final business cases for potential projects. Project sponsors will be required to consider and demonstrate how their scheme aligns with the NIFTI Investment Priorities, including setting out how potential negative impacts against one or more of those priorities will be mitigated. With regard to the Hierarchies, the onus will be on project sponsors to demonstrate that a given option is the most environmentally sustainable and cost-effective solution for the issue at hand.

While NIFTI has been informed by extensive supporting analysis, the evidence base for policy and investment can always be improved. We will continue to carry out analysis and develop policy in a range of priority areas, such as electric vehicles and decarbonisation, urban congestion, demand management, the role of rail for both passenger and freight transport, protecting and renewing key infrastructure, and investing under uncertainty.
National Investment Framework for Transport in Ireland Investment Priorities

- Mobility of People & Goods in Urban Areas
- Decarbonisation
- Protection & Renewal
- Enhanced Regional & Rural Connectivity

National Investment Framework for Transport in Ireland Modal Hierarchy

Modal Hierarchy

1. Active Travel
2. Public Transport
3. Private Vehicles
1

Overview
The National Investment Framework for Transport in Ireland is the strategic framework for future investment decision making in land transport. It will guide transport investment in the years ahead to enable the National Planning Framework, support the Climate Action Plan, and promote positive social, environmental and economic outcomes throughout Ireland.

1.1 | Introduction

Transport connects people and places. It facilitates opportunities and helps to create prosperous communities, from city centres to rural areas. The sector also has a key role to play in achieving our climate change targets and mitigating the worst effects of climate breakdown. The National Investment Framework for Transport in Ireland (NIFTI) has been developed with these relationships in mind.

NIFTI is the Department of Transport’s high-level, strategic framework for future investment in the land transport network. Its purpose is to guide the development of the transport network in the decades ahead to enable the National Planning Framework and promote positive social, environmental and economic outcomes throughout the country. A number of key challenges in relation to transport investment have been identified and our strategic Investment Priorities are designed to address them.

The following section outlines why investment in transport is important and sets out the policy context within which NIFTI has been developed.

1.2 | Investing in Transport

Investment in transport is never for its own sake. The goal of transport is not the construction of a new railway line, for example, but to facilitate all the benefits which that piece of infrastructure will bring by allowing for the movement of people and goods.

Transport supports liveable communities and connects families and friends. Investing in transport allows people to travel around the island, accessing amenities, employment and key public services such as healthcare and education. The right transport investment promotes
positive social and economic outcomes for all. By developing an accessible network, the transport system can ensure that everyone can get to and from their chosen destinations.

Transport is fundamental for economic development. Reducing the time spent travelling between and within towns and cities supports economic activity. Ensuring that surface access to ports and airports is available for goods and services of high strategic value is essential for international trade. Providing workers with access to employment creates opportunities and is crucial for attracting investment. Tourism depends on transport links, both internally and with regard to international gateways.

As the second largest source of Irish greenhouse gas emissions, the transport sector will have to significantly decarbonise in the decades ahead for Ireland to meet its climate change goals and minimise the damage from climate breakdown, such as more frequent extreme weather events, rising sea levels and population displacement.

As the economy has grown in recent years, transport activity and emissions have risen also, and the correlation between emissions and economic growth must be broken. This will require considerable investment in walking, cycling and public transport, which will also bring environmental benefits in terms of air quality and noise pollution.

Tackling congestion through the provision of sustainable mobility also lessens the amount of time people spend commuting each day and leads to improvements in public health.

1.3 | Project Ireland 2040

Project Ireland 2040 was launched in February 2018 with the publication of the National Planning Framework (NPF) and the National Development Plan 2018-2027 (NDP). A revised National Development Plan 2021-2030 was published in October 2021.

Project Ireland 2040 is underpinned by a set of shared objectives, the National Strategic Outcomes (NSO), for the decades ahead which will ensure Ireland develops sustainably and that the benefits from that development are shared by every community in the country.

The population of Ireland is projected to grow by one million people between 2018 and 2040. In recent decades Dublin and the wider Eastern and Midland region has experienced the majority of growth in population, homes and jobs. This concentration is not sustainable. Consequently, the NPF sets out a region-focused strategy for managing future growth. This regional rebalancing must be supported by appropriate transport investment across the country.

The NPF targets half of the growth in population between now and 2040 to take place in the Eastern and Midland region, and only 25% within Dublin and its suburbs. The remaining half is to be shared between the Northern and Western, and Southern Regions. Half of population growth is targeted to take place in the five cities—Dublin, Cork, Limerick, Galway and Waterford—and half in towns, villages and rural areas.

Outside the cities, the regional importance of Athlone, Sligo, Letterkenny, Drogheda and Dundalk is recognised, as are the important cross-border economic and social links with Derry and Belfast in relation to the final three of those towns. To help tackle urban sprawl and the continual expansion of our towns and cities, a target of 40% of all new housing to be delivered within the footprints of existing settlements has also been set.

While the NPF sets the national spatial and development strategy, the three Regional Assemblies have a key role to play in delivering the NSOs at a regional scale. Central to this is the preparation of Regional Spatial and Economic Strategies for each of the regions, to promote the sustainable development of the regions and identify the policies and initiatives to enable the delivery of national planning policy at a regional level. The Regional Assemblies actively engage with the Department of Transport in respect of their Regional Spatial and Economic Strategies, including identifying where transport investment can help meet regional priorities. In future, this engagement and investment will be guided by NIFTI.

To support the continued realisation of the National Planning Framework, the revised NDP has set out a major public capital investment programme of €165bn between 2021 and 2030. In the first five years of the plan, over €13bn will be invested in transport which will
see maintenance requirements for existing infrastructure largely met and, over the lifetime of the plan, a host of significant and transformative new infrastructure and services delivered.

Within the NDP, Departmental funding envelopes are set out for a five-year period to 2025, and this is extended on a rolling basis as part of the annual Estimates process.

1.4 | Strategic Investment Framework for Land Transport

The Strategic Investment Framework for Land Transport (SIFLT) was published by the Department of Transport in 2015. In the context of constrained funding following the financial crisis, SIFLT established high-level priorities for future transport investment and the key principles to which investment proposals had to adhere.

Developed in the context of constrained investment as a result of fiscal consolidation, at the time of publication SIFLT noted that funding levels were insufficient to maintain the network and there was virtually no scope to invest in infrastructure improvements. The key transport investment challenge, therefore, was to “attain funding levels consistent with maintaining, renewing and improving” the network so that it could support the economic and social needs of the country.

SIFLT has successfully guided investment in the land transport network over recent years and its first investment priority of achieving steady state maintenance is prominent within the NDP and revised NDP. However, the SIFLT framework must be periodically reviewed to ensure it remains appropriate. With the launch of Project Ireland 2040 in February 2018, it is timely to undertake such a review.

NIFTI will replace SIFLT as the framework for future land transport investment (Figure 1). In the hierarchy of national and subnational frameworks, strategies and plans, the NPF has established the shared vision across Government for development in the coming decades, underpinned by the public capital investment programme set out in the NDP.

NIFTI translates the ten NSOs to a transport-specific context, developing the Investment Priorities that will ensure that the transport sector plays its part in delivering the NPF.

Future transport investment projects and programmes as identified in investment strategies—whether they are developed by the NTA in the case of public transport, TII in the case of the National Roads network, or Local Authorities in the case of regional and local roads and other projects of a local nature—will have to demonstrate their fit with NIFTI and, by extension, with the NPF and NSOs.

1.5 | Sustainable Mobility Policy Review

In parallel with NIFTI, the Department has undertaken a review and plans to publish a new Sustainable Mobility Policy shortly. This will set out the policy framework for walking, cycling and public transport to support Ireland’s overall requirement to achieve a 51% reduction in greenhouse gas emissions by 2030. The new policy will primarily focus on measures to promote and facilitate active travel and public transport for all and, in doing so, encourage less private car usage nationally to support our climate commitment. It will set out a comprehensive set of actions to increase active travel infrastructure provision and improve public transport capacity and services across the country. These will be supported by behavioural change and demand management measures to make sustainable modes the preferred choice for as many people as possible. The Climate Action Plan sets out additional measures to promote other complementary transport mitigation measures such as the switch over to electric car usage and greater use of renewable fuels for transport.

The new policy will build on and replace the existing sectoral policy documents that were published in 2009: Smarter Travel, A Sustainable Transport Future 2009-2020, and the National Cycle Policy Framework.

It will be underpinned by funding for sustainable mobility under the renewed National Development Plan, which provides €35bn in total for transport investment over the next decade.
The overarching sustainable mobility policy framework is centred around three principles—Safe and Green Mobility, People Focused Mobility, and Better Integrated Mobility—supported by ten high-level goals which together shape a wide range of supporting actions to be delivered by 2025.

1.6 | The Climate Action and Low Carbon Development (Amendment) Act 2021

The Climate Action and Low Carbon Development (Amendment) Act 2021 establishes a legally binding commitment to achieve net-zero emissions no later than 2050, and a 51% reduction in emissions by the end of this decade. The Act provides for the development of a series of carbon budgets informed by the Climate Change Advisory Council (CCAC). Each carbon budget represents the total amount of greenhouse gases that may be emitted in the State during each five-year period from 2021 to 2025, and 2026 to 2030.

The first set of carbon budgets was proposed by the CCAC in October 2021. The proposed carbon budgets will go to Government and then to the Oireachtas for approval. Once these overall, economy-wide carbon budgets are approved, the Minister for Environment, Climate and Communications will divide the overall carbon budgets into sectoral emissions ceilings and bring to Government for approval.

To achieve the national emission reduction targets, the Act also requires the development of annual Climate Action Plans that set out detailed mitigation actions for each sector.

*Under development
1.7 | Climate Action Plan

Transport currently accounts for approximately 18% of Ireland’s greenhouse gas (GHG) emissions. To put Ireland on a pathway to achieve net zero emissions by 2050, the Climate Action Plan 2021 sets an emission reduction target for the transport sector of 7 million tonnes of CO₂, approximately 51% over the period 2021 to 2030. To achieve this target the Plan sets out a range of measures to reduce emissions in the transport sector. These measures consist of a mix of investments in sustainable transport infrastructure designed to deliver an additional 500,000 daily journeys by walking, cycling and public transport, scaling up the deployment of zero emissions technologies to increase the fleet of Electric Vehicles (EVs) and low-emission (with hyphen) vehicles (LEVs) on the road to 945,000, increasing biofuel blending rates, and the use of behavioural change interventions, including demand management, to reduce the kilometres driven by the remaining internal combustion engine (ICE) cars.

Given the significant contribution transport makes to Ireland’s GHG emissions and the ambitious target for the transport sector outlined above, it is imperative that NIFTI reflects the need to rapidly decarbonise the transport sector.

1.8 | National Air Pollution Control Programme

Ireland is required to produce a National Air Pollution Control Programme (NAPCP) every four years, under the EU National Emissions Ceiling Directive (NECD). The NECD establishes emission ceilings for 2020 and 2030 for five specified pollutants.

The first NAPCP for Ireland was prepared and submitted to the European Commission in 2019. The NAPCP demonstrates the pathway Ireland will follow to achieve compliance with the NECD 2020 and 2030 targets and presents an overview of current and projected 2030 emissions levels for each of the five pollutants.

The transport sector is a significant contributor to air pollution in Ireland. It is the primary source of nitrogen oxide emissions, with passenger cars and heavy goods vehicles the most significant emitters. The NAPCP lists the policies and measures contained within relevant policy documents including the NDP, the Clean Air Strategy, and the National Energy and Climate Plan which will support the reduction of air pollutants, including for the transport sector. While these measures are mainly designed to address related problems such as reducing greenhouse gas emissions, addressing congestion and promoting fuel efficiency, they will also contribute to a reduction in nitrogen oxide emissions. Measures include encouraging vehicles with higher engine standards into the Irish fleet through early scrappage schemes, obliging suppliers of road transport fuels to ensure that a proportion of the fuels they place on the market are produced from renewable sources, and achieving modal shift through large-scale public transport capital projects such as BusConnects.

The NAPCP notes the particular importance of achieving high rates of electric vehicle penetration to remain in compliance with the nitrogen oxide emissions ceiling for 2030. This will also support reductions in other local air pollutants and contribute towards achieving the climate mitigation goals set out in the NDP and the Climate Action Plan.

1.9 | Clean Air Strategy

Air pollution is one of the leading causes of premature death in Europe. Besides health impacts, air pollution can cause significant adverse environmental impacts, including the degradation of biodiversity and water quality. To address these health and environmental challenges the Department of the Environment, Climate and Communications (DECC) is in the process of developing a National Clean Air Strategy.

In the transport sector, emissions arise mostly from road transport, which is responsible for nitrogen oxide, fine particulate matter and black carbon pollution arising from increased numbers of diesel cars and buses in our cities and towns. The Urban Environmental Indicators report published by the Environmental Protection Agency (EPA) in 2019 reveals the extent of nitrogen dioxide pollution across Dublin City resulting from heavy traffic levels.

The consultation document prepared as part of the development of the Clean Air Strategy makes
several suggestions for how these emissions could be reduced, including the transition away from internal combustion engine vehicles to electric vehicles, increased travel by sustainable modes, the deployment of low emissions zones, and the introduction of congestion charging.

A number of ongoing policy initiatives will indirectly support improvements in local air quality. For example, transitioning journeys to more sustainable modes will support the climate policy goals outlined in the Climate Action Plan while also contributing to improvements in local air quality. The Clean Air strategy maximises these synergies and reduces the potential for tensions between policy objectives.

