

Energy Strategy: Transport Research

Active Travel and Modal Shift
Final Report

Department for Infrastructure (DfI)

Project number: 60655485

16 August 2021

Quality information

Prepared by	Checked by	Verified by	Approved by
Claire McComish Senior Consultant	Peter Morrow Associate Director	Richard Adams Associate Director	Peter Morrow Associate Director

Revision History

Revision	Revision date	Details	Authorized	Name	Position
0	25.06.21	Draft Issue for Client Comment	PM	Peter Morrow	Associate Director
1	19.07.21	Revised Issue following Client Comment	PM	Peter Morrow	Associate Director
2	16.08.21	Final Issue following Client Comment	PM	Peter Morrow	Associate Director

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:
Department for Infrastructure (DfI)

Prepared by:
Claire McComish
Senior Consultant
T: 02890607200
E: claire.mccomish@aecom.com

AECOM Limited
9th Floor, The Clarence West Building
2 Clarence Street West
Belfast BT2 7GP
United Kingdom

T: +44 28 9060 7200
aecom.com

© 2021 AECOM Limited. All Rights Reserved.

This document has been prepared by AECOM Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

Table of Contents

1.	Introduction	6
1.1	Introduction.....	6
1.2	Report Structure	6
2.	Literature Review.....	7
2.1	Introduction.....	7
2.2	Design and Policy.....	7
2.3	Implementation.....	9
2.4	Push Measures	10
2.5	Costs	13
2.6	Benefits	15
2.7	Covid-19 Schemes and Impacts.....	16
3.	Barriers, Opportunities and Options.....	17
3.1	Introduction.....	17
3.2	Consultation	18
3.3	Barriers.....	19
3.4	Opportunities	20
3.5	Options	21
4.	How to Guide	22
4.1	Introduction.....	22
4.2	Targeted Interventions.....	23
4.3	Integrated Approach to Programme Design	26
4.4	Linking Communities	28
4.5	Smarter Choice Measures.....	28
4.6	Accessibility to Public Transport.....	30
4.7	Costing and Funding	31
4.8	Active Travel Delivery.....	32
5.	Recommendations.....	32
5.1	Introduction.....	32
5.2	Recommendations	33
	Appendix A – Barriers to Active Travel.....	35
	Appendix B – Opportunities for Active Travel	38
	Appendix C – Options for Active Travel.....	40
	Appendix D – Resources / References	43

Figures

Figure 1 – Active Travel Steps to Delivery.....	22
Figure 2 – Transport Modal Hierarchy.....	27

Tables

Table 1 – Push Measures Indicative Costs.....	13
---	----

Table 2 – Typical Cycling Infrastructure Costs.....	14
Table 3 – Active Travel Options.....	21
Table 4 – Funding Opportunities	32

1. Introduction

1.1 Introduction

- 1.1.1 A key focus within the Energy Strategy is the need to reduce emissions. Transport is the second largest emitting sector in Northern Ireland, comprising 23% of emissions (2018 data; agriculture is the largest at 27%).
- 1.1.2 Transport will therefore have a significant role in delivering future carbon reductions, and it is important to understand that the decarbonisation of vehicles will not solely achieve the reductions required. The Sixth Carbon Budget¹ recently noted that change will have to occur through a combination of low carbon technologies *and* societal and behavioural changes.
- 1.1.3 Reducing demand for private car use primarily via modal shift, will therefore be critical for carbon reduction targets, so it is important to understand what interventions and approaches can be taken to increase active travel and public transport use in Northern Ireland.
- 1.1.4 We are however going from a low base. The most recent NI Travel Survey has shown that the number of trips made by car in NI recently increased by around 1%, with the distance travelled by car surging by 9%. Furthermore, 77% of commuting trips are made by car in NI, a full 16 percentage points more than in England.
- 1.1.5 At the same time, just 1% of journeys are made by bicycle (half of that in England) with 18% on foot (a full six percentage points lower than in England). Perhaps most disappointingly, the quarter share of all journeys that are made by walking, cycling or public transport has not increased over the last 10 years therefore it can be concluded that modal shift is just not happening here in Northern Ireland.
- 1.1.6 Looking forward, we need to make tough choices to achieve the sizeable change required following the commitment from the UK Government in June 2019 to achieve a 100% reduction in greenhouse gas emissions by 2050. In order to achieve the required reductions in vehicle emissions there is now an urgent need to reduce the distance travelled by private car in Northern Ireland.
- 1.1.7 This means appropriate infrastructure, but also a battle to change mindsets and to make our towns and cities reflective of our transport priorities. We need to provide society with realistic choices so that the car is not the default travel mode, enabling people to make smarter travel decisions.
- 1.1.8 This research report discusses a range of interventions from around the world, before considering which could be applied here to achieve the maximum benefits. It also includes a high level 'how to' guide to aid decision makers in the delivery of the requisite measures.

1.2 Report Structure

- 1.2.1 This report is made up of the following chapters:

¹ Sixth Carbon Budget (Dec 2020), The Path to Net Zero, Climate Change Committee

- Chapter 2 discusses the findings of the research literature review;
- Chapter 3 considers barriers and opportunities for active travel and also outlines feasible options;
- Chapter 4 sets out a How to Guide for active travel delivery; and
- Chapter 5 outlines the recommendations and next steps for active travel delivery in Northern Ireland.

2. Literature Review

2.1 Introduction

2.1.1 A literature review has been undertaken on the extensive and growing body of research regarding the benefits of active travel.

2.1.2 Around 80 documents have been reviewed and considered across six broad themes discussed in this chapter.

2.2 Design and Policy

2.2.1 The built environment influences how people travel; therefore, designers and policymakers have opportunities to make changes in that environment to enable and support healthier and more active communities. Previous thinking prioritised significant infrastructure for motorised transport to ensure efficient progression through the network based on predictions of future travel demand by such modes.

2.2.2 However, such an approach has proven to be a barrier to sustainable transport, often because appraisal criteria has been biased towards certain modes. There has also been poor community engagement due to complex processes and a lack of understanding, lack of co-ordination and fragmented governance².

2.2.3 The prioritisation of motorised transport has also affected the planning and development of our neighbourhoods and the wider public realm. The increasing cost-effectiveness and convenience of car travel has had huge impacts on the design of our towns, cities and rural communities, often leading to the decentralisation of urban activities (such as out-of-town shopping centres and business parks). This has resulted in an increasing need to travel by private car to access employment and services. Car travel has therefore replaced many journeys formerly made by walking or cycling, as people have travelled longer distances more frequently. Along with the use of cars for short journeys, these are the key factors in the decline of physical activity levels over the past 40 years³.

2.2.4 Public transport accessibility in Northern Ireland is much better than is often perceived. Recent work on Local Transport studies has shown that 68% of Northern Ireland's population can access a town within 30 minutes by public transport during the morning peak period. It is apparent that people already have a number of realistic travel options, the issue is that the private car is still often the default choice.