1.10 | Biodiversity

If poorly implemented, transport infrastructure investment can damage the natural world and lead to losses in connectivity and habitat fragmentation. To mitigate these risks, a Strategic Environmental Assessment (SEA), Appropriate Assessment (AA), and Strategic Flood Risk Assessment (SFRA) have been carried out alongside NIFTI to identify potential negative environmental outcomes of the framework for protected sites and designated species. This analysis is discussed further in Section 6.

1.11 | United Nations Sustainable Development Goals

The 2030 Agenda for Sustainable Development was adopted by all United Nations Member States, including Ireland, in 2015. At its heart are 17 Sustainable Development Goals. Appropriate development of transport infrastructure can be a powerful means of achieving some of the Sustainable Development Goals, such as ensuring healthy lives and promoting wellbeing; making cities and human settlements inclusive, safe, resilient and sustainable; promoting sustained, inclusive and sustainable economic growth; and taking urgent action to combat climate change. As part of Project Ireland 2040, there is already significant alignment between the National Strategic Outcomes and the Sustainable Development Goals. NIFTI will ensure that this alignment is extended to the transport sector when undertaking future investment.

1.12 | Accessibility and Inclusion

To deliver the greatest possible benefits and support the realisation of the strategic outcomes described in the NPF, transport infrastructure must be accessible by design, so that it accounts for and serves the needs of all members of our society. The United Nations Sustainable Development Goals stress the importance of providing access to safe, affordable, accessible and sustainable transport systems for all by 2030, referencing in particular the needs of women, children, persons with disabilities and older persons.

In July 2020, Transport Infrastructure Ireland published the Travelling in a Woman’s Shoes report which investigates the needs and travel behaviours of women, and is the first study of its kind conducted in Ireland. The report found that women in Ireland rely heavily on car transport infrastructure and identified significant caregiving responsibilities, safety concerns and equality of access as drivers of car dependency for women. The full realisation of the National Strategic Outcomes set out by the NPF requires that future transport investment address the barriers that women face in the access and use of our transport system.

The NPF notes that a significant proportion of the population will experience disability at some stage in their lives, and acknowledges the need to facilitate independent living, access, and mobility in relation to buildings and the environment, and full integration with society generally for people with disabilities, including access to employment. Transport accessibility is a crucial element of facilitating access to and integration with wider society for people with disabilities.

The NPF observes that there is significant similarity in many of the planning related issues that are most impactful for people with disabilities and for older people, and it is likely that transport accessibility will become increasingly important in the coming years as our population ages. Given this, it is crucial that our transport infrastructure
be accessible by design to empower independent travel by users with a variety of different mobility requirements.

New technologies have the potential to revolutionise everyday journeys for groups with reduced access to transport and there is widespread innovation taking place in areas across the transport sector, from self-driving cars designed to be accessible to people with disabilities to applications designed to support accessibility, such as by helping people with vision impairments navigate public transport stations using audio technology, to the development of artificial intelligence software that uses existing closed circuit television cameras to automatically identify and report incidents of concern on public transport, helping service users feel safe after dark. Transport investment must be flexible and adaptive enough to exploit the opportunities provided by emerging technologies as they develop, and indeed to foster and support native innovation in this space.

1.13 | Conclusion

The right transport investment helps to deliver high-quality travel and supports positive outcomes for society, the environment and the economy. However, these outcomes do not happen by chance. It is important to have in place a framework to guide transport investment and deliver the infrastructure and services we need. That is the purpose of NIFTI.

New transport investments will have to demonstrate their alignment with NIFTI. By extension, this will ensure that investment is aligned with the NPF and its National Strategic Outcomes, resulting in a consistent approach to investment across Government, with transport supporting our growth and development goals. In this way, NIFTI will ensure that transport enables the NPF.

NIFTI establishes a common lens through which to consider potential investment in transport infrastructure. However, it is not the only consideration. In addition to NIFTI, transport investment will continue to be informed by specific sectoral priorities and wider policy objectives, including the new Sustainable Mobility Policy, the United Nations Sustainable Development Goals, considerations around inclusion, and key environmental policies and plans such as the Climate Action Plan, National Air Pollution Control Programme, Clean Air Strategy, National Biodiversity Action Plan and All-Ireland Pollinator Plan.
The Purpose of NIFTI
The Purpose of NIFTI

The purpose of the National Investment Framework for Transport in Ireland is to support the delivery of the National Planning Framework. Transport is a key enabler of the National Strategic Outcomes and the appropriate transport investment can facilitate these outcomes across a range of areas, including the environment, society and economy.

2.1 Introduction

The National Planning Framework has set out the vision for the sustainable development of Irish society over the coming decades, a vision encapsulated by the ten NSOs. Transport has a key role to play in realising this vision.

NIFTI ensures that transport investment is aligned with the NSOs and supports, enables and facilitates the NPF, delivering positive social, environmental and economic outcomes throughout Ireland.

The following section articulates our high-level objectives when we invest in transport and how this investment relates to the ten NSOs.

2.2 Objectives of Transport Investment

In the coming decades, we will invest to deliver a safe and sustainable land transport network which supports prosperous communities, promotes balanced development and helps to realise our climate change goals.

There will be an estimated one million more people living in Ireland in 2040 when compared to 2018. The NPF has set specific targets for where this population will live and work, and transport has a key enabling role to play in achieving these targets. By delivering sustainable mobility infrastructure and services in our cities and towns, transport can help realise compact growth and the decarbonisation of the transport sector. By developing the interurban road and rail network and public transport
services, people will be able to travel between regions quickly and safely to visit family and friends and access economic opportunities and services. By investing in the regional and local road network, transport can ensure the continued vibrancy of our towns, villages and rural areas. By securing access to our ports and airports, transport can ensure international connectivity and support economic development. By investing in infrastructure that is accessible by design, transport can support an integrated, diverse and inclusive society where all members can access essential services, participate in the economy, and contribute to their local communities.

It is not possible to definitively list all of Ireland’s transport needs over the next two decades, nor is it the purpose of NIFTI to identify specific transport interventions. However, the framework ensures that future investment aligns with the National Strategic Outcomes and thereby delivers the transport network that Ireland will need in the coming decades to enable the NPF.

2.3 | National Strategic Outcomes

The National Strategic Outcomes are a single vision and shared set of goals for every community in Ireland (Figure 2). In some cases, transport’s role is explicit, such as delivering sustainable mobility, while in others transport has a facilitating role, such as access to high-quality childcare, education and health services.

Future investment in transport should meet one or more of the National Strategic Outcomes. To take some examples from the revised NDP, the development of BusConnects and comprehensive cycle networks in each of the five cities meets the...
fourth NSO, sustainable mobility, and also strongly supports compact growth and transitioning to a low carbon society. By contrast, a nonurban project such as the development of the link between Cork and Limerick will enhance regional accessibility in the south and southwest of the country. There may be occasions when a certain type of investment performs strongly against one NSO but negatively against another. Where these considerations arise, they will be balanced through the strategic assessment stage in the project lifecycle, discussed in greater detail in Section 5.

While transport investment can be an enabler of the NPF, it must be noted that good transport investment is contingent on policy elsewhere too. While transport is a key component of delivering compact growth, effective land use policy is necessary to reduce the need to travel and deliver the population densities required for viable public transport services.

Decisions taken in other sectors can also impact on the demands placed on the transport system. For example, the development of communications technology infrastructure can mitigate the need for travel in certain circumstances, while the construction of key public services such as schools and hospitals will create demand for trips and pressures on the network locally. Ideally, new development will optimise the use of existing transport assets rather than require the construction of new infrastructure.

The following sections set out in more detail the types of outcomes that transport can deliver or enable in support of the NPF across a range of considerations.

2.4 | Delivering Clean, Low-carbon and Environmentally Sustainable Mobility

A sustainable transport system is one that can meet the needs of the population today without compromising its ability to meet the needs of the population tomorrow. In terms of environmental sustainability, the reduction in greenhouse gas emissions is a foremost priority. This is reflected in National Strategic Outcome 8, which is the transition to a low-carbon and climate resilient society. It is also a national objective to achieve a low-carbon, economically competitive and environmentally sustainable economy by 2050. As the second largest source of greenhouse gas emissions in Ireland, the transport sector has a key role to play in achieving these objectives.

Building on the substantial investment in sustainable mobility set out in the revised National Development Plan 2021-2030, the 2021 Climate Action Plan sets out additional measures to help Ireland achieve a 51% reduction in emissions from the transport sector by 2030 compared to current levels and delivering an additional 500,000 daily journeys by walking, cycling and public transport. These measures will be reflected in, and complemented by, actions to be included in the forthcoming Sustainable Mobility Policy, which will establish the sectoral policy framework for active travel and public transport.

The Climate Action Plan also commits to increasing the number of electric vehicles on the road to 945,000 by 2030. To achieve this level of electric vehicle penetration, it is vital to address potential barriers to uptake such as range anxiety, which is a driver’s fear that an electric vehicle will have insufficient energy to complete a given journey. To address this issue, the Climate Action Plan commits to the development of a national infrastructure strategy to support the development of the national charging network, particularly in non-urban areas.

Reducing greenhouse gas emissions will mean different things on different parts of the network. Within our cities and large towns, NIFTI will support investment in public transport, walking and cycling to encourage modal shift away from the private car. Demand management will also have a role in encouraging this shift. The deployment of demand management measures in our large urban centres is given significant consideration in the recently published Five Cities Demand Management Study. Further analysis will also be required to identify how measures identified in this study can be applied in different regions and locations across the country. Advancing research in this area will be important in supporting the delivery of the Climate Action Plan and the forthcoming Sustainable Mobility Policy Framework.

On the interurban network, the construction of new roads, with the potential to induce additional car use, will be appraised in the context of
Ireland’s climate change goals, particularly with the coming introduction of carbon budgeting. Improvements to rail and interurban bus services can reduce the need to travel by car between our cities, while the development of charging infrastructure and uptake of electric vehicles can serve to mitigate emissions from those journeys which are taken by car.

While ensuring surface access to ports and airports is primarily a question of facilitating the efficient movement of economic activity, NIFTI will support the development of sustainable mobility options for private passengers to access strategic links, such as progressing the MetroLink project.

In rural areas, it will not be viable to provide the full suite of sustainable mobility options available in our cities and towns. Nevertheless, the strategic provision of park and ride facilities can be an effective means of increasing the catchment area for public transport services in certain areas. Services such as Local Link can reduce reliance on the private car to some extent, and new innovations such as mobility as a service have the potential to allow for the intelligent expansion of routes in future. Greenways can also make a contribution to reducing private car use in rural areas by providing an alternative means of accessing larger settlements. Overall, however, the private car can be expected to remain the primary transport mode for people living in rural areas so, as with interurban travel, it will be important to support the transition to low-emission vehicles.

Many of the same measures that reduce greenhouse gas emissions can also have a beneficial impact for other elements of environmental sustainability. Increased public transport and alternative fuel usage can help to improve air quality and reduce noise pollution, while active travel brings health benefits. Conversely, if urban densification occurs but internal combustion engine cars remain the primary transport mode, emissions and air quality will worsen. It is essential that the transport sector does not cause undue negative outcomes in terms of health and quality of life, while enabling the urban growth envisaged by the NPF.

2.5 | Supporting Successful Places and Vibrant Communities

The National Planning Framework estimates that the population of Ireland will grow by one million over the next twenty years to almost six million people. Where this population lives and works will be a key factor in how Ireland develops, socially and economically, and the National Planning Framework has set the objective of accommodating one quarter of the growth in Dublin, one quarter in the other four cities, and the remaining half in towns and rural areas. The provision of appropriate transport infrastructure will play a crucial enabling role in the delivery of this objective and supporting quality of life for all Ireland’s inhabitants.

The densification of Ireland’s five cities will place additional strain on urban transport networks which are already approaching capacity in many locations. For the NPF spatial goals to be delivered, it is therefore essential that urban congestion is tackled. This will mean increasing public transport capacity and usage, and investing in active travel to discourage private car use as much as possible. Beyond the cities, the provision of park and ride close to transport links can ensure access to employment and services for those living outside the major settlements and reduce the need for people to commute into the cities by car. In the medium-term, congestion charging may be required in some of the cities and is being considered in the context of the Sustainable Mobility Policy Review as informed by the Five Cities Demand Management Study.

On the interurban network, besides providing people with more opportunities to travel by sustainable modes, the transport system and new infrastructure should support rather than undermine the NPF spatial objectives. For example, in the absence of other measures, improving the connection between two urban centres contributes to interurban connectivity but could encourage sprawl, thereby impacting on compact growth. Where such tensions arise, sequencing will be an important consideration to ensure that the right investment is undertaken at the right time and negative spillovers are mitigated.
To support the continued vibrancy of rural Ireland, rural areas must be attractive places to live and work. This will mean ensuring reliable access to services and amenities, particularly for communities that are highly dependent on a small number of regionally important transport links. Given that transport in rural Ireland largely does not face capacity constraints, a key focus will be meeting maintenance requirements for existing infrastructure to provide a guaranteed level of connectivity to centres of scale. This will be supplemented by the targeted provision of new infrastructure and services where necessary.

2.6 | Facilitating Safe, Accessible, Reliable and Efficient Travel on the Network

Delivering a high level of service means the provision of a transport network that is safe, reliable, efficient and accessible. The growth in population forecast between now and 2040 will result in a significant increase in trips, for both people and goods. Investment in the land transport network must enable this growth without compromising on service levels. Moreover, investment must be financially sustainable, and among other things this means ensuring that the transport network is appropriate to the population’s needs rather than delivering high levels of excess capacity.
In urban areas, NIFTI will support investments which allow people to access employment, services and leisure opportunities safely and within a reasonable time period. As with supporting other NSOs, this will mean encouraging modal shift though the provision of high-quality public transport and active travel facilities and reducing the need to travel by private car. It will also mean ensuring that new services and infrastructure are fully accessible and retrofitting existing infrastructure so that the entire transport system becomes accessible over time.