² CIHT Better Planning, Better Transport, Better Places

³ Public Health England – Working Together to Promote Active Travel

2.2.5 In Northern Ireland, around 100 years ago there was a roughly equal split between those living in rural and urban areas. In the intervening period this has shifted to nowadays seeing two-thirds of people living in urban areas. However, commuting in order to access work opportunities has increased in that time. So, whilst it has been easier for those in urban areas to avail of sustainable travel options and/or have shorter commutes, those in rural areas are and will always be more car dependent.

2.2.6 The impact of land-use planning on transport cannot be underestimated, and an examination of societal aspirations for development and the subsequent application of planning policy suggests an unsustainable situation. Research by Ulster University's Property & Planning Centre in 2019⁴ noted that between 2015-18, of the 15,000 residential planning applications lodged in NI, nearly 70% were in greenfield in locations despite accounting for just 22% of the total number of units.

2.2.7 Of those applications in rural areas, 85% were approved. This invariably represents car dependent development, and as a volume of additional traffic on the road network it roughly equates to the daily flow on the Westlink in Belfast.

2.2.8 Streets and roads make up around three quarters of all public space; their design, appearance, and the way they function has a huge impact on the quality of peoples' lives, as well as economic and social vitality and environmental sustainability⁵.

2.2.9 The Manual for Streets guidance changed the Government's approach to the design and provision of residential and other streets. This included a hierarchy of provision that put walking and cycling at the top, and following its principles helped design places that encouraged active travel⁶. Due to changes in the national planning framework, issues with delivery of development and the Covid-19 pandemic, the guidance is being updated as part of the first steps in considering how street design may need to evolve to accommodate new vehicles and new ways of using roads⁷.

2.2.10 The LTN 1/20 Cycling Infrastructure Design document was published in 2020 by the Department for Transport (DfT), reinforcing the UK Government's message that highway

LTN 1/20

Key Concepts:

- Cycling infrastructure should be accessible to all
- In urban areas, cyclists should be separated from both vehicles and pedestrians with segregated infrastructure
- Cycling infrastructure should be designed for high volumes
- Future highway schemes will be expected to improve facilities for cycling
- Cycling infrastructure must join with other facilities creating a connected network

⁴ Creating a more effective and sustainable housing development model for NI, UURPC

⁵ Chartered Institute of Highways and Transportation (CIHT)

⁶ DfT & DCLG (2007/2010) Manual for Streets & Manual for Streets 2

⁷ DfT Future of Mobility: Urban Strategy

authorities and designers must aim to make cycling a form of mass transit across the UK. This requirement for higher standards has resulted in this national guidance for England and Northern Ireland which outlines the significant redesign in cycling infrastructure that is now expected as standard and which if not met will result in refusal or withdrawal of Government funding.



Over the last three decades, cycling policies in the Netherlands aimed at increasing accessibility and facilities for cyclists and have resulted ***in bicycles being used for 27% of all journeys nationwide***
 Ministry of Transport – Cycling in the Netherlands

2.2.11 Whilst UK policy has been moving in the right direction of prioritising and enabling active travel and modal shift over the past decade, there is potential for new approaches such as deciding on a preferred future and providing the means to help move towards that future⁸.

2.2.12 New approaches in the shift towards non-standard cycles is also gaining momentum with the recent legislation in Northern Ireland to allow use of E-bikes on public roads without the need for registration and licensing⁹. E-scooters whilst not included in the approved legislation are proving popular for recreational use and in London the government undertook safety trials during July 2020 to gauge viability for legislation.

2.3 Implementation

2.3.1 Transport authorities throughout the UK and Ireland note effective implementation plans for schemes should state:

- The scheme's aims
- Detailed actions of what the scheme will entail
- Funding needs and availability
- What results are expected to be achieved
- Timescales
- Indicators to monitor progress against objectives¹⁰

2.3.2 The implementation of active travel measures can be politically challenging as there may be multiple authorities, interest groups, organisations and users who are involved in the implementation of policies and measures and have differing opinions on priorities and delivery.

2.3.3 Institutions which are responsible for the implementation of road space reallocation schemes can often have conflicting performance targets and there are differing technical ideologies across decisions makers which can collectively act as barriers to successful scheme implementation¹¹.

⁸ TRICS Decide and Provide Guidance Note

⁹ Electrically Assisted Pedal Cycles (Construction and Use) Regulations (Northern Ireland) 2020


¹⁰ Northern Ireland Executive Sustainable Development Strategy – Everyone's Involved

¹¹ Multimodal Optimisation of Road Space in Europe Road Space Reallocation: Organisational, Institutional and political dimensions

- 2.3.4 A study conducted by the Journal of Transport and Health notes that areas with high baseline levels of active travel will generate schemes with high benefit to cost ratios and are therefore more likely to gain investment, in comparison to areas with little / no existing infrastructure who may be less likely to receive investment. This is therefore a barrier to the implementation of active travel infrastructure in some areas which perpetuates inequalities in infrastructure availability¹².
- 2.3.5 The DfT highlights that local knowledge from key members and groups should not be underestimated and that it should be utilised from the initial stages of scheme development in order to develop a solution suitable to the needs of an area and minimise concerns from the public¹³.
- 2.3.6 Transport for Scotland (TfS) recommends early engagement with the local communities through focus groups and social media in order to gather scheme support. TfS also note that engagement with marginalised or lower income groups is important as they are often the people who benefit most from low cost, low emission transport, but yet face barriers to using the schemes. For example, the Bikes for All project in Glasgow utilised a range of measures to overcome these barriers, including offering women-only training and investing time to build relationships with important community groups¹⁴.
- 2.3.7 Safety is a key consideration of any scheme, however We are Cycling UK note that contra-flow cycle lanes are regularly prevented from being implemented due to the failure of road safety audits to objectively consider the risks to cyclists, or acknowledge the wider safety benefits of diverting cyclists away from alternative heavily trafficked routes. Therefore, the true risk to cyclists should be assessed with the implementation of appropriate safety measures where hazards have been identified. For example, in 2004 in Belgium the Minister for Transport made contra-flow cycle lanes mandatory on one-way streets as a road safety measure, unless there were legitimate reasons to not implement them¹⁵.

2.4 Push Measures

- 2.4.1 It is important that schemes are delivered, however, managing transport demand at both a localised and strategic level is a means of discouraging the use of private vehicles and in turn promoting the usage of active modes of transport.
- 2.4.2 The Chartered Institution of Highways & Transportation (CIHT) published the Parking Strategies and Management guidance in 2005, highlighting



When something is free, we naturally demand more of it. Free resources induce demand. When it's free for everyone, and everyone is demanding more of it because it's free, there can never be enough. Free parking is a self-fulfilling prophecy creating an appetite that can never be satiated

Propmodo: Cities are Finding a Good Spot to Rethink Parking Minimums

¹² Journal of Transport and Health A Natural Experimental Study of New Walking and Cycling Infrastructure across the UK: The Connect2 Programme

¹³ Department for Transport Local Sustainable Transport Fund Case Study Evaluation – Impact of Sustainable Transport Measures on Town Centres

¹⁴ Transport for Scotland Guidance for Community Bike Share Schemes

¹⁵ We are Cycling UK Contra-flow Cycling

the need to understand the different ways in which parking can, and should be, used to contribute to wider policy objectives.

NI Example – Fermanagh & Omagh District Council Parking Strategy 2017

Study: Considered provision, management & operational strategies, pricing strategies, and staff car parking.

Council Action: Revised provision, location dependent pricing strategies and improved signage

Results: Long stay parking decreased by ~10%, and space availability increased in premium car parks by ~20% after implementation

- 2.4.3 The document highlights that parking has major influence on the transport choices people make and can be used as a key demand management tool¹⁶. Control over the availability and price of parking spaces is a key instrument in limiting car trips, thereby encouraging the relative attractiveness of other modes.
- 2.4.4 The British Parking Association (BPA) also notes the need for effective parking management and enforcement in our towns and cities, as unrestricted parking generates congestion and pollution through vehicle circulation, and there is a need to recover the costs associated with maintaining car parks¹⁷.
- 2.4.5 Professor Donald Shoup, a world expert in approaches to parking, notes that the provision of free or cheap parking in town centres encourages people to drive and increases vehicle circulation. Parking Benefit Districts (PBDs) are a concept that allow users to pay the market price for parking and the revenue that is generated can be used to pay for public services which can generate investment in the local area¹⁸. For example, the scheme was introduced in Old Pasadena in 1993 to finance a \$5m streetscape and alleyway improvement project. In 2001 the city's 690 parking bays yielded \$1.3m in revenue which was utilised to repay the improvement project as well as funding local public services¹⁹.
- 2.4.6 The implementation of Workplace Parking Levies (WPLs) is a pricing mechanism which allows local authorities to levy a charge on organisations for the number of parking bays they provide for employees. The revenue generated from WPLs is then reinvested in local measures for improving sustainable transport. WPLs are typically introduced as part of a package of transport interventions as the potential positive impacts of the scheme are likely to be less pronounced in comparison to other road pricing mechanisms²⁰.
- 2.4.7 A congestion charging scheme is a defined area whereby users are charged payment for daily entry into the zone during its operational hours. The scheme was introduced in central London in 2003, alongside complementary public transport and traffic management measures, with the aim of reducing congestion and encouraging a modal shift towards the use of sustainable travel modes. Transport for London (TfL) monitored the impacts of the scheme and found that traffic in the central zone had reduced by 20%, there were 40-70 fewer traffic accidents per

¹⁶ CIHT Parking Strategies and Management Guidelines 2005.

¹⁷ British Parking Association Rethink Parking on the High Street: Guidance on Parking Provision in Town and City Centres

¹⁸ Donald Shoup Parking Benefit Districts 2016

¹⁹ Donald Shoup Parking Benefit Districts The Ideal Source of Public Revenue 2004

²⁰ UK Government Mayor's Guidance on Workplace Parking Levy

year, emissions and pollution had reduced and around £100m worth of revenue was available for reinvestment within the London Transport network²¹.

2.4.8 The re-allocation of road space has been identified by the Multimodal Optimisation of Roadspace in Europe (MORE) as the most effective measure in contributing towards less car dependent cities and includes measures such as pedestrianisation, bus priority lanes and cycle lanes. The measures are popular in England, with **66% of respondents** in a DfT opinion survey stating they support the reallocation of road space to walking and cycling²².

2.4.9 Research undertaken by DfT in conjunction with Sustrans in 2019 sought to understand whether the re-allocation of road space for bicycles would bring the operation of cities to a standstill. The research found that cycle lanes are more efficient at moving people compared to motorised road space, as a 3m wide lane can facilitate the movement of 2,000-6,500 pedestrians and cyclists per hour compared to only 700-1,100 people by car²³.

2.4.10 A Low Traffic Neighbourhood (LTN) is a group of residential streets where temporary or permanent measures have been implemented to restrict the passage of through motor traffic, such as bollards and planters, whilst still allowing pedestrians, cyclists, disabled users and emergency vehicles to travel through the area. LTNs aim to reduce car usage and increase active modes of travel by making private car usage less convenient and simultaneously making walking and cycling more attractive through the removal of motor traffic and space creation. Looking at examples in Waltham Forest, typical traffic levels before implementation are noted as between 2,500 and 4,500 vehicles per day; after implementation traffic levels had dropped by between 45 and 97% depending on location²⁴.

2.4.11 The provision of LTNs leads onto the concept of 15-minute neighbourhoods in which people are able to access essential goods and services by sustainable active modes within 15 minutes from their home through the creation of local hubs. The aim is to create interconnected self-sufficient urban areas which reduce car use or the need for a car. This concept lends itself more to land-use policy rather than infrastructure with focus on zoning and regeneration of space.

LTN CASE STUDY

LTNs are not a new phenomenon and some were implemented pre-pandemic; they showed high levels of success such as the Waltham Forest LTNs which were introduced in 2015. The schemes resulted in more local walking and cycling i.e. after three years residents did 115 minutes more walking and 20 minutes more cycling per week, and the car ownership reduced by 6% after two years, a 70% reduction in road traffic injuries per trip, and a 10% reduction in local crime levels.

Source: London's LTNs: An Emerging Evidence Base Jan 2021

²¹ Transport for London Congestion Charging in Central London: A Retrospective

²² DfT Public Opinion Survey on Traffic and Road Use

²³ DfT & Sustrans Common Misconceptions of Active Travel Investment – A Review of Evidence

²⁴ enjoywalthamforest.co.uk



Quiet Lanes are more applicable to rural settings and are designated lightly trafficked rural roads (daily volumes typically <1000) for shared use by multiple modes such as walkers, cyclists, horse riders in addition to motor vehicles. Quiet lane measures include reduced speed limits and enhanced signage to encourage cars to slow down and take cognisance of other users. Quiet lanes are a key measure to widen transport choice in a rural community by encouraging local journeys to be made by more sustainable modes and work best when part of a designated network connecting local services²⁵.

2.5 Costs

2.5.1 Typical costs for the range of push measures as detailed in section 2.4 of this report are outlined in Table 1.

Table 1 – Push Measures Indicative Costs

Push Measure Type	Indicative Cost per Scheme	Provision
Quiet Lanes		Entry / exit signs, fingerposts and formal advertisements
Low Traffic Neighbourhoods – dependent on desired specification	£10,000 - £30,000	Low Cost i.e. basic modal filters, hatching at gateway junctions, limited public realm improvements
	£60,000 - £150,000	Medium Cost – Mid range materials, targeted junction improvements and public realm
	£200,000+	High Cost – High quality materials, significant public realm and junction improvements
Work Place Levy	£450,000	10 FTE employees, office space and resources
Congestion Charging Scheme	£161.7m – Set up costs £96m – Running Costs pa	London Congestion Charging Scheme
	£125m – Set up costs £5-10m – Running Costs pa	Stockholm Congestion Charging Scheme

²⁵ CPRE Guide to Quiet Lanes

2.5.2 The DfT²⁶ noted typical costs of cycling interventions in the UK as outlined in Table 2. It is considered that the cost of high-quality cycling infrastructure includes costs for walking infrastructure as generally cycling schemes are provided as shared use.