On the interurban network, an objective of the NPF is to deliver average journey time speeds of 90km/h or better between all of Ireland’s cities and regional centres. In some instances this will mean the development of new infrastructure or upgrading of existing infrastructure, though addressing congestion on the key strategic links surrounding our cities will also be necessary to improve reliability. Investment in interurban bus and rail services can ensure accessibility to centres of scale for those who are unable to travel by car, while meeting asset protection and renewal requirements can help to ensure the safety of the network.

In common with interurban passenger travel, a key issue for freight is congestion on the land transport network adjacent to strategic links. Addressing congestion through demand management measures and the diversion of some trips to other modes and links will help to ensure the reliable and efficient movement of imports and exports.

Finally, investment in rural roads will help to ensure that those living in rural communities can travel safely and reliably to centres of scale.

Moreover, many of Ireland’s strategic links are part of either the core or comprehensive Trans-European Transport Network (TEN-T). There are certain infrastructure requirements arising from the TEN-T Regulation, which will need to be considered in the context of future transport planning and investment.

Enhancing regional and rural accessibility, with improved services and reliable journey times to centres of scale, and pursuing compact growth are essential to ensuring that economic development and opportunity is distributed across the regions, with conditions that attract investment and foster opportunities for indigenous employment and enterprise growth.

### 2.7 Promoting a Strong and Balanced Economy

As a small, open economy, Ireland is dependent on high-quality international connectivity through its strategic links. State ports and airports have the ability to raise their own finance so Exchequer funding for key projects is not necessary but enhancing surface access is under the remit of the Department and of strategic importance.
3

Identifying the Challenges
Identifying the Challenges

The National Investment Framework for Transport in Ireland is informed by a broad range of supporting analysis which has identified key transport challenges across the network, both today and in the future. The framework has been developed to address these challenges and ensure that transport investment enables and facilitates the National Strategic Outcomes in the coming years and decades.

3.1 | Introduction

As part of NIFTI, a wide range of supporting analysis has been conducted to identify key transport challenges, needs and constraints, both today and in the future. This analysis can divided into three broad categories: context and background, the existing land transport network, and the future land transport network.

The first set of analysis considers the context within which NIFTI has been developed and identifies factors with the potential to affect how and where transport will take place in the decades ahead. Given uncertainty around future developments in the transport sector, NIFTI is designed with sufficient flexibility to accommodate potential changes to transport use and patterns arising from, for example, Brexit and new technologies.

The current network work package considers the management and renewal of the existing land transport system in terms of maintenance, safety, resilience and contractual obligations. Ensuring that existing assets provide safe travel and are maintained to a good standard is fundamental to realising the full benefits of past investment.

Finally, applying National Planning Framework settlement and population projections, the future network work package identifies potential constraints on the future land transport network, indicating the types of issues and areas that will need to be addressed if the ten National Strategic Outcomes are to be realised.
The following section summarises the key points that emerged from the background analysis and identifies the challenges to be addressed through future investment.

### 3.2 | Context and Background

From the perspective of future travel demand, the population and settlement targets contained in the National Planning Framework indicate the areas where we expect demand for travel to increase in the future if our spatial objectives are realised. With half of population growth between now and 2040 targeted to happen within the five cities, our urban transport systems will have to cope with many more trips than is currently the case. Accommodating this growth sustainably will mean, above all, investment in active travel and public transport. The objective of rebalancing future population growth so that half takes place in the Northern and Western Region and the Southern Region combined will also require development of accessible centres of scale and supporting transport infrastructure. This includes the cities in those regions—Cork, Galway, Limerick and Waterford—as well as the regional centres of Letterkenny and Sligo.

In terms of infrastructure supply, for the coming decade the NDP has identified a range of transport projects that will be commenced, subject to compliance processes such as the Public Spending Code. These include BusConnects in all five cities along with comprehensive walking and cycling networks, MetroLink, DART+, the upgraded link between Cork and Limerick and the replacement of the Dublin-Belfast Enterprise train fleet. In addition to these very large projects, a host of smaller projects are set out that will enhance regional connectivity and improve the transport offering in rural Ireland. Finally, besides investment in new projects, it is expected that a significant proportion of maintenance and renewal costs across the network will be funded in future years following a long period of underinvestment in the aftermath of the financial crisis.

From comprising around a third of all land transport expenditure in the mid-2000s, sustainable mobility—meaning active travel and public transport—has taken up an increasing share of investment in recent years (Figure 3). This trend
Given current investment levels, the significant cost of protecting and renewing existing transport assets, and the substantial funding commitments made to new projects in the NDP, careful management of available resources will be necessary over the coming years.

Climate change and climate breakdown represent another central piece of the context for NIFTI. Ireland has made EU and international commitments to reduce greenhouse gas emissions and almost one fifth of our emissions are attributable to the transport sector. It will therefore be necessary to decarbonise the transport sector if the worst effects of climate change are to be mitigated.

This challenge is underlined by the fact that transport emissions have risen by a disproportionate amount in recent decades. Between 1990 and 2016 Irish greenhouse gas emissions rose by 10.5%, while the equivalent increase in the transport sector was over 13 times greater at 138.9%.

The Environmental Protection Agency projects an increase in transport energy demand of 23% by 2035 compared to 2015 levels and, in the absence of additional policy interventions, an increase in sectoral emissions of 11.3% between 2020 and 2035.

Given these projections, there is an urgent need to break the historic correlation between transport emissions on the one hand and travel demand and economic growth on the other. There are actions which can be taken to prevent carbon emissions rising while facilitating increased transport demand. Encouraging modal shift to sustainable modes, promoting cleaner fuel technologies, demand management, and improved

Figure 4: Revised National Development Plan 2021-2030 annual investment in transport, 2021 to 2025

is set to continue, with the revised NDP stating that prioritisation of projects will be in line with the Programme for Government commitment that investment in new public transport and new roads will be at a ratio of 2:1. It is also worth noting that investing in roads supports bus-based transport, which is the predominant mode of public transport in much of the country.

While the NDP 2018-2027 represented a step change in public capital investment, which has since been maintained by the NDP 2021-2030, it is nevertheless important to note that as a share of national income investment in transport will be below historical levels in the coming years. Taking a long-run average, between 1953 and 2011 an estimated 1.13% of GDP was invested in land transport annually—though this average disguises the peaks and troughs which occurred over that period. The most significant of these peaks took place between 1999 and 2011, when land transport investment averaged 1.44% of GDP annually, reaching 1.86% in 2008.

Considering modified Gross National Income, or GNI*, as a more accurate measure of underlying economic activity, between 1995 and 2019 transport investment averaged 1.29%. This measure also peaked in 2008, at 2.23%, before declining steeply to just 0.64% in 2013. Under the revised NDP, gross investment in transport will increase in the next five years, but still fall short of historical levels as a share of GNI*, with projected investment ranging between 1.00% and 1.15% between 2021 and 2025. Figure 4 shows the annual capital allocation for transport between 2021 and 2025 as set out in the revised NDP.

Given planned investment levels, the significant cost of protecting and renewing existing transport assets, and the substantial funding commitments made to new projects in the revised NDP, careful management of available resources will be necessary over the coming years.

Key Transport Challenge

Balancing the protection and renewal of existing assets with significant investment in new infrastructure within available resources
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The Environmental Protection Agency projects an increase in transport energy demand of 23% by 2035 compared to 2015 levels and, in the absence of additional policy interventions, an increase in sectoral emissions of 11.3% between 2020 and 2035.\(^5\) Given these projections, there is an urgent need to break the historic correlation between transport emissions on the one hand and travel demand and economic growth on the other.

There are actions which can be taken to prevent carbon emissions rising while facilitating increased transport demand. Encouraging modal shift to sustainable modes, promoting cleaner fuel technologies, demand management, and improved integration between transport, planning and land use will all be crucial.

To strike this balance between increased travel demand and reduced emissions, as well as setting a target of almost 1 million low-emission cars on the road by 2030, the Climate Action Plan targets that all replacements for bus and commuter rail vehicles and carriages be low or zero carbon by 2030. At a higher level, developments in communications technology may mitigate trip demand also.

As well as being an important source of emissions, the transport sector is also particularly vulnerable to the effects of climate change. On the land transport network, these impacts include increased flood risk, coastal erosion and the degradation of infrastructure due to more frequent extreme weather events.

Brexit and its potential impact on Ireland’s connectivity is another challenge that NIFTI considers. Following the June 2016 vote to exit the European Union, the United Kingdom officially ceased to be an EU Member State on 31 January 2020. Following a transition period during which the future relationship between the EU and UK was negotiated, from 1 January 2021 new trading arrangements are in place between the two. The long-term impact of this new relationship on trade will become clear over time, but adjustment to freight transport patterns can already be observed compared to previous decades.

Ireland is one of the most peripheral countries in the EU, particularly west of Dublin, and the departure of the United Kingdom has increased this peripherality. Prior to Brexit, large volumes of Irish trade with the rest of the EU travelled via UK ports. A 2018 study carried out by the Irish Maritime Development Office estimates that the total value of this ‘landbridge’ trade was €21.4bn in 2016, representing 30.9% of total Irish trade with the EU valued at €69.4bn.\(^6\) While some of this trade has moved to direct sailings to the EU, for time sensitive goods in exposed sectors disruption to the landbridge poses an acute challenge.

To preserve Ireland’s international connectivity, a variety of investments in our transport infrastructure may be required. New shipping routes and investment in air freight for time sensitive goods may be necessary. Ports may need to be expanded to accommodate larger ships and provide space for additional customs checks. While NIFTI is primarily a framework for investment in the land transport network rather than the aviation or maritime sectors, surface interventions which contribute to Ireland’s international connectivity may be necessary following Brexit and are supported by the framework.
Brexit also sees a realignment of the Trans-European Transport Network, the EU-wide network of railways, roads, waterways, shipping routes, ports and airports. The objective of developing this network is to strengthen social, economic and territorial cohesion across the EU and the TEN-T Regulation stipulates that the core network be completed by 2030. Within the core network are 10 core network corridors, which aim to facilitate the coordinated development of the network. Ireland is part of the North Sea-Mediterranean Corridor, which runs from Ireland to the south coast of France via Belgium, Luxembourg and the Netherlands. Prior to Brexit, the UK was also on this corridor. Following a 2021 realignment in response to Brexit, Ireland has also now joined the Atlantic Corridor and is part of two TEN-T corridors for the first time. This has created additional connections between Irish ports and ports in France, Belgium and the Netherlands, with the Atlantic Corridor also extending to Spain and Portugal.

In terms of cross-border connectivity, the Withdrawal Agreement reached between the UK and the EU in November 2019 has seen Northern Ireland adopt Single Market regulations on goods and act as an entry point to the Customs Union. This protocol prevents a hard border being imposed between the two jurisdictions which, among other things, would have a substantial negative impact on connectivity in the North West.

A final contextual consideration for NIFTI is technological development in the transport sector, particularly innovations facilitated by the internet and advances in communications technology. Mobility as a service (MaaS) is about providing travellers with a range of mobility options and allowing them to choose the one that suits them best. Individuals do not need to possess their own means of transport but instead access transport services on demand. This concept is well-established in cycling in the form of public bike share schemes, such as those in Dublin, Cork, Galway and Limerick. Combined with mobile technology, if such schemes came to cover private cars and public transport it is conceivable that on-demand services delivered by shared taxi type vehicles could be an important part of the future public transport offering, in both rural and urban areas.

Demonstrating the potential of MaaS, in 2018 the International Transport Forum (ITF) published a study that simulated the impact of widespread, shared taxi-type mobility in Dublin. The study estimates that just 2% of the current number of private vehicles could deliver the existing volume of trips within the Greater Dublin Area with substantial reductions in emissions and congestion, more cheaply and with increased social equity. Even if just a fifth of private car trips were replaced by shared modes, the study estimates that emissions would fall by 22% and congestion by 7%. These simulations suggest taxi-type shared mobility could play an important role in decarbonising the transport sector in the coming years.

A related innovation that could significantly impact the transport sector in the coming years is connected and autonomous vehicles (CAVs). Legal, regulatory, policy and technological factors will determine how soon CAVs become commonplace on roads, but their potential impacts include improved safety, reduced congestion and large economic benefits as road capacity is used more efficiently, transport costs are reduced and productivity increases. Developments in CAVs could support the NPF National Policy Objectives of making stronger urban places and supporting people, homes and communities—though there is also a risk that they might encourage urban sprawl if people become more willing to travel longer commutes.

Infrastructure development in Ireland should facilitate the interaction of intelligent transport systems. Across all areas of future technological change, the approach must be forward-looking and open-minded—to ensure both the interventions necessary to facilitate beneficial
developments, and the avoidance of costly errors through premature commitment to regulatory or physical infrastructure which ultimately becomes inefficient or obsolete.

Finally, while NIFTI supporting analysis focused predominantly on emerging transport technologies, transport planning cannot be considered in isolation; rather, it should be considered in relation to society’s accessibility needs. This means we need to consider the relationship between transport, the built environment and digital connectivity. For example, the rollout of the National Broadband Plan and Making Remote Work: National Remote Working Strategy, combined with the development of technologies which help facilitate remote working has the potential to change working habits and associated travel demand.