Table 2 – Typical Cycling Infrastructure Costs

Cycling Infrastructure Type	Cost per Km / Unit
Cycle Superhighway	£0.24m - £1.45m
Mixed Strategic Cycle Route	£0.46m - £0.88m
Cycle Route Re-surfacing	£0.14m - £0.19m
Cycle Bridge	£0.1m - £0.5m
Cycle Crossing	£0.14m - £0.41m
Area Wide Workplace Cycle Facilities	£0.2m - £0.75m
Large Scale Cycle Parking	£0.12m - £2.5m

2.5.3 In 2006 the City Council of Seville implemented a number of active travel measures, including the creation of a 120km cycle network and the promotion of cycling. The entire cycle network was segregated from motorised traffic with a cost of €270,000 per km and annual maintenance costs of €1,500 per km.

2.5.4 The DfT notes that high specification cycling schemes cost £1.3 million per km on average in comparison to road schemes which cost around £50 million per km (the HS2 rail scheme is predicted to cost £77 million per km).

2.5.5 Furthermore, cycling infrastructure results in relatively low capital outlay compared to other types of transport investment. Cycling and walking schemes have high benefit to cost ratios making them better value for money²⁷.

2.5.6 Cycling UK notes that the average economic benefit to cost ratio of investing in active travel schemes is 13:1 and that an estimation of returns on the investment in Cycling England's first six cycling towns suggests a BCR of 2.6-3.5 over 10 years²⁸. Cycling UK further notes that academics who studied the cost benefit analysis used by Copenhagen, to decide whether to build new cycling infrastructure, concluded that cars cost society and private individuals six times more than cycling does. The impact of the car came in at €0.50 per kilometre and the impact of the bicycle at €0.08 per kilometre.

²⁶ DfT – Typical Costs of Cycling Interventions (Cycle City Ambition Schemes)

²⁷ DfT Common Misconceptions of Active Travel Investment

²⁸ Cycling and the Economy – Cycling UK

- 2.5.7 The authors compared cars to bicycles in terms of air pollution, climate change, travel route, noise, road wear, health and congestion. The study also found that, looking at the costs / benefits for society alone, one kilometre by car costs €0.15, whereas society earned €0.16 on every kilometre cycled in associated benefits²⁹.
- 2.5.8 In 2012 Sustrans sought to compare road construction costs to that of cycling infrastructure costs and associated job creation to ascertain value for money. The key findings from their study, which compared the Community Links and in Scotland and the Valley Cycle Network in Wales projects, concluded the following:
- 12.7 jobs were supported or sustained for every £1million of investment in sustainable transport infrastructure.
 - 1.6 jobs (direct, indirect and induced) were supported or sustained for every km of route constructed.
 - The average cost per km of construction was £103,891.
 - The average cost per scheme was £128,199 and there were on average 0.74 FTE jobs per km of path constructed.

2.6 Benefits

- 2.6.1 Active travel has traditionally not enjoyed a high profile amongst key decision makers / stakeholders due to the perception that the evidence of associated benefits from active travel are weak i.e. health, social and economic in comparison to motorised travel benefits³⁰.
- 2.6.2 In considering this, research has shown that the benefits of active travel are significant, particularly in terms of health benefits; cycling up to 4km three times a week unlocks health benefits of £160 per person in terms of NHS savings³¹.
- 2.6.3 Physical inactivity is responsible for one in six UK deaths (equal to smoking) and is estimated to cost the UK £7.4 billion annually (including £0.9 billion to the NHS alone)³². Public Health England notes that regular physical activity reduces risk of dementia by up to 30%, fractures by 68%, depression by 30% and all mortality by 30%³³.
- 2.6.4 In terms of social benefits, DfT notes that active travel in older people provides a sense of empowerment, pride, fun and liberation. Cycle priority measures and more walkable neighbourhoods attract homebuyers and younger people (also less likely to own a car) who benefit from short commutes, access to amenities, education etc. Children travelling to school by active travel tend to be more alert, achieving better results in education³⁴.
- 2.6.5 Walking and cycling have an economic role to play in wider society. The DfT states that cycling contributes £5.4bn to the economy per year and supports 64,000 jobs – and up to a 40% increase in shopping footfall by well-planned improvements in the walking environment³⁵. Furthermore, if the UK could achieve cycling levels

²⁹ Gossling S & Choi A – Transport Transitions in Copenhagen: Comparing the costs of cars and bicycles

³⁰ Transport Scotland – Active Travel Policy Review

³¹ Pedalling into Prosperity – Greater Manchester Sustainability Platform

³² DfT Gear Change 2020

³³ Public Health England (2019)

³⁴ DfT The Value of Cycling 2016

³⁵ DfT Cycle Infrastructure Design Local Transport Note 1/20

similar to that of Denmark, it is estimated that the NHS would save £17billion within 20 years³⁶.

2.6.6 The benefits on retail, employment and public spending are therefore not widely recognised or communicated. Retailers in particular express concern at the potential loss of revenue arising from schemes involving removal of traffic and / or parking and substitution with reduced or removed traffic due to active travel infrastructure³⁷.

2.6.7 Retailers commonly overestimate the importance of the car by almost 100% whilst simultaneously underestimating the number of people travelling by walking, cycling and public transport. A survey conducted in Lea Bridge Waltham Forest showed that businesses believed that 63% of their customers arrived by car, a survey showed that only 20% arrived by car³⁸.

2.6.8 Similarly, in Graz Austria, more customers travelled by walking and cycling than were perceived to i.e. 44% walked and 8% cycled compared to the perception of 25% and 5% respectively. Travel by private car was around half of what was perceived by retailers i.e. 32% compared to 58%³⁹.

Active Travel Benefits

- Health & Wellbeing
- NHS savings
- More attractive neighbourhoods
- Social interaction
- Healthier workforce
- Increased retail footfall
- Improved air quality
- Carbon reduction
- Reduction in greenhouse gases

2.7 Covid-19 Schemes and Impacts

2.7.1 The COVID-19 pandemic has affected all forms of transport due to a combination of Government lockdowns, an increase in working from home and widespread fear of contracting and spreading the virus in close contact situations; global road transport activity was almost 50% below the 2019 average by the end of March 2020. Furthermore, passenger transport demand has been significantly impacted globally i.e. public transport trips were down by 90% since the crises began in many of the world's major cities⁴⁰.



2.7.2 The imposed lockdowns forced the public to rethink why they travelled and whether it was essential to do so, as well as how they travelled due to the limited availability of services. This led to a rise in more active modes, resulting in a demand for pop-up active travel infrastructure schemes such as Low Traffic Neighbourhoods (LTNs) and the re-allocation of road space to aid social distancing including footway widening and dedicated cycle lanes.

³⁶ British Cycling – Benefits of Investing in Cycling

³⁷ AECOM – Active Travel in Town Centres

³⁸ Walking and Cycling the Economic Benefits, TfL 2018

³⁹ Sustrans Graz Study 2003

⁴⁰ Global Energy Review 2020 www.iea.org

- 2.7.3 Governments globally pledged funding for temporary active travel schemes and research has shown that the public uptake has been significant.
- 2.7.4 Public transport usage significantly decreased as the UK Government actively advised the public not to use public transport at the beginning of the pandemic with only a modest increases in usage noted after the first lockdown. This would suggest that the public have developed a negative attitude and lost confidence in public transport as a main mode of transport i.e. only 52% of regular public transport users are expected to use public transport such as they did pre-pandemic in particular vulnerable and elderly users⁴¹.
- 2.7.5 Future commuting patterns are uncertain, but many businesses have recast how they believe people will work with generally more people based at home, although manufacturing and retail industries are assumed to see little to no change. Any new changes to transport patterns will likely see transport used more flexibly to make new working routines e.g. 76% of businesses expect flexible working to become normal⁴².
- 2.7.6 Active travel schemes do not need to focus solely on walking and cycling measures but rather should indirectly target the discouragement of car travel through congestion charges, parking prices, workplace parking levies etc.
- 2.7.7 Some successful pop-up active travel schemes will now be moving towards implementation on a permanent basis, however key issues have been highlighted in a number of studies including pinch point issues, capacity issues and material availability.
- 2.7.8 Users do not always adhere to the one-way systems and consultation with communities has been limited due to speed of implementation as a reaction to the pandemic. This has led to a disproportionate reaction by local politicians based on vocal community groups opposed to schemes. Therefore, careful consideration should be given to the justification of such schemes and the provision of clear evidence, communication and community buy-in are critical⁴³.
- 2.7.9 In light of the pandemic and due to the changes in attitudes to active travel, governments should rebalance their infrastructure investment goals to focus on high quality liveable neighbourhoods and safe routes to schools and town and city centres. These have the potential to benefit local communities as they can be delivered at pace and have the benefits of supporting the construction sector which therefore also supports job growth as well as public health⁴⁴.

3. Barriers, Opportunities and Options

3.1 Introduction

- 3.1.1 The literature review led to the development of a list of potential barriers and opportunities for the uptake of active travel. Considering the identified barriers and opportunities in a local context allowed the development of a number of realistic and deliverable options in order to encourage modal shift in Northern Ireland.

⁴¹ DecarboN8 - At a Crossroads: Travel Adaptations during Covid19 Restrictions and Where Next?

⁴² Greener Miles; Delivering on a Net-Zero Vision for Commuting

⁴³ DfT Active Travel Funding – Lessons learned from Phase 1 and opportunities for Phase 2.

⁴⁴ DecarboN8 – At a Crossroads: Travel Adaptations during Covid19 Restrictions and Where Next?

3.2 Consultation

- 3.2.1 Consultation was undertaken with the Department for Infrastructure's Active Travel Unit and Transport Planning & Modelling Unit in May 2021. A summary of the key points of discussion are outlined below:

Consideration of Policies, Strategies and Plans

- 3.2.2 Active travel is supported by a number of key policies, strategies and plans including the Bicycle Strategy for Northern Ireland (2014), The Strategic Plan for Greenways (2016) and Belfast Cycling Plan – Making Belfast an Active City (2021).
- 3.2.3 DfI have committed to a programme of investment including a £20m fund for Blue / Green infrastructure to support communities and promote active travel.
- 3.2.4 Therefore, existing policies and allocated funding should ensure scheme backing and delivery.

Existing Barriers

- 3.2.5 There are number of existing barriers to active travel in Northern Ireland with existing public mindset being a significant one. Personal circumstances and / or embedded habits are not easily changed through promotion of active travel.
- 3.2.6 Whilst active travel infrastructure does exist in Northern Ireland in some locations, it is not widespread, and the public may not be aware of successful schemes. What does success look like in terms of vision, delivery and outcomes? Better promotion of success is required.
- 3.2.7 Due to the historical lack of progress in achieving modal shift in Northern Ireland, there may be difficulty in justifying reallocation of road space in cities and towns if there is no resulting change.
- 3.2.8 Whilst there are policies and plans regarding active travel, these are considered limited in comparison to the rest of the UK.

Opportunities

- 3.2.9 There are a number of opportunities for active travel in Northern Ireland as shown by radical change in thinking due to the Covid-19 pandemic. Periods of lockdown have led to lower traffic volumes, differing journey patterns resulting in a shift in traditional traffic peak periods. Furthermore, the purpose of journeys has become more focused on leisure rather than commuting to workplaces. As such the opportunity to build on this change in thinking could achieve modal shift.
- 3.2.10 The role of demand management should be considered to encourage the use of more active modes. Whilst providing additional active mode infrastructure may increase uptake, managing existing car-based infrastructure will also yield benefit such as parking restrictions, review of parking provision and controlled parking zones.
- 3.2.11 Active travel can support over-arching policies and strategies such as the Energy Strategy by reducing the need for energy by motorised vehicles. Therefore, opportunities should reflect political, health, environmental and climate change policy goals. Provision of successful schemes aligned to local policy will ensure political will and Government funding.

Push and Pull Measures

3.2.12 Push and pull measures should focus on short journeys i.e. first / last mile accessibility and provision must provide a preferable option to the private car. Permeability is a consideration through modal filters etc however high-quality infrastructure must also equally incorporate all modes.

3.2.13 A change in policy is required in order to tackle free and plentiful parking in towns and cities. Consideration should be given to the relocation of parking from frontages.

Implementation

3.2.14 Implementation of active travel schemes requires full support from local councils to ensure successful delivery. Where knowledge is lacking, collaborative working is required to ensure implementation.

3.2.15 Temporary active travel schemes have recently been provided as pop-ups due to the Covid-19 pandemic; such schemes are now undergoing a review to consider scheme equity, footway usage and impacts on junction delay. Furthermore, it is recognised that more robust consultation is required on such schemes particularly with taxi drivers.

3.3 Barriers

3.3.1 A barrier to active travel is an obstacle that prevents movement or access by active modes i.e. walking or cycling and can be both physical and perceived. A number of barriers considered relevant to the Northern Ireland context are listed below and outlined fully in Appendix A.

- | | |
|---|--|
| ▪ Current lack of segregated infrastructure | ▪ Public transport connections for active travel modes |
| ▪ Safety concerns | ▪ Affordability of travelling by active modes |
| ▪ Mindset | ▪ Pollution |
| ▪ Completing long distance trips by active modes | ▪ Social Exclusion |
| ▪ Spatial Distribution i.e. sprawling development | ▪ Parking |
| ▪ Ability to walk / cycle | ▪ Active travel scheme funding |
| | ▪ Established policy |

Barriers most prevalent in Northern Ireland are considered to be:

- Lack of Segregated Infrastructure – Lack of segregated infrastructure is more of a barrier in urban environments where traffic and non-motorised users more readily conflict. Active travel users favour segregated infrastructure from a safety and user experience point of view.
- Affordability – Whilst efforts can be made by public transport providers and public bike hire providers to remain competitive in terms of pricing, low incomes remain due to rising unemployment (particularly as a result of the Covid-19 pandemic). Therefore, active travel provision may be provided but remain inaccessible to certain groups due to costs of equipment or use.