3.3 | Current Network Analysis

A key determinant of investment in the land transport system is the annual cost of asset protection and renewal, or ‘steady state’. This represents the minimum level of investment necessary to maintain existing assets, including any upgrades necessary for reasons of safety and accessibility, and meeting the costs arising from existing contractual commitments such as public-private partnerships (PPPs). Ensuring that assets are maintained in an adequate condition is crucial to realising the full benefits of past investment.

Table 1 shows the estimated annual cost of maintaining the various parts of the network in an adequate condition. The overall protection and

### Key Transport Challenge

**Incorporating innovative and emerging technologies within the future transport system**
renewal requirement is estimated to be €1.7bn in 2018 prices, though not all of this is met by the Department of Transport. A certain amount of asset protection and renewal is covered by TII reinvesting revenue generated through their tolling operations, Local Authorities contributing to the maintenance of regional and local roads from their own resources, and transport operators' revenue. Accounting for these factors, the estimated annual cost of asset protection and renewal attributable to the Department of Transport is €1.3bn—though it should be noted that funding from alternative sources may not always be available at present levels.

There are a number of caveats to note with this estimate. Firstly, implicit in the revised NDP is an increase in asset protection and renewal costs over time as new infrastructure is developed.

In terms of infrastructure supply, the estimates above relate to the network as it currently exists. A number of significant new pieces of transport infrastructure are expected to be delivered by 2030 under the revised NDP and these will add maintenance and operation costs to the network. On the demand side, the population increase of one million by 2040 can be expected to place additional pressures on infrastructure also, perhaps necessitating increased protection and renewal spending.

It is also assumed here that the current condition of the network is adequate throughout. However, as a result of the financial crisis, maintenance requirements were not fully met for a number of years and this has led to the degradation of some assets and the operation of public transport vehicles beyond their normal working life. Constrained investment due to the fiscal consolidation effort has seen the perceived quality of Ireland's road and rail infrastructure deteriorate in recent years, based on the World Economic Forum's Executive Opinion Survey of business leaders, and Ireland's land transport infrastructure is now the lowest ranked in Western Europe. From an average of 1.44% of GDP being invested in land transport annually between 1999 and 2011, by 2015 just 0.44% was invested.

While the previous and revised NDPs represent a step change in transport investment, it is important to note that restoring degraded assets to an adequate condition now is likely to be more expensive than if they had been maintained in an adequate condition over the past decade. The World Bank estimates that, on average, repairing a neglected stretch of road is three times more expensive than prompt maintenance. Similarly, analysis carried out by TII suggests that underspending on pavement renewal by €100m annually will save €2bn on renewal costs over 20 years but the outstanding costs of restoration at the end of the period will be €3bn—i.e., short-term savings on renewal cost 50% more in the long run.

Protection and renewal costs also face upward pressure in the years ahead from climate change.
Rising sea levels, more intense storm and rainfall events, and increased river and coastal flooding are all likely. Such events will have a significant impact on the transport network, with disruption to even small sections having potentially large effects.

The National Adaptation Framework sets out the national strategy to reduce Ireland’s vulnerability to the negative effects of climate change. In line with its requirements, the Department of Transport has prepared a Transport Climate Change Sectoral Adaptation Plan which was approved by Government in October 2019. As well as identifying the key sectoral risks and priorities, the Sectoral Plan recommends 21 adaptation actions. These will increase knowledge and understanding of the likely impacts of climate change on the sector, support stakeholders in identifying and prioritising risks, and assist in the implementation of adaptation measures to improve resilience across the sector.

Many adaptation measures include considerable engineering and construction undertakings that amend or alter transport infrastructure and the surrounding environment. Costs associated with adaptation can therefore be high. The main reactive cost for the transport sector is associated with the repair and reconstruction of land transport infrastructure. Preventive costs include improving drainage, reinforcing bridges and elevating road and rail lines.

While provision is made in the transport budget each year for winter maintenance, supplemental funding of €100m was required between 2014 and 2016 to repair damage to the network caused by extreme weather events. If the frequency and severity of such events increase, the reactive adaptation costs will rise also. Nevertheless, while adaptation measures may be expensive, it can be expected that the costs of implementing an effective and well-planned adaptation strategy will be a fraction of costs incurred if no adaptation measures were introduced.

Finally, while the NDP commits to meeting most transport asset protection and renewal costs, this only relates to capital expenditure. There is also a significant element of current expenditure involved with asset protection and renewal, covering activities such as the rescaling of road surfaces, drainage works and the provision and maintenance of signs, markings, traffic signals and

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ADAPTING TO CLIMATE CHANGE

August 2017 flooding in Donegal

There is likely to be a substantial increase in the frequency of heavy precipitation events in the winter and autumn months due to climate change. The Sectoral Adaptation Plan for Transport identifies the increase in extreme precipitation levels and the resulting increase in flooding as a high priority risk for the transport sector.

In August 2017, the remnants of Hurricane Gert hit the northwest of Ireland, which saw 63% of August’s average annual rainfall fall in just nine hours. The rainfall led to severe flooding in the region, with the Inishowen peninsula in Donegal experiencing the worst of the damage. As a result of the flooding, bridges collapsed and cars were washed away, while homes, community amenities, farmland and other properties were destroyed.

The total cost to the Exchequer of the damage was €14.3m. This included substantial road repairs to address over 600 issues which were identified along the 1,500km road network in the area and repairs to 115 damaged bridges.

Rural areas which are served by only a small number of roads and public transport services are particularly vulnerable to these impacts. As such, there is a need to identify key local links and infrastructure at risk from extreme weather and prioritise early investment, in order to build resilience, save lives and reduce the Exchequer impact in the medium- to long-term.
barriers. Engaging in these activities at an early stage improves safety and mitigates the need for subsequent, more costly restoration work.

A specific example of the continuing constrained investment in protection and renewal activities funded through current expenditure is road improvement and maintenance. In 2008, the current allocation for this activity was €200m. By contrast, the allocation for this item of current expenditure in 2021 is €111m, representing a reduction of 45% in nominal terms.

Unlike capital investment for which a medium-term plan exists through the revised NDP, current allocations are subject to the annual Budgetary Estimates process. As such, while the revised NDP commits significant capital investment to protection and renewal, it is uncertain when the current expenditure component of asset protection and renewal will be restored to its pre-crisis levels.

### Table 2: National Planning Framework targeted pattern of city population growth

<table>
<thead>
<tr>
<th>City</th>
<th>Population 2016</th>
<th>Population Growth to 2040</th>
<th>Minimum Target Population 2040</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>People</td>
</tr>
<tr>
<td>Dublin</td>
<td>1,173,000</td>
<td>20-25</td>
<td>235,000-293,000</td>
</tr>
<tr>
<td>Cork</td>
<td>209,000</td>
<td>50-60</td>
<td>105,000-125,000</td>
</tr>
<tr>
<td>Limerick</td>
<td>94,000</td>
<td>50-60</td>
<td>47,000-56,000</td>
</tr>
<tr>
<td>Galway</td>
<td>80,000</td>
<td>50-60</td>
<td>40,000-48,000</td>
</tr>
<tr>
<td>Waterford</td>
<td>54,000</td>
<td>50-60</td>
<td>27,000-32,000</td>
</tr>
</tbody>
</table>

### 3.4 | Future Network Analysis

The final element of NIFTI supporting analysis considers the potential needs and requirements of the future land transport network. Understanding the likely pressures and bottlenecks on the network in the coming years and decades can help ensure that investment is appropriately targeted to support the NPF.

Extensive modelling exercises have been conducted for a variety of future scenarios across the network, the most important of which is the 2040 Do-Minimum scenario. In this scenario, it is assumed that the population of Ireland will grow in accordance with NPF population and settlement projections out to 2040, with all the associated increase in travel demand that comes from that growth. To develop a sense of future infrastructure supply, it is also assumed that proposed transport investment under the NDP 2018-2027 is delivered. This excludes projects that received a commitment for pre-appraisal or consideration within the NDP 2018-2027. The purpose of these modelling exercises is to identify where there may be gaps in the future provision of transport to inform investment decisions and NIFTI. Effectively, the modelling indicates where additional interventions may be required, beyond those set out in the NDP, between now and 2040 to enable the NPF.

It is important to note that this scenario is not necessarily realistic. It assumes that the population continues to grow until 2040 but that
there is no additional transport provision to cater for rising travel demand beyond the 2030 time horizon of the current NDP. In reality, some form of response from the transport sector would be inevitable, and in the absence of this response the actual population would not live in the modelled areas.

To deliver compact growth, the NPF targets substantial population increases in all five of Ireland’s cities over the coming decades. Much of this growth is targeted to happen within existing urban footprints and lead to densification. Table 2 shows the targeted population increase for each of the five cities and the minimum associated population by 2040. This population is the basis for travel demand in the cities in 2040.

A consistent issue identified in the modelling for the five cities is congestion. This is especially widespread for Dublin and Cork, while Galway, Limerick and Waterford are projected to experience significant pressures on specific links. Congestion is a substantial drain on the economy, with research estimating that congestion in the Greater Dublin Area could cost more than €2bn annually by 2033—albeit in the absence of intervention.

It also has significant adverse impacts on quality of life for the residents of cities. Given space constraints, urban congestion will primarily have to be addressed by encouraging modal shift to sustainable modes. The provision of park and ride at strategic locations beyond the cities can increase the catchment of public transport and provide an alternative means of reaching the city centre. Within the cities, frequent and reliable public transport of sufficient capacity and high-quality active travel infrastructure can incentivise people to travel using sustainable modes rather than by car.

The role of further demand management solutions such as congestion charging and availability of parking should be explored. Sequencing will be a key consideration regarding such interventions, ensuring that demand-side measures do not precede the adequate provision of alternative transport options and discourage travel entirely.

To ensure that the entire city transport network operates efficiently, it is important that pressures at key junctions and links are addressed. It is notable that many of the links experiencing

Over 150m journeys were taken on Dublin Bus services in 2019. However, the network faces a number of challenges which have been compounded by rising passenger numbers and congestion in recent years.

At present, there is a lack of continuous dedicated bus lanes in the city, with buses often sharing road space with other traffic. This results in poor journey time reliability and service quality for passengers. The existing structure of bus routes also largely provides connections on a radial basis, from suburbs to the city centre. This means there is a lack of direct services between the suburbs and results in multiple bus routes serving a single area. Finally, the existing fare structure needs to be simplified with an upgraded ticketing system that can accommodate modern contactless payment technology.

BusConnects will alleviate these issues over a ten-year period through a number of deliverables. Some existing routes will be rationalised into high-capacity, high-frequency ‘spines’ which can accommodate additional services. Bus priority lanes are planned for each of these routes, with comprehensive cycling infrastructure delivered alongside. There will also be increased provision of orbital, intra-suburban bus services which will feed into the high-capacity spine routes. A simplified fare system and modern ticketing technology will be introduced. Finally, emissions will be reduced through the purchase of new low- and zero-emission buses.

While Dublin is the first city to implement a BusConnects programme, all five cities will see their sustainable mobility systems similarly upgraded over time.
Capacity issues in the modelling are adjacent to public transport hubs, such as train stations, or are at locations with few alternative links available, such as roundabouts and bridges.

Investment beyond the cities can help address pressures on urban infrastructure if traffic is diverted from entering the city centre, creating more space for sustainable mobility solutions. For example, the modelling suggests that this will be a result of the proposed Galway City Ring Road, by diverting east-west traffic which currently has to travel through the city around the city instead. As far as possible, infrastructure investment should take trips out of cities and towns which do not inherently need to be there, such as heavy goods vehicles travelling to ports via urban areas.

Achieving modal shift away from the private car and towards sustainable modes will help to alleviate issues of congestion and will also be crucial to Ireland meeting its climate change goals. Generally speaking, the Do-Minimum scenario modelling suggests that NDP investment will help to increase the modal share for public transport, but indicates that active travel mode share will remain the same or decline in the absence of additional intervention. Part of this decline may be due to the availability of more attractive public transport options, though it should also be noted that much of the future cycling offering has been modelled by proxy in the absence of detailed designs at this time. Investment in good quality cycling infrastructure, including segregated lanes, parking and bike sharing, has been a driver of modal shift elsewhere. The revised NDP 2021-2030 sets out details of a new National Active Travel Programme with funding of €360 million annually for the period from 2021 to 2025. A new National Cycling Strategy is to be developed by the end of 2022, and will map existing cycling infrastructure in both urban and rural areas to inform future planning and project delivery decisions in relation to active travel.

A number of sites have been identified within the existing footprints of our cities for special development. Transport-orientated development is an approach that seeks to maximise the amount of new housing, employment and services provided in close proximity to high-quality transport connections. In this way, the transport sector can facilitate compact growth and improved quality of life.

Effective planning and land use strategies encourage the use of sustainable mobility and contribute to liveable communities. Dún Laoghaire is an example of this in practice.

In keeping with the principles of transit-oriented development, densities in the immediate vicinity of the DART station are higher than the town average. Dún Laoghaire is also the terminus for well-serviced bus routes, while residents are within walking distance of a range of local amenities, including shops, cultural centres, and blue and green space.

Dún Laoghaire also has a high proportion of households without a car. Crucially, although no-car households often correlate with deprivation, this is not the case in Dún Laoghaire. This suggests that many residents choose not to own a car due to the walkability of their neighbourhood and the availability of sustainable mobility modes.