- Mindset – Due to personal circumstances or embedded habits, the public can be reluctant to change. Furthermore, due to limited promotion of success stories, some may not be aware of any active travel successes in Northern Ireland and the associated benefits both personally and more widely.
- Spatial Distribution – One third of Northern Ireland's population live in rural areas and the dominance of Belfast in terms of employment and services presents a barrier to active travel in that the car will enable more convenient longer commutes.
- Land Use Planning – Over the next 25 years, Northern Ireland is set to have the second largest percentage growth in population in the UK after England, alongside a 7% increase in the number of households. Current land-use planning decisions and zoning designations have resulted in a sprawling residential provision subsequently resulting in difficulties in providing a connected active travel network across such a large area.
- Parking – Using Belfast City Centre as an example, there are 11,000 parking spaces within the Belfast city centre boundary that remain unregulated, and a further 10,000 spaces provided for employees / under contract. Collectively these spaces represent over 55% of the parking stock in the city centre⁴⁵. Widely available free / cheap parking presents a barrier to active travel as it reinforces the car as the default mode of travel for many trips.

Often the provision of free, short duration parking in town centres is viewed as being positive for trade. However, this can act as a barrier to active travel by making short trips by car the most convenient, when they could realistically be made using active modes instead.

3.4 Opportunities

3.4.1 A number of opportunities for active travel are listed below and outlined fully in Appendix B. It is considered that all presented opportunities are achievable in Northern Ireland, however it is also acknowledged that some may take longer to be realised.

- | | |
|---|--|
| <ul style="list-style-type: none"> ▪ Social changes due to Covid-19 pandemic ▪ Net zero carbon targets ▪ Dedicated funding for active travel ▪ Shift in policy making | <ul style="list-style-type: none"> ▪ Emerging transport methodologies ▪ Public transport network upgrades ▪ Emerging alternative modes ▪ Park and Ride provision ▪ Green infrastructure |
|---|--|

3.4.2 The Covid-19 pandemic has presented a number of opportunities, particularly in behavioural change and peak period travel, however it has also resulted in lower public transport use due to safety concerns and crowding. Public transport

⁴⁵ Belfast Integrated Parking Strategy and Action Plan 2016

accessibility in Northern Ireland is better than perceived i.e. 68% of Northern Ireland's population can access a town within 30 minutes by public transport during the morning peak period. Therefore, focussing on a shift in behaviour change and attitudes to walking cycling, wheeling and public transport may be more achievable in the short term.

3.5 Options

3.5.1 A number of potential options aimed at promoting active travel and modal shift are detailed in Table 3 and outlined fully in Appendix C, along with associated implementation timeframes.

Table 3 – Active Travel Options

Short to Medium Term	Medium to Long Term
Reallocation of Road Space	Intelligent Transport Systems
Parking Demand Management	Planning Policy Reform
Behavioural Change Campaigns	Clean Air Zones
Public Transport Linkage	Congestion Charging
20mph Zones	Workplace Parking Levies (WPLs)
Ban on Pavement Parking	Parking Benefit Districts (PBDs)
Park and Ride Network Expansion	
Permanent Active Travel Schemes	
Green Infrastructure	
Low Traffic Neighbourhoods	
15-minute Neighbourhoods	
Quiet Lanes	

3.5.2 It is considered that the following four options can be delivered in Northern Ireland in a relatively short time frame and therefore should be prioritised for delivery:

- Reallocation of Road Space
- Parking Demand Management
- Behavioural Change Campaigns
- Public Transport Linkage

3.5.3 As outlined in the consultation document on the Energy Strategy for Northern Ireland, an interventionist approach to transport and travel is required in order to shape choices to deliver behavioural change. Consultation on the Energy Strategy was completed on the 2nd July 2021 and delivery of the final strategy will take time. Therefore, we are still at an early stage in the process to improving carbon emissions in Northern Ireland. Whilst some of the proposed options will aid in

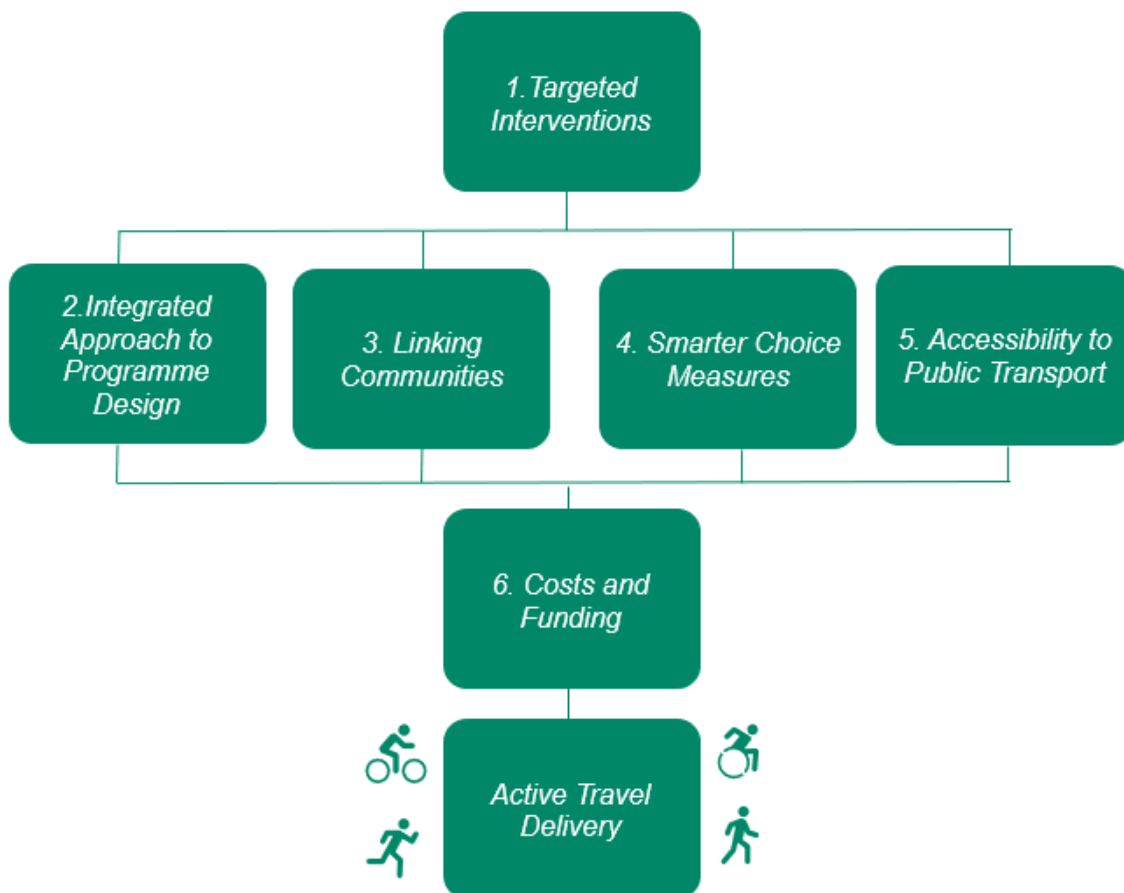
working towards achieving the goals of the strategy, other aspects will also have to align i.e. switch to alternative fuels etc.