Combined with competitive journey times to the city centre when compared with the private car, the comprehensive provision of sustainable mobility likely contributes to the modal split of the Dún Laoghaire Local Electoral Area, in which 46% of people commuted using a sustainable mode according to 2016 Census figures.
Interventions to encourage modal shift have been found to be much more effective in a brief window just after someone moves home. Many areas earmarked for development are located adjacent to existing rail links but in others there may be an opportunity to encourage modal shift by ensuring that high-quality sustainable mobility services and infrastructure are in place when the first residents move in. Again, the appropriate sequencing of interventions will be a foremost consideration for future investment.

Balanced regional development is another of the central outcomes of the NPF. Improved accessibility between regions and between urban areas will be crucial in achieving this NSO. To support this objective, the NPF sets a target of improving interurban journey times by increasing average speeds to 90km/h between the five cities and five regional centres.

As well as enabling balanced and sustainable regional development, improved interurban connectivity benefits transport users through improved journey times and journey reliability, which increases productivity and makes more time available for leisure activities. Improved safety levels generally result from high-quality infrastructure. With coordinated land use policies, improvements to interurban transport links can increase economic productivity in urban centres and their regions.

NIFTI supporting analysis indicates that there will be challenges on the National Roads network by 2040 in the Do-Minimum scenario, particularly on the links connecting urban centres other than Dublin. The southern cities of Cork, Limerick and Waterford are projected to have disproportionately long journey times between each other given geographical distances. Similar issues also affect travellers in the North West and North East. Significant delays will also be a problem on the radial routes into and out of Ireland’s cities. It will therefore be necessary for some investment in improved interurban connectivity. Where appropriate, this should include improvements to public transport services, both rail- and road-based.

The National Strategic Outcomes point to a number of priorities for the interurban network. Improving capacity and capability will support successful communities, deliver high-quality transport and promote balanced economic development, particularly as investment would necessarily be primarily focused outside the Eastern region on the basis of the needs identified. To ensure that interurban travel is clean and low-carbon, it will also be necessary to encourage modal shift to public transport through improved services and to transition away from fossil fuel vehicles and towards alternative fuels and technologies. The transition to low-emission vehicles will also require the development of low-carbon energy sources and a national network of charging infrastructure.

The role of the rail network, including its scope and service levels, needs to be considered in detail. This should include examination of the possibility of introducing higher-/high-speed rail and increased use of the rail network by freight.

In addition, interurban investment needs are competing for limited public funding not only with each other but with investment needs in urban areas and in rural areas. There are interdependencies between these different parts of the network. Improved interurban transport links could, without careful design and land use planning, lead to urban sprawl. Similarly, there can be a trade-off between rural accessibility and interurban journey speeds.

Key Transport Challenge

Increasing sustainable mode share to reduce emissions and address urban congestion

Key Transport Challenge

Improving interurban connectivity, particularly in the South, North West and North East
While half of the population growth over coming decades is targeted at the cities and towns, it is worth reiterating that the other half is targeted at smaller urban and rural areas. If the NPF is to be achieved, rural Ireland must be an attractive place to live and work, with reasonable access to services and amenities.

Rural communities rely on urban areas for accessing certain services. The development of the national transport network will therefore be vital to enhancing access to services for people in rural Ireland. Continued investment in urban transport networks will aid those living in rural areas as well.

Due to the low density of rural Ireland, providing comprehensive public transport is not as feasible or viable as in more densely populated areas. Services such as Local Link have an important role to play in ensuring accessibility and reducing the volume of trips made by car. However, significant modal shift to public transport is unlikely in rural areas and the primary method of travel can be expected to remain the private car. Therefore, as with interurban transport, ensuring that an increasing proportion of private car trips are taken in low-emission vehicles will be important for reducing emissions.

Regional and local roads serve an important economic role in a local context and have valuable social and community functions. The provision of suitable road infrastructure will also be essential in ensuring accessibility for inhabitants of rural areas. The national secondary, and regional and local road networks in particular are important infrastructure that support mobility within rural areas and provide access to the national interurban network.

Infrastructure resilience is a particularly important consideration in rural areas. Some areas are served only by a small number of important roads, perhaps even just one. If any of these links are disrupted, a large number of potential journeys may not take place at all. The failure of such ‘lifeline’ links can have significant accessibility impacts for rural communities. Increased frequency and severity of extreme weather events due to climate change could therefore be especially damaging for communities in rural Ireland reliant on lifeline roads.

Given the capacity that exists on the regional and local road network, significant new infrastructure
may be unnecessary in the coming decades. Investment should protect and renew existing assets and ensure infrastructure is resilient to extreme weather events. Targeted interventions may also be required for safety and to support socioeconomic development. Prioritising these investment requirements will support rural communities and ensure access to markets for rural industries.

A final area considered in NIFTI supporting analysis is how unanticipated shocks or accelerations of existing trends, such as the disruption caused by the COVID-19 pandemic, can result in different travel demands, patterns and behaviours than those projected in the existing transport models. It is possible that short-term changes to travel patterns brought about by such shocks may develop into long-term, permanent features of the transport landscape, affecting key transport investment considerations such as commuting patterns and modal choice.

NIFTI is informed by extensive analysis using TII’s National Transport Model and the NTA’s five Regional Transport Models. While these models are valuable tools in the transport planning process, they are developed and calibrated using observed travel behaviour and trends. It is necessary to understand these assumptions in relation to travel patterns, economic conditions and settlement patterns, and what would happen were any of these key variables to change significantly.

To assess the impact that external developments and shocks could have, a number of alternative demand scenarios, such as a significant increase in the numbers engaging in teleworking or e-commerce, were examined at a high level as illustrative case studies as part of the supporting analysis. These case studies demonstrate how underlying changes in travel behaviour can have significant impacts on future network requirements. They also highlight the value of adopting scenario analysis as part of the transport planning process.

Ireland has one of the most open economies in the world and an economic model that promotes foreign direct investment, which requires effective and efficient strategic connections with the rest of the world. Ports and airports are essential to Ireland’s international competitiveness and attractiveness as a visitor destination.

As an island nation, ports are necessary for international trade and handled approximately 99% of Ireland’s trade tonnage in 2017. The tier one ports of Dublin, Cork and Shannon Foynes handle the vast majority of maritime freight and are therefore especially important.

Irish airports are a driver of inward direct investment, handling tens of millions of passengers every year. While only approximately 1% of Irish freight tonnage moves through Irish airports, air freight represents 35% of the value of all Irish imports and exports. Dublin airport is particularly important and accounts for 85% of aviation passenger numbers and 91% of air freight handled.

A growing population will put increased pressure on these key international gateways. There are also planned capacity expansions at Dublin airport, Dublin port and Shannon Foynes port. An increase in the public transport modal share of travel to these facilities through projects such as MetroLink will be crucial to maintaining adequate surface access and ensuring sufficient capacity on key strategic links for freight.
planning process, which can lead to enhanced adaptability and help guard against the impacts of unanticipated change.

### Key Transport Challenge

**10**

**Ensuring that transport investment decisions are robust to unanticipated shocks and uncertainty**

### 3.5 Conclusion

There are a range of challenges that threaten to undermine the transport sector’s ability to enable the NPF. These include striking the appropriate balance between new investments and protecting and renewing existing assets, decarbonising transport through increased sustainable mobility, supporting connectivity and accessibility in regional and rural areas, and safeguarding access to strategic links for people and goods. NIFTI guides project planning and decision-making to ensure that future investment in transport is tailored to meet these challenges and prioritises the most efficient and effective interventions to do so.
4

Investment Priorities
For future transport investment to support the delivery of the National Planning Framework and address the challenges we face, it will be necessary to give priority to certain types of investment over others. The NIFTI Investment Priorities identify the types of transport interventions that will be given precedence under the framework. These priorities are supplemented by Modal and Intervention Hierarchies, which will ensure that the most appropriate solution to a given problem or opportunity is deployed.

4.1 | Introduction

Drawing on the challenges identified in Section 3, the following section sets out the four NIFTI Investment Priorities. These priorities will enable us to meet the identified challenges as efficiently and effectively as possible regardless of the size of future funding envelopes.

The priorities are supplemented by Modal and Intervention Hierarchies. These Hierarchies will ensure that, for any investment, the most appropriate, environmentally friendly and cost-effective option for meeting a given set of objectives is selected.

4.2 | Investment Priorities

Drawing on the Key Transport Challenges, four NIFTI Investment Priorities have been identified. These replace the three investment priorities established by SIFLT in 2015.

As discussed in Section 1, SIFLT was developed in a constrained fiscal context where the basic maintenance needs of the network were not being met. Consequently, achieving the required maintenance investment was its first priority. In contrast to SIFLT, the NIFTI Investment Priorities are not ranked hierarchically. Protecting and renewing the network
remains a priority but there is also a need for new investment to help realise our other objectives for the transport system. In particular, the urgency of decoupling transport activity from greenhouse gas emissions will require the development of new infrastructure and services, and an ambitious investment programme to this effect has been set out in the revised NDP.

Finally, it should be noted that investing to deliver one priority does not necessarily preclude supporting other priorities at the same time. In fact, many worthwhile transport investments will perform strongly across several of the NIFTI Investment Priorities.

4.2.1 NIFTI Investment Priority: Decarbonisation

The transport sector is Ireland’s second largest source of greenhouse gas emissions, responsible for a fifth of emissions in 2019. To support the delivery of a low-carbon future and the Government’s ambitious targets set out in the Climate Action Plan, it is crucial that future transport investment decarbonises the transport sector to the greatest extent possible while catering to the travel demand of a growing population. Aside from emissions, transport investment has a host of other environmental impacts which must be taken into consideration when developing infrastructure, such as on biodiversity, air quality and water pollution. Decarbonisation and protection of our natural environment will mean investing in sustainable modes so that transport users have safe, accessible, reliable and efficient alternatives to the private car.

The targets set out in the Climate Action Plan are ambitious, and delivery will require the participation of all parts of our society. Therefore, it is essential that sustainable mobility alternatives take account of the needs of transport users whose experience has not always been well-considered in the design of transport systems to provide viable alternatives to car travel that are accessible to all. It will also mean supporting the adoption of low-emission vehicles and related infrastructure so that emissions from trips that are taken by private car fall also.

Many of the investments that will help drive decarbonisation have positive spillovers for other...
NSOs, such as compact growth, and will have health, environmental and quality of life benefits more widely than just greenhouse gas emissions, such as improved air quality and increased levels of physical activity.

4.2.2 | NIFTI Investment Priority: Protection and Renewal

Given its extent and value, protecting and renewing the existing land transport network is a key priority for transport investment. This is consistent with the recommendations of the Public Investment Management Assessment carried out for Ireland by the International Monetary Fund in 2017. Asset protection and renewal (or ‘steady state maintenance’ as it was previously referred to) was the highest priority identified by SIFLT. A more expansive description is used here to emphasise the fact that there are certain interventions that go beyond strictly maintaining the network in its present state but which are still foremost priorities. For example, safety and accessibility are regarded as fundamental performance standards that must be present for the relevant asset to be deemed fit for purpose. Accordingly, necessary improvements to ensure safety or increase accessibility are considered a form of asset protection and renewal.

Protecting and renewing existing infrastructure will help to meet many of the challenges identified in the supporting analysis. The renewal of public transport assets will assist with decarbonisation. Preservation of the interurban road and rail networks will ensure regional connectivity. Protecting and renewing the regional and local road network and lifeline infrastructure ensures rural accessibility and resilience, particularly in relation to climate change. Preserving key strategic links will help deliver the necessary capacity on surface access routes to ports and airports and promote balanced regional development.

In general, timely asset protection and renewal is more cost effective than restoring degraded assets later. While there will be significant investment in asset protection and renewal in the coming years under the revised NDP, there is also a need to repair parts of the network that have deteriorated due to past underinvestment. This restoration should proceed in order of strategic importance.

4.2.3 | NIFTI Investment Priority: Mobility of People and Goods in Urban Areas

To make our towns and cities more vibrant and sustainable places to live and work, a key outcome of the NPF is compact growth. Specifically, a target has been set that half of population growth in the next twenty years is accommodated in the five cities.

There are already acute congestion issues in certain parts of our cities today, and the modelling conducted as part of NIFTI supporting analysis indicates that these problems will considerably worsen in the 2040 Do-Minimum scenario. While the population can be assumed to live in certain locations for the purposes of modelling, in the presence of severe congestion and long journey times it is likely that our cities would continue to sprawl in reality. Given spatial constraints within our cities, it is essential that urban congestion is tackled through measures such as improved and expanded walking and cycling infrastructure and the provision of better and more comprehensive public transport services. These measures must be designed with the needs of a diverse range of users in mind so that sustainable mobility alternatives are accessible to all residents of urban areas.

While sustainable mobility supply side interventions can encourage some level of modal shift, demand side measures that reduce demand for travel and disincentivise private car use must also be considered, such as reducing the availability of parking in urban centres and congestion charging. Innovations such as shared mobility and mobility as a service are also likely to have an increasingly important role to play.

While the success of a transport project is always to some extent dependent on policy made outside the sector, robust planning and land use is particularly crucial to urban mobility. Transport should be a central consideration for future development, reducing the need for new
infrastructure and optimising existing transport capacity, mitigating the need to travel and ensuring that the most sustainable modes are encouraged. The sequencing of investment will also be important in certain instances, such as ensuring that the provision of public transport infrastructure such as train stations precedes residential development in a given location to facilitate transport-orientated development.

The principles of compact growth and improving sustainable urban mobility are not confined to the five cities. There are over 200 towns in Ireland, and a consistent focus of transport development in all of these settlements should be to provide high-quality alternatives to the private car wherever possible. Improvements to urban mobility in these smaller centres, in particular, will also be of benefit to people living in rural Ireland who depend on local towns to access certain goods and services.

4.2.4 | NIFTI Investment Priority: Enhanced Regional and Rural Connectivity

Enhancing connectivity means delivering reliable, shorter journey times to centres of scale for people and goods.

Connectivity ensures access to jobs, leisure and public services for everyone in Ireland, and is particularly important for people living in rural areas who are dependent on a small number of transport links.

It includes ensuring that vulnerable groups retain access to lifeline infrastructure, allowing them to access essential services, amenities and employment. For freight, connectivity means ensuring that goods can get to market and access ports and airports in a timely manner from everywhere in the State, and that the use of strategic links by traffic of high economic and strategic value is secure.

International connectivity is an important dimension of this and, although NIFTI relates to the land transport network, future investment in regional and rural transport made in accordance with the framework can be a key enabler for international trade and travel by ensuring access to ports and airports.

Enhancing connectivity supports regional and rural accessibility and a strong and balanced economy. By addressing priority bottlenecks where they exist on the land transport network, the value of the network can be optimised. The types of measures that might be supported under this Investment Priority are diverse and will depend on specific transport needs and local contexts, but could include the introduction of a regional bus service in an area poorly served by public transport or the realignment of a road to improve safety, journey speeds and reliability. The Connecting Ireland Rural Mobility Plan is an example of an ongoing public transport initiative in this area, increasing connectivity outside our towns and cities.

4.3 | Investment Hierarchies

The NIFTI Investment Priorities represent the key objectives of transport investment that new projects must align with in the years ahead. They are supplemented by two principles-based Hierarchies which will ensure that the most sustainable means of delivering a given transport project is selected.

4.3.1 | Modal Hierarchy

To enable the National Strategic Outcomes, particularly around decarbonising the transport system and delivering compact growth, a significant shift from low-occupancy private vehicles to more sustainable modes of travel will be required. For this reason, future transport planning will prioritise sustainable modes, while acknowledging that the private car will remain an important mode of travel in much of Ireland.

NIFTI sets out a hierarchy of travel modes to be accommodated and encouraged when investments and other interventions are made. Sustainable modes, starting with active travel (walking, wheeling and cycling) and then public transport, will be encouraged over less sustainable modes such as the private car.

The application of the Modal Hierarchy within transport planning will be flexible and pragmatic, and will help ensure that the most appropriate
solution to a given problem is implemented. It is acknowledged that some modes will not be appropriate to address some challenges—walking and cycling are not feasible modes of longer distance, interurban travel, and rural areas do not have the population density to make large-scale public transport an effective solution. Where more sustainable modes are feasible it will be the responsibility of the sponsoring agency to develop solutions involving those modes. Where more sustainable modes are unsuitable, the onus will be on project sponsors to demonstrate why they do not achieve the project objectives.

Active travel is the most sustainable mode of travel. Increasing the share of active travel can reduce the carbon footprint of the transport sector, improve air quality, reduce urban congestion, and bring about positive health impacts as a result of increased physical activity. It is also important in enabling access to other mobility options, such as public transport. The attractiveness of this mode is dependent on infrastructure—for example, dedicated footpaths, segregated cycle lanes and the quality and priority of road crossing points all impact upon the number of people engaging in active travel. However, active travel, by itself, is less feasible over longer distances and therefore not appropriate for addressing all of the challenges across the transport network.

Public transport refers to buses, light and heavy rail, and shared transport. Bus and rail, by design, are able to transport large volumes of people and increasing levels of usage can therefore have environmental benefits. While most bus and rail services are subsidised by the State, economies of scale mean that they are more cost-effective in or between areas of higher population density.

Shared transport is a subset of public transport and encompasses taxis, ride-sharing and other forms of shared mobility. On average, it should also have higher occupancy levels than private transport, though less than bus or rail.

Encouraging a shift from private transport to these modes would mean fewer vehicles on the road per traveller and therefore environmental benefits and reduced congestion. As with active travel, the quality of the transport offering across dimensions including journey times, safety, frequencies and comfort—is very important in attracting users.

Private transport includes cars, motorcycles and mopeds. These are low occupancy vehicles which occupy road space, and generally have
the greatest contribution to poor air quality and congestion. Providing infrastructure to cater for increased traffic volumes and improved journey conditions for these vehicles generally requires upgraded or new road infrastructure.

Future developments such as mobility as a service and alternative fuels or technologies such as electric vehicles may have a substantial impact on private travel in coming decades. Electric vehicles are an important part of the to decarbonisation of transport in Ireland. It is therefore worth differentiating between investments which will enable the transition to these and other innovations, and investments which primarily increase the capacity or capability of the network serving all private vehicles. However, while low-emission vehicles can contribute to decarbonisation and have a role to play in locations where a dispersed population makes sustainable mobility less feasible, they are not an effective solution to congestion compared to the development of a sustainable transport system.

While business cases for new transport projects tend to focus on passenger travel, the movement of goods is also a crucial use of the transport network and an important benefit to consider. While most internal freight movements take place on the road network today, the Modal Hierarchy can be a useful tool for project sponsors to consider alternatives where feasible. Examples might include rail freight or the use of cargo bikes in congested urban areas as part of last mile delivery.

Beyond the Hierarchy, which seeks to ensure that travel is undertaken in the most sustainable manner possible, behavioural shifts and emerging technologies in other sectors may also help mitigate the need for travel. A prominent example of this is the shift to home working for certain professions brought about by the public health response to the COVID-19 pandemic and facilitated by access to high-speed internet and information technology innovations. If remote working persists at an increased level, it has the potential to reduce travel demand and change travel patterns.

4.3.2 | Intervention Hierarchy

Addressing the challenges facing the Irish transport network, today and in the coming decades, will require a certain level of public investment and intervention. However, interventions can take many different forms, and what is appropriate will depend on the specific issue being addressed.

In order to deliver the National Strategic Outcomes and address challenges faced by the transport system, it is necessary to invest according to the NIFTI Investment Priorities, ensure that our investments are financially sustainable over the lifetime of the infrastructure, and avoid investments which will have unnecessary negative environmental impacts.

A hierarchy of intervention types has been developed to ensure that investment is proportionate to the problem identified. The NIFTI Intervention Hierarchy (Figure 7; Table 3) sets out four high-level categories of investment.

These four categories of investment will be used to inform intervention decisions, both at the budgetary level and the project level. To support the delivery of the NPF, and to make best use of our existing assets, a hierarchy of these intervention types will be applied. Maintaining the existing transport network will be given first priority, followed by maximising the value of the network through optimising its use. Infrastructural investments will only be considered after these two categories have been assessed as inappropriate for the identified problem, with upgrades to existing infrastructure to be considered before new infrastructure.

It will be important to consider the Intervention Hierarchy in the context of the specific problem being addressed. For example, when renewing infrastructure at the end of its life, optimising or improving infrastructure may meet more of the Investment Priorities and offer significantly greater value for money. Wider footpaths, reallocation of road space, retirement of infrastructure, segregated cycle infrastructure, and public transport priority on existing urban roads can all enable modal shift, which could reduce urban congestion and contribute to decarbonising the
### Table 3: NIFTI Intervention Hierarchy—Example Measures

<table>
<thead>
<tr>
<th>Description</th>
<th>Types of Measures</th>
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| **MAINTAIN** | • All protection and renewal investment for road, rail and active travel  
• Drainage works  
• Targeted maintenance and renewal measures where asset quality has reduced safety levels  
• Targeted maintenance and renewal measures to ensure asset accessibility  
• Climate resilience measures |
| ‘Maintain’ refers specifically to measures which protect the existing transport network, and keep it at the standard or capability at which it was designed. This includes all protection and renewal investment, and investments targeted at climate resilience. |
| **OPTIMISE** | • Intelligent Transport Systems  
• Demand management, including user charging  
• Park and ride  
• Parking supply measures  
• Electric vehicle charging infrastructure  
• Rail signalling or track-relay enhancements  
• Integrated ticketing  
• Improved real-time information |
| ‘Optimise’ refers to measures which are targeted at increasing levels of service of transport infrastructure through enabling and encouraging more efficient behaviour and sustainable use of the network. |
| **IMPROVE** | • Active travel improvements including wider footpaths, segregated cycleways, improved signalling  
• Railway line-speed or frequency improvements  
• Railway electrification  
• Targeted road safety improvements such as removing dangerous bends  
• Light/heavy rail station improvements to accommodate larger trains  
• Shifting modal shares of infrastructure through, e.g., dedicated bus corridors |
| ‘Improve’ refers to measures which increase the capability of existing infrastructure, through increasing the standards of that infrastructure, or measures which shift existing capacity to more sustainable modes. |
| **NEW** | • New roads, rail, or active travel infrastructure  
• Major road capacity upgrades, including upgrading a road from single to dual carriageway  
• Major rail capacity upgrades such as upgrading from single to double track, or constructing infrastructure (e.g., loops) to accommodate greater frequency or speeds. |
| ‘New’ encompasses all measures which entail significant increases to transport infrastructure capacity. |
Figure 7: NIFTI Intervention Hierarchy

4.4 | Conclusion

To ensure value for money, future investment in the transport system will continue to be subject to rigorous appraisal and the requirements of the Public Spending Code and sectoral guidance set out in the Common Appraisal Framework for Transport Projects and Programmes. Alongside these technical requirements, some of which are discussed in greater detail in Section 5, NIFTI puts in place Investment Priorities and Hierarchies to ensure the strategic alignment of future transport investment and to support the NPF.

The four NIFTI Investment Priorities address the challenges identified in the supporting analysis, informing investment decisions each year as well as longer-term capital planning. The priorities recognise that many of the challenges can be addressed, at least partially, by protecting and renewing existing assets so that they are maintained in an adequate condition and resilient to the impacts of climate change, particularly in locations served by a small number of vulnerable links. Meeting protection and
renewal requirements also helps ensure the value for money of past investment and encompasses necessary improvements to ensure safety and accessibility.

The priorities also recognise the urgency of decarbonising the transport sector. Addressing urban congestion through sustainable mobility measures will contribute to decarbonisation and an improved natural environment, quality of life and, alongside securing the use of strategic links for goods of high importance, support balanced economic development. Finally, targeted enhancements to connectivity can support positive outcomes relating to society, the environment, levels of service and the economy.

The NIFTI Investment Priorities are reflected in the Modal and Investment Hierarchies. Whereas the Investment Priorities identify the types of investment we will undertake, the Hierarchies establish how we will do so. Both Hierarchies are principles-based tools rather than strict rules. Investment planning will continue to be needs-based and objectives-led, and the Hierarchies will assist, at both the project and budgetary levels, to identify the most appropriate solution to a given problem. Their application in investment planning will be pragmatic, weighing up trade-offs between, for example, maximising the value of the existing network and developing new infrastructure for more sustainable modes of travel.
5 Implementation
To ensure the success of NIFTI, sectoral appraisal guidance will be updated so that the framework is reflected at the level of individual projects. Strategic Assessment Reports will be a key new output to demonstrate alignment with NIFTI, both at the level of individual schemes and when capital planning across schemes. To further inform future policy development, we will continue building the evidence base in priority areas.

5.1 | Introduction

NIFTI sets out the framework for investment in Ireland’s transport system over the next 20 years to support the NPF. The success of NIFTI requires a process that channels investment in accordance with the NIFTI Investment Priorities. Among other things, this process must include effective governance and oversight, clearly defined roles and responsibilities, and a rigorous project development process. The following section sets out some of the proposals for how NIFTI will be implemented in the coming years.

5.2 | Identifying Transport Investments

NIFTI puts in place a framework for future transport investment that is consistent with the NPF and which enables the delivery of the NSOs. Potential challenges to realising the NSOs have been identified and the resulting NIFTI Investment Priorities have been developed to meet these challenges, both today and in the future.

NIFTI does not identify specific projects for investment. It is also beyond the scope of NIFTI to prioritise specific geographic areas or themes for investment. The identification of specific transport projects and potential investments is guided by the NTA’s Metropolitan Transport Strategies, TII’s National Roads 2040 Plan and the Regional Spatial and Economic Strategies. However, the projects that emerge from these sectoral investment strategies will have to demonstrate their alignment with NIFTI to receive funding.
5.3 **Project Development**

The latest version of the Public Spending Code was published in December 2019. It sets out the value for money requirements for the evaluation, planning and management of public investment projects in Ireland. This includes the overall project development lifecycle, roles and responsibilities, approval and governance, and the tasks, processes and products that must be undertaken and delivered for a potential project to be approved to proceed to the next stage of the project lifecycle and, ultimately, to implementation.

Schemes that are identified as priorities within strategic plans may be given approval to proceed to the first stage of project development, the Strategic Assessment Stage. At this stage, scheme sponsors are required to set out the strategic case for projects. This includes the need for the scheme, the scheme objectives, and its alignment with policy. This information is brought together in a Strategic Assessment Report, alongside the preliminary identification of options and costs and an appraisal plan. To be approved to proceed to the next phases of project development, Strategic Assessment Reports will have to demonstrate that the scheme aligns with NIFTI and, by extension, the NPF more generally.

It will be a requirement for all new transport schemes that the Strategic Assessment Report sets out how the project aligns with the NIFTI Investment Priorities. Option development will also be considered within the investment Hierarchies, with justification required if more seemingly cost-effective or environmentally sustainable solutions are judged as inappropriate.

As the scheme advances through the project lifecycle, the sponsoring agency will be required to revise and update these assessments in light of new information and analysis so that the evidence used to identify the preferred option includes the strategic fit with NIFTI and the NPF.

**Implementation**

Sponsoring agencies will be required to demonstrate project alignment with NIFTI within Strategic Assessment Reports to proceed to the Preliminary Business Case stage. This analysis will be revised and updated throughout the project and programme lifecycles.