4. How to Guide

4.1 Introduction







- 4.1.1 The Department’s recently published *Planning for the Future of Transport - Time for Change* document discusses the need to reprioritise transportation aims and actions using existing policy to support sustainable solutions. The focus is on the changes that the Department and the Executive can make so that transport contributes to societal and environmental objectives as well as economic objectives.
- 4.1.2 Furthermore, the document provides examples of ‘the right scheme in the right place’ in order to provide greater understanding and clarity regarding the critical roles that different transport modes can play in promoting the green and economic recovery as well as improving community place-making.
- 4.1.3 In order to build upon this change in direction, this How to Guide aims to provide a roadmap for delivery of measures to provide active travel schemes in a typical medium sized town in Northern Ireland. This guide covers six steps for practical and successful delivery of active travel proposals as shown in Figure 1.

Figure 1 – Active Travel Steps to Delivery



4.2 Targeted Interventions

4.2.1 The first step in considering active travel schemes is identifying opportunities to provide them, for example where there is:

-  Congestion.
-  Existing poor design.
-  High accident rates between private vehicles and active modes.
-  Poor air quality.
-  Success of temporary schemes in place due to Covid-19 pandemic.
-  Spatial Inequalities

4.2.2 Targeting areas with existing **barriers** will result in significant impact, however, the right type of active travel intervention should be targeted to the locality. Considering the options discussed in section 3.5, in terms of locality the following should be considered:

4.2.3 The **Reallocation of Road Space** is the most effective measure in contributing to less car dependent environments and is popular amongst the public creating spaces that are accessible for all. Towns in Northern Ireland are typically designed as a linear network and as such are dominated by motorised vehicles and parking.

4.2.4 Within town centres the following should be implemented:

- Provision of consistent high-quality segregated one / two-way cycleways on main routes with connections to cycle lanes and / or shared paths further out of town
- Removal of town centre on street parking on one side of main routes to enable provision of segregated cycle infrastructure and public realm improvements
- Widen footways to encourage walking and wheeling
- Provision of bus priority lanes on main public transport routes

4.2.5 **Parking Demand Management** complements the reallocation of road space by managing the availability and cost of parking. In town centres there is a need to ensure parking occurs in the right places through a number of controls including:

- | | |
|--|--|
| ▪ Development of a parking strategy | ▪ Longer parking control operation times |
| ▪ Reduction in on-street provision through improved public realm i.e. parklets | ▪ Removal of free parking |
| ▪ Shorter on street duration limits | ▪ Ban on pavement parking |
| | ▪ Revision to on-street parking charges |

- Tiered rates of charging dependent on proximity to services
 - Enhanced enforcement
- 4.2.6 **Low Traffic Neighbourhoods (LTNs)** should be implemented in areas outside of immediate town centres such as on residential suburb streets to encourage short trips to local retail and services by active modes. Consideration should be given to housing density, available local services and access to green spaces. Initial precursors to LTNs in residential areas may include parking controls or reduced speed limits.
- 4.2.7 The concept of **15 Minute Neighbourhoods** aligns with LTNs and contends that residents in suburbs should be able to access services to meet their daily needs within a 15-minute walk or cycle including access to public transport enabling longer distance travel when required in. Neighbourhoods can be enhanced with provision of mobility hubs i.e. rapid electric vehicle charging points and bike hire.
- 4.2.8 Provision of **Quiet Lanes** in more rural areas will widen transport choice as reduction in speed limits improve safety for all and encourage local journeys to be made by more **sustainable** modes. Implementation includes provision of additional signage and reduction in speed limits on particular roads. Consideration of connection to local services, greenways and public transport should also be explored.
- 4.2.9 Across the wider network, **Park and Ride** sites throughout Northern Ireland have proven to be popular, with around 50 sites currently in operation and six additional sites announced in 2020 / 2021. Park and Ride sites are located at key road junctions acting as **hubs** for car sharers or for anyone completing part of their journey on public transport. Continued expansion of the Park and Ride network incorporating active travel linkages would enhance modal shift opportunities.
- 4.2.10 A network of **Greenways** is proposed for Northern Ireland as outlined in the Strategic Plan for Greenways (2016) in both urban and rural areas allowing for direct linkage by active modes. Further consideration of incorporating linkages to public transport as the network develops would allow for increased accessibility by active modes.
- 4.2.11 In terms of perceived barriers, local **demographics** and **affordability** should be considered. For example, 2016 Urban Villages research in Belfast showed that in North Belfast 38% of respondents did not have access to a bike and 5% could not afford one. In South Belfast 46% did not have access to a bike and 3% could not afford one. Furthermore, 14% of respondents in North Belfast and 16% in South Belfast considered public transport too expensive. Active travel solutions in this instance include behaviour change campaigns, promotion of affordable options, linkage with public transport providers and hire / sharing schemes for first / last mile journeys.
- 4.2.12 Active travel should be **inclusive** for all, however certain groups i.e. the elderly and mobility impaired can feel excluded from active travel due to physical barriers such as declining health and limited accessible infrastructure. The elderly and mobility impaired walk / travel slower than others and as such can have issues at road crossings in that they feel they cannot cross safely. The existing footway network can be inconsistent in terms of dropped kerbs and tactile paving therefore presenting further accessibility issues. AgeUK note that older people can also

choose not to walk due to the lack of public benches and accessible toilets⁴⁶. The consideration of the elderly and mobility impaired at design stage of schemes is essential to promote inclusion.

- 4.2.13 Social exclusion from active travel may also be the case for ethnic minorities as researched by TfL⁴⁷ and highlighted by the Government's Social Exclusion Unit. Ethnic minorities may feel excluded from active travel due to limited opportunities such as demands on time, affordability, awareness or lack of role models. Image and perceptions such as social status, cultural constraints and negative perceptions can also lead to exclusion.
- 4.2.14 Solutions to exclusion include targeted marketing strategies in promoting leisure use as opposed to utility use in the realisation that a 'one size fits all' approach cannot be adopted to achieve inclusion. Solutions should also focus on educational materials in a range of languages (if required) to build confidence and provide reassurance.
- 4.2.15 The vast majority of journeys in Northern Ireland continue to be made by private car (71%) whilst travel by active modes has remained consistently around 25% despite increased promotion of active travel. The Travel Survey for Northern Ireland (TSNI) shows that the number and length of journeys made by walking and cycling have also remained consistent i.e. ~170 1-mile walking trips and ~7 5-mile cycling trips per person per year. Therefore, the **significant scope** to achieve modal shift should be considered when proposing interventions.
- 4.2.16 Recent successes due to the Covid-19 pandemic show that modal shift can be achieved and therefore consideration should be given to where this is most apparent and look towards making temporary active travel schemes permanent. This may be more targeted if funding allocation for infrastructure such as the Belfast Cycling Network⁴⁸ is readily available i.e. Blue / Green Infrastructure funding.
- 4.2.17 As shown during the pandemic, there is now a noticeable shift to more flexible working and focus on better a work / life balance therefore provision of accessible links between commuter and leisure interventions i.e. greenways / green space may present more attractive options for users. If combined with integrated ticketing across public transport this may help to tackle spatial issues with wider network provision.
- 4.2.18 It is clear from the UK's net zero commitments that transport has to make significant reductions through to 2050. This was recently further stepped up by the UK government with a reduction target of 78% by 2035. There are currently two 'draft' climate bills being brought through the NI Assembly (one with an 82% reduction by 2050 and the other with net zero by 2045), with New Decade New Approach committing to action within this current parliamentary term.
- 4.2.19 **So where can emissions be reduced and how?** The Climate Change Committee's Sixth Carbon budget suggests that 59% will come from a **combination of measures** including low carbon tech and / or societal behaviour changes, with the remaining 41% coming from low carbon tech only.