5.4 **Supporting the National Strategic Outcomes**

NIFTI’s Investment Priorities clearly set out the key areas for investment in Ireland’s transport network to address future challenges and facilitate the NSOs. Furthermore, the Modal and Intervention Hierarchies set out how we intend
for the necessary infrastructure to be developed efficiently and sustainably.

As well as ensuring we invest in the right things, it is important to ensure that transport planning is integrated with spatial planning, and that transport investment is correctly sequenced. Developing a sustainable transport network and delivering compact growth are complementary objectives. Limited urban space means public transport and active travel are necessary to deliver compact growth. Conversely, higher densities of people increase the viability of these types of transport modes.

While good transport planning is necessary to deliver spatial plans and vice versa, without careful planning, investments which help achieve certain objectives can inadvertently have a detrimental impact on others. For example, investments which have a transformative impact on interurban connectivity can lead to urban sprawl. Unintended consequences such as this can be avoided by ensuring that transport and spatial planning are correctly sequenced; that is, ensuring that the order in which investments are made drives the desired spatial planning outcomes. This means ensuring that development planning is coordinated and integrated across transport and other sectors.

An NPF National Policy Objective is that the statutory arrangements between spatial and transport planning that exist in the Greater Dublin Area are extended to other cities. This will help to ensure that transport investment decisions reflect population planning concerns. Moreover, the Department of Transport, in consultation with the Department of Housing, Local Government and Heritage, will consider how transport appraisal requirements around assessing spatial and land use considerations can be strengthened in our sectoral guidance. Advancing this work will be a priority after the new Common Appraisal Framework is published in 2022 and is likely to encompass considerations such as sequencing, parking availability and how potential adverse impacts of a given investment on one or more of the NIFTI Investment Priorities will be mitigated.

5.5 | Developing Investment Plans

The revised NDP has set out a public capital investment programme of nearly €165bn to help deliver on the ten NSOs, with €59bn of this expected to occur between 2021 and 2025. Of the €59bn, an indicative allocation of over €13bn has been earmarked for capital expenditure by the Department of Transport in the first five years of the plan.

As part of future capital planning exercises, Strategic Assessment Report output will improve the evidence base available to Government when comparing and prioritising projects against one another. The existing appraisal process helps to ensure that the best option, in terms of overall value for money, is selected to meet a specific project’s objectives, but is limited as a tool to compare projects against one another. Strategic Assessment Reports will, however, be used to inform decisions on overall capital planning. In the future, Strategic Assessment Reports will be produced for projects in the transport sector in advance of the commitment of major resources to a project.

Implementation Action

The Department of Transport will develop strengthened requirements around spatial and land use considerations as part of updated sectoral appraisal guidance.

Implementation Action

Strategic Assessment Reports will be developed at a sufficiently early stage to inform project prioritisation in long-term capital planning.
5.6 | Enhancing Transport Project Appraisal Guidance

Transport infrastructure will be a key enabler of the NSOs. It will also be more important than ever that value for money is achieved in public expenditure given the many competing priorities, both within transport and across other sectors. For these reasons, the approaches used to assess the strategic fit, costs, benefits and risks associated with schemes must be robust and fit for purpose.

The Common Appraisal Framework for Transport Projects and Programmes (CAF) sets out guidance for the appraisal of proposed transport investment in Ireland. It ensures scheme options are rigorously assessed, and thus supports the careful consideration of options by decision makers before any project is approved.

A new version of CAF is being developed alongside NIFTI. This update will include a review of all existing sector-specific guidance and detailed information on the sectoral implementation of new requirements within the Public Spending Code, as well as assessing the strategic fit of proposed projects with NIFTI. Once the new CAF is approved and published, the NIFTI Investment Priorities and Hierarchies will be applied at individual, project-level assessment and appraisal.

At each Decision Gate, a project’s strategic fit with NIFTI’s Investment Priorities will need to be assessed. Sponsoring agencies will also be required to demonstrate that the development and appraisal of options adhere to the principles of the NIFTI Hierarchies. Specific guidance on how to meet these requirements will be set out in the CAF.

04

Implementation Action
The CAF will be updated to strengthen the appraisal of proposed transport expenditure and ensure that NIFTI and the NPF are firmly embedded in the appraisal process.

5.7 | Continuing to Develop the Evidence Base

As summarised in Section 3 and set out in detail in the Background Papers, a substantial amount of supporting analysis has been undertaken to identify the challenges that the transport system faces, today and in the future, and inform our Investment Priorities.

As well as informing NIFTI, this supporting analysis has indicated areas where additional work is required. To further develop the evidence base for investment decision making, these topics will be prioritised for further research and policy development following publication of NIFTI.

Significantly increasing the number of electric and other low-emission vehicles on our roads over the next decade is a key component of reducing the Irish transport sector’s greenhouse gas emissions. Doing so supports our transition to a low-carbon society and falls within our Investment Priorities. However, continuing the existing set of financial supports for LEVs also creates a challenge as it imposes significant costs on the Exchequer. In this context, we will carry out research to identify options to increase LEV uptake to support the transition away from grant supports.

In order to achieve the level of EV and LEV penetration envisioned in the Climate Action Plan, it is also important to ensure that the necessary recharging and refuelling infrastructure is available to service these vehicles so as to avoid infrastructure deficits becoming a potential barrier to uptake. We will develop a national infrastructure strategy to deliver publicly accessible recharging and refuelling infrastructure for LEVs to stay ahead of demand, having particular regard to non-urban needs.

To decarbonise the transport sector, it will not be sufficient to reduce emissions from passenger travel. Emissions from the movement of goods must also fall. We will develop a comprehensive strategy for road haulage which will consider, among other things, measures to decarbonise road-based freight transport.

The supporting analysis has highlighted that annual protection and renewal costs to maintain the transport network are substantial.
Consequently, it cannot be guaranteed that all of these costs will be met in a given year, particularly in the context of wider fiscal constraints. Where protection and renewal costs cannot be entirely met, funding should be diverted to the most strategically important elements of the system, including lifeline infrastructure. On a sectoral basis, we will identify priority assets and infrastructure for protection and renewal, taking into consideration climate adaptation and evolving infrastructure uses, including for industry.

In trying to identify the future challenges on the transport network within the five cities, the transport modelling indicates that urban congestion will be an issue by 2040 without further intervention beyond that set out in the NDP. To inform the development of policy in this space, we will refresh the costs of congestion analysis for the Greater Dublin Area published in 2017. We will also carry out similar analysis for the other four cities.

While this analysis will help to estimate the economic impact of congestion in our urban areas it will not, in itself, suggest the appropriate policy response. In certain contexts, some form of demand management will be required to achieve our sustainability and decarbonisation goals. We will conduct research to better understand how to deliver demand management measures in a way that achieves a just transition and supports economic wellbeing.

Rail can be a highly efficient means of transporting large numbers of people in an environmentally sustainable way. To inform our future investment in this sector and the role for rail in delivering our strategic priorities, the All-Island Strategic Rail Review is currently underway and is expected to be published in 2022.

Technological and social changes have the potential to significantly alter the way people and goods travel around Ireland. These changes can take place slowly over time or rapidly in response to an unanticipated shock, such as COVID-19. Moreover, the short-term changes brought about by a shock can serve to accelerate and consolidate longer term trends. It is therefore important that transport planning considers a range of possible scenarios to identify the investment requirements of the network. We will continue to develop our understanding of the challenges and opportunities facing the sector. We will ensure that scenario planning is appropriately incorporated into the consideration of proposed investments.

A central motivation for NIFTI is to ensure that future investment in land transport supports the delivery of the National Planning Framework. While the Investment Priorities set out in NIFTI support the realisation of, for example, compact growth and regional rebalancing, more work can be done to ensure the coordination of public investment across the transport and planning systems. With the Department of Housing, Local Government and Heritage, the Land Development Agency and the National Transport Authority, we will work to identify the housing potential associated with planned or proposed transport infrastructure in our urban centres.

5.8 | Monitoring and Oversight

The success of NIFTI will depend on how effectively the framework and its priorities are implemented at the level of individual transport projects. To make certain that this happens, appropriate monitoring and oversight of the implementation of NIFTI will be required within the Department of Transport and its agencies.

Within the Department of Transport, a NIFTI implementation group will be established to monitor progress against the Implementation Actions and Policy Actions. In addition, the Department has existing arrangements in terms of oversight of capital investment. These will be adapted as necessary to include monitoring ongoing and future investments against the delivery of the four NIFTI Investment Priorities.

In addition to monitoring the implementation of NIFTI’s follow-up actions and future sectoral investment to ensure it aligns with the NIFTI Investment Priorities, the NIFTI implementation group will be responsible for reporting on the implementation of the SEA Monitoring Framework. This will include monitoring that Departmental divisions with investment and/or oversight responsibilities ensure project Sponsoring Agencies consult with the appropriate statutory bodies where a project has transboundary impacts in Northern Ireland. In the event that potential for significant
Table 4: Priority Areas for Further Analysis and Policy Development

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impacts is identified, the group will verify, through the appropriate Departmental division, that Sponsoring Agencies have identified and undertaken necessary remedial actions.

Through the appropriate Departmental divisions, the implementation group will monitor and report on Sponsoring Agencies’ compliance with the relevant environmental screening and appraisal requirements, appropriate planning processes, inherent mitigation and construction best practices in respect of future transport investment. This will be part of the Department of Transport’s ongoing compliance with environmental regulations.

The Department of Transport is committed to mainstreaming environmental requirements and objectives into early-stage decision making, and this is reflected in its sectoral appraisal requirements, the CAF. In line with the recommendations identified through the SEA process, the Department will seek to strengthen and further integrate environmental considerations within the updated CAF.

5.9 | Conclusion

Future transport investment will be assessed for its alignment with NIFTI. The CAF is in the process of being updated in parallel with NIFTI to ensure that the Investment Priorities and Hierarchies, and by extension the NPF and NSOs more widely, are embedded at the level of individual projects.

At the Strategic Assessment Stage of the project lifecycle, sponsoring agencies will have to demonstrate how their scheme aligns with NIFTI to advance to the Preliminary Business Case stage, and this analysis will be subject to ongoing updating and refinement as the project progresses. Furthermore, through the future development of our sectoral appraisal guidance, sponsoring agencies will be required to consider the spatial implications of transport proposals, how investment is sequenced, and to develop mitigation strategies for potential negative impacts of a project against the NIFTI Investment Priorities as appropriate. Strategic Assessment Reports will also be a key input into long-term capital planning, helping decision-makers prioritise across potential investments at an early stage.

Finally, while a considerable body of evidence has been collected to inform NIFTI, it is recognised that more work is required in certain areas. As a priority, we will pursue additional analysis and policy development in areas such as encouraging electric vehicle adoption, the decarbonisation of the road haulage sector, prioritising protection and renewal investment, congestion and demand management, the future development of the rail network, and ensuring our investment decisions are robust to unanticipated shocks.
Assessing Environmental Impact
Assessing Environmental Impact

Several environmental assessments have been conducted in support of NIFTI to identify the potential environmental impacts of future investment made in accordance with the framework. We will ensure that future proposed transport projects take account of the environmental issues identified through our updated sectoral appraisal guidance, and we will monitor the impacts of NIFTI on the environment over time.

6.1 | Introduction

The preparation of NIFTI has been an iterative process. A number of environmental assessments have been carried out in parallel with its development. These assessments include a Strategic Environmental Assessment (SEA), Appropriate Assessment (AA) and Strategic Flood Risk Assessment (SFRA). All three assessments have informed the development of NIFTI and provided the basis for considering high-level environmental issues and mitigation measures to be embedded in the future implementation process.

6.2 | Strategic Environmental Assessment

<table>
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<tr>
<th>Description</th>
<th>Types of Measures</th>
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<tbody>
<tr>
<td><strong>Population, Human Health and Economy</strong></td>
<td>Protect and enhance human health and quality of life in relation to increasing accessibility to economic, employment and community facilities through enhanced transport infrastructure and contributing to reduced transport emissions.</td>
</tr>
<tr>
<td><strong>Tourism and Recreation</strong></td>
<td>Protect recreation areas and amenity facilities and support and enhance access for tourism and recreation.</td>
</tr>
<tr>
<td><strong>Biodiversity, Flora and Fauna</strong></td>
<td>Protect and, where appropriate, enhance terrestrial, aquatic and soil biodiversity, particularly EU and national designated sites and protected species, and associated ecological corridors.</td>
</tr>
<tr>
<td><strong>Landscape and Visual Amenity</strong></td>
<td>Safeguard the character and diversity of the Irish landscape and minimise the visual effects on sensitive, designated landscapes and public views.</td>
</tr>
<tr>
<td><strong>Cultural Heritage</strong></td>
<td>Protect cultural heritage resources and their settings.</td>
</tr>
<tr>
<td><strong>Geology and Soils</strong></td>
<td>Protect geological sites of value and contribute towards the appropriate management of soil resources and quality.</td>
</tr>
<tr>
<td><strong>Air Quality</strong></td>
<td>Contribute to the reduction of air pollution (and improvement of air quality) resulting from transport.</td>
</tr>
<tr>
<td><strong>Noise and Vibration</strong></td>
<td>Contribute to mitigation of noise pollution issues resulting from transport.</td>
</tr>
<tr>
<td><strong>Water Environment</strong></td>
<td>Support the achievement of Water Framework Directive objectives and avoid increasing flood risk.</td>
</tr>
<tr>
<td><strong>Land Use and Material Assets</strong></td>
<td>Promote the sustainable use of natural resources (including land), encourage energy efficiency, materials reuse and recycling and the effective use of existing infrastructure.</td>
</tr>
<tr>
<td><strong>Climate Change (Mitigation)</strong></td>
<td>Minimise contributions to climate change (through reducing greenhouse gas emissions and decarbonisation of the transport fleet) as a result of construction of new and/or upgraded transport infrastructure or operation of existing and new transport networks and fleets.</td>
</tr>
<tr>
<td><strong>Climate Change (Adaptation)</strong></td>
<td>Ensure that resilience to climate change is incorporated within the existing transport network and any proposed new transport infrastructure and that environmental resilience to climate change is supported.</td>
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</table>
6.2.1 | Purpose of the SEA

The purpose of an SEA is to incorporate environmental considerations into decision-making at an early stage and throughout the planning process. SEA aims to:

- Identify, evaluate and describe the potential significant effects of NIFTI on the environment
- Communicate effects and mitigation, and provide a framework for the effective monitoring of mitigation
- Identify beneficial (and neutral) effects
- Provide an opportunity for stakeholder and public involvement in the NIFTI development process.

6.2.2 | Summary of the Assessment Approach

A review of policy and plans was undertaken for each topic listed in the SEA Directive, and this informed the identification of key environmental issues relevant to NIFTI and the SEA, and the development of high-level SEA objectives for each topic. These SEA objectives provided a framework for the assessment of potentially significant effects of NIFTI and are detailed in Table 5. They will also be used to provide mitigation and recommendations to monitor any impacts of NIFTI.

The assessment involved several steps:

- A compatibility analysis of the SEA objectives with the NIFTI framework
- Assessment of the Investment Priorities and Hierarchies against the SEA objectives to determine potential adverse and beneficial effects
- Assessment of potential cumulative effects between NIFTI Investment Priorities and other plans and programmes
- Assessment of the proposed NIFTI and consideration of reasonable alternatives
- Recommendations for the implementation of NIFTI in line with the SEA objectives

6.2.3 | Findings of the SEA

The SEA assessment documented in the SEA Environmental Report has highlighted a number of potential impacts associated with the outcomes, Investment Priorities and Hierarchies proposed by NIFTI.

Negative Impacts include, but are not limited to:

- Short-term/localised negative impacts on water quality and increased noise pollution during construction.
- Localised increases in pollution or increased CO₂ emissions, or localised climate vulnerability such as flooding.
- Long-term impacts on biodiversity, landscape or cultural heritage features as a result of new infrastructure developments.
- Long-term impacts as a result of land-take and changes in land use required for new developments.

Positive Impacts include, but are not limited to:

- Positive impacts to population and human health as a result of increased safety, with improvements to signage, adequate road surfacing, junction upgrades or realignment works.
- Benefits for the economy, tourism and regional connectivity providing better social inclusion.
- Reduced carbon emissions and improved air quality as a result of sustainable mobility developments.
- Reduction in localised noise pollution and vibration as a result of development in sustainable and active travel modes and actions to promote electric vehicles.

For further detail on the assessment of NIFTI, see Section 8 of the Environmental Report.
6.3 | Appropriate Assessment

In addition to compliance with the SEA Directive, the preparation and implementation of NIFTI must meet the provisions of the EU Habitats Directive (92/43/EEC) and transposing regulations (European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

6.3.1 | Purpose of the AA

The purpose of the Appropriate Assessment is to determine the potential adverse effects of a plan or project (in combination with other plans or projects) on Special Areas of Conservation and Special Protection Areas. These sites are protected by national and European law. Data and information on the plan and an analysis of potential effects on the site must be obtained and presented in a Natura Impact Statement (NIS).

6.3.2 | Findings of the AA

The conclusion of the NIS for NIFTI is that, following detailed assessment and appropriate mitigation for protecting European sites and their associated species and habitats, there will be no adverse effects on the integrity of any European sites, either alone or in-combination with other plans or projects.

Any projects arising from the implementation of NIFTI will be required to conform to the mitigation measures and key principles for protecting European sites identified within the NIS. In addition, all projects arising from the implementation of NIFTI will themselves be subject to screening for AA and potential AA when details of locations and design become known.

6.4 | Strategic Flood Risk Assessment

The Planning System and Flood Risk Assessment Guidelines were published in 2009 by the Office of Public Works in conjunction with the Department of the Environment, Heritage and Local Government. The Guidelines are to be used at all levels of government when preparing development plans, from national strategies to individual planning applications.

6.4.1 | Purpose of the SFRA

Failure to properly assess flood risk in previous land use strategies has caused economic, social and environmental issues due to land in unsuitable locations being developed, without appropriate consideration to flood risk and flood risk mitigation.

The objective of SFRA is to ensure the framework for determining investment decisions on the transport network takes account of flood risk in catering for future growth and can address planning and infrastructural needs required to facilitate projected growth.

The Flood Risk Guidelines are core to the development of the SFRA. The Guidelines introduce the concept of the ‘sequential approach’, which is a tool used in the planning process to ensure developments are directed towards land at low risk of flooding. NIFTI is required to demonstrate adherence to the sequential approach through the selection of investment opportunities and routes which are sympathetic to existing flood risk.

6.4.2 | Findings of the SFRA

This SFRA has identified that NIFTI, and infrastructure projects that sit beneath it, have the potential to result in significant adverse impacts on flood risk without appropriately considered development and mitigation. These issues relate primarily to infrastructure creep in flood zones, increased surface water runoff, and an increase in the vulnerability of the transport network.
NIFTI acknowledges this challenge and the example outcomes and Investment Priorities of NIFTI set out a clear ambition to direct future investments down a more sustainable path. This includes the desire to protect and renew existing transport networks to increase resilience, adapt to climate change, and establish a reliable and environmentally sustainable network.

The SFRA sets out a list of criteria against which future investments under NIFTI will be assessed. These criteria are designed to complement the existing Flood Risk Guidelines. They are aligned to the sequential approach and will ensure that the potential for significant adverse impacts on flood risk are avoided. The purpose of this is to ensure that a robust and comprehensive assessment of flood risk is undertaken and is at the forefront of future decision-making to facilitate sustainable development.

### 6.5.1 Exploring Alternatives to NIFTI

A key part of the development of NIFTI has been to consider alternative frameworks that can still meet the challenges facing the transport sector and its ability to enable the NSOs. Three plan alternatives were considered, as summarised below.

**Alternative 1: No Plan – Do Nothing**

In the absence of NIFTI, the 2015 Strategic Investment Framework for Land Transport would remain the Department of Transport’s framework to guide and inform investment decision-making. SIFLT established three, ranked priorities:

- Achieve Steady State Maintenance
- Address Urban Congestion
- Maximise the Value of Existing Land Transport Networks

The key issue with continuing with SIFLT is that its Investment Priorities are reflective of a different context. This is true both in terms of investment levels, with SIFLT developed during a period of fiscal constraint, and with regard to overarching Government policy, with the publication of the NPF and Climate Action Plan in the years since 2015.

**Alternative 2: With Plan – Update SIFLT**

One solution to ensure that future investment reflects the changed context since the publication of SIFLT is to update the Investment Priorities to ensure their alignment with the NPF. Within NIFTI, four Investment Priorities have been identified which will help ensure that future investment in transport enables the delivery of the NSOs:

- Decarbonisation
- Protection and Renewal
- Mobility of People and Goods in Urban Areas
- Enhanced Regional and Rural Connectivity

Updating SIFLT with these four priorities helps to ensure transport investment supports the NPF, and the inclusion of decarbonisation better reflects the Climate Action Plan and the increased urgency of that policy objective throughout Irish society.
However, continuing with a ranked approach to Investment Priorities does not reflect the changed fiscal context, where protection and renewal costs will largely be met in the coming years and greater focus must be placed on how best to invest funding above this amount. Moreover, strictly applying a ranked set of priorities could lead to protection and renewal being pursued to the detriment of the other priorities. For example, protecting and renewing existing assets will not be sufficient to deliver the sustainable mobility options required to decarbonise the transport sector.

Alternative 3: With Plan – NIFTI (Preferred Plan)

NIFTI represents a complete review of the national transport investment framework and update to SIFLT. In common with Alternative 2, four new Investment Priorities have been identified from the background analysis to support the NPF. However, these priorities are not ranked. Future investment in transport will have to demonstrate its alignment with at least one of these priorities, and projects that align with several of them will generally be preferred, but it is no longer the case that protection and renewal is the first priority in all cases. This gives NIFTI greater flexibility over pursuing broader transport investment objectives.

Compared to SIFLT, NIFTI also introduces investment Hierarchies which will ensure the most environmentally sustainable solution to a given problem is deployed. In addition, maintenance and optimisation of existing assets will be preferred to the construction of new infrastructure, with the latter likely to have greater environmental impact in most cases.

NIFTI also sets out the revised transport sector structures and processes which will ensure that individual transport projects are aligned with the overarching vision of the NPF. Finally, NIFTI sets out a series of follow-up actions for research and policy development which will ensure that we continue to build the evidence base for transport investment in the coming years.

6.5.2 | Summary of SEA Recommendations

Several environmental recommendations are set out within the SEA Environmental Report. These include:

- Integrating SEA objectives into the NIFTI implementation process, including specific requirements to take account of SEA key issues, objectives and recommendations in:
  - Regional and local land use and transport strategies
  - The application of the CAF for strategic options comparison
  - The development of an updated CAF
- Developing guidance on meeting the requirements of NIFTI and the SEA, directed at each tier of decision-making from regional and local plans to project-level standard management and mitigation measures
- More detailed and regular monitoring of transport modal share and traffic movements over the coming years to monitor changes in behaviours, including as a result of the COVID-19 pandemic
- Consulting with stakeholders to identify constraints, requirements and opportunities for future transport plans
- The NIFTI implementation group should undertake annual monitoring and reporting of the performance of NIFTI against SEA targets. The group should meet annually with the transport agencies to discuss the findings and any necessary actions to mitigate impacts which occur
- Findings of the monitoring plan should be reported within future NIFTI plans/SEA
- Reviewing the SEA objectives and targets as part of lessons learned for the next national transport investment framework to reduce assessment uncertainty and delivery risk
- Feeding information gathered into the next national transport investment framework.
6.5.3 | Monitoring NIFTI

The SEA Environmental Report has provided a monitoring framework for monitoring the environmental impacts of NIFTI and future transport investment. This framework includes a number of targets and indicators for each SEA objective as well as information sources for data required for monitoring.

This includes, but is not limited to, monitoring the following:

- The decrease or increase in road accidents as outlined in the Road Safety Strategy 2021-2030
- The proportion of people reporting regular commuting by active travel
- The number of unmitigated conflicts with the appropriate protection of statutory designations relating to the landscape, including those within the land use plans of Local Authorities
- Greenhouse gas emissions from transport
- The percentage increase of non-hazardous construction and demolition waste used as a substitute material in road construction.

6.6 | Conclusion

Investment in the transport network and infrastructure can have a range of environmental impacts, both positive and negative. To ensure that future investment taken in accordance with NIFTI maximises the beneficial environmental impacts of transport, as well as mitigating potential negative impacts, our updated transport sectoral appraisal guidance will reflect the issues identified in the SEA, AA and SFRA and require project sponsors to give strong consideration to environmental issues. We will track key metrics and indicators over time to ensure that NIFTI is delivering its environmental objectives, and this information will also inform future reviews and updates of the national land transport investment framework.
List of Abbreviations

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<tr>
<td>AA</td>
<td>Appropriate Assessment</td>
</tr>
<tr>
<td>C-ITS</td>
<td>Cooperative Intelligent Transport System</td>
</tr>
<tr>
<td>CAF</td>
<td>Common Appraisal Framework for Transport Projects and Programmes</td>
</tr>
<tr>
<td>CAV</td>
<td>Connected and Autonomous Vehicles</td>
</tr>
<tr>
<td>CCAC</td>
<td>Climate Change Advisory Council</td>
</tr>
<tr>
<td>CNG</td>
<td>Compressed Natural Gas</td>
</tr>
<tr>
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<td>Dublin Area Rapid Transit</td>
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<tr>
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<tr>
<td>e-MOS</td>
<td>enhancing Motorway Operation Services</td>
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<tr>
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</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>ETS</td>
<td>Emissions Trading System</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct investment</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GNI*</td>
<td>Modified Gross National Income</td>
</tr>
<tr>
<td>ITF</td>
<td>International Transport Forum</td>
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<tr>
<td>LEV</td>
<td>Low-Emission Vehicle</td>
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<tr>
<td>MaaS</td>
<td>Mobility as a Service</td>
</tr>
<tr>
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</tr>
<tr>
<td>NDP</td>
<td>National Development Plan</td>
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<td>National Emissions Ceiling Directive</td>
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<td>National Investment Framework for Transport in Ireland</td>
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<td>NIS</td>
<td>Natura Impact Statement</td>
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<td>National Planning Framework</td>
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<td>National Strategic Outcome</td>
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<td>Public-Private Partnership</td>
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References


2 As well as the five cities, the National Planning Framework defines Athlone, Drogheda, Dundalk, Letterkenny and Sligo as important regional centres.

3 As well as land transport, this allocation includes funding for aviation, maritime transport, sports and tourism. Historically, however, land transport is by far the largest area of capital expenditure within this group, averaging 94% of the total from 2010 to 2019.


13 The Central Statistics Office defines a town as an urban area with a population exceeding 1,500 people.


15 An Environmental Report is undertaken on a specific environmental issue when EIA is not required.

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Galway, City Centre, Eyre Square (Section 2) by Professor Chaosheng Zhang