⁴⁶ https://www.ageuk.org.uk/globalassets/age-uk/documents/reports-and-publications/reports-and-briefings/active-communities/rb_june15_the_future_of_transport_in_an_ageing_society.pdf

⁴⁷ <http://content.tfl.gov.uk/barriers-to-cycling-for-ethnic-minorities-and-deprived-groups-summary.pdf>

⁴⁸ <https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/belfast-cycling-network-2021final.pdf>

4.2.20 A **programme** of integrated active travel interventions particularly in urban areas will yield greater impacts than stand-alone schemes; furthermore, infrastructure can be provided with a suite of complementary softer measures in order to present active modes as the most convenient way to travel. For example, provision of a combined package of cycling infrastructure, workplace cycling facilities i.e. showers / parking and behaviour change incentives would result in higher modal shift than providing infrastructure alone.

4.2.21 Following the identification of **opportunity**, a thorough feasibility study should be conducted in order to appraise the preferred option, develop concept design and to consider whether the proposed intervention is viable.

4.2.22 Other considerations at feasibility stage may include:

- Scheme objectives and alignment with policy
- Funding sources
- Costs
- Anticipated benefits
- Required data collection and usage forecasts
- Anticipated issues or concerns
- Deliverability
- Draft programme for delivery

4.3 Integrated Approach to Programme Design

4.3.1 An **integrated approach** to the delivery of active travel requires collaborative working internally within the Department and also across numerous sectors in order to ensure co-ordinated and inclusive active travel schemes. Stakeholders are internal or external groups that can affect, directly or indirectly, the activities and performance of a proposed scheme, therefore, **stakeholder engagement** is best undertaken at the early stages of scheme planning. Consulting early and often will ensure that requirements are agreed, and a delivery solution is negotiated that is acceptable to the majority of stakeholders.

4.3.2 Wider consultation is also incorporated within the Northern Ireland planning process through community involvement including the statement of community involvement advertisement by the applicant, neighbourhood notification process and the provision of the Community Places service, thereby involving stakeholders at all stages of the process. Therefore, utilisation of these resources should be considered if applicable in order to engage with residents and potential scheme users.

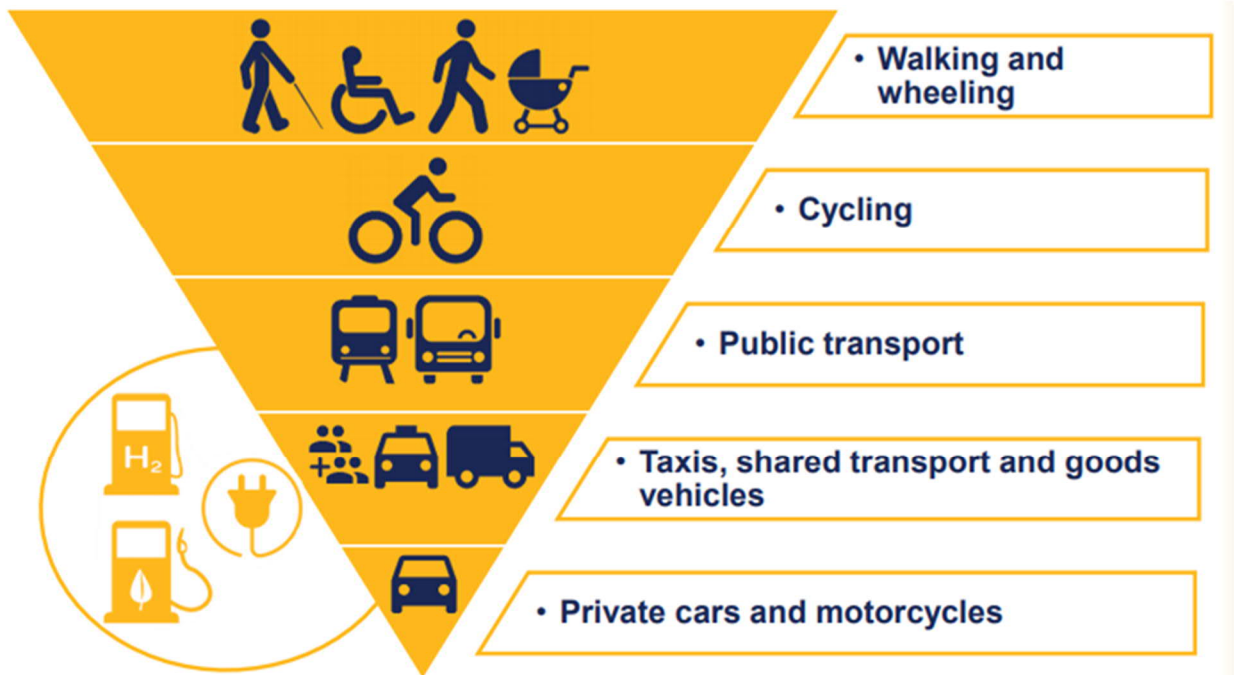
4.3.3 Potential key stakeholders in Northern Ireland may include:

- | | |
|--------------------|------------------------------|
| ▪ Translink | ▪ Cycling groups |
| ▪ Community groups | ▪ Sustrans |
| ▪ Tourism NI | ▪ Political parties |
| ▪ Local Councils | ▪ Local Employers and unions |

- Education Board and schools
- NHS, GP's health charities

- 4.3.4 **Promotion of successes** will aid in acceptance of changes in approach amongst consultees and the wider public. Successful scheme delivery promotion will inadvertently create support for additional schemes.
- 4.3.5 The continued **integration of land-use policy and transport planning** will aid in the success of active travel interventions, applying the policy in practice at varying levels including Local Development Plan level, design, rural development, maintenance and operational level and as consultees as part of the planning process.
- 4.3.6 Adopting good design practices at initial scheme stages including a robust feasibility study and securing funding will provide confidence in active travel scheme delivery.
- 4.3.7 Utilising existing Northern Ireland strategic policy whilst applying new thinking and methodologies is key to prioritising change. Application of the '**decide and provide**' methodology allows decisions based on the preferred future first and then providing the means of working towards it, accounting for uncertainty through scenario planning and consideration of social trends.
- 4.3.8 Consideration of the need to achieve modal shift for short journeys should focus on a **modal hierarchy** which prioritises sustainable transport, firstly providing for wheeling and walking then cycling, followed by public transport and then other modes as shown in Figure 2.

Figure 2 – Transport Modal Hierarchy



Source: DfI Planning for the Future of Transport – Time for Change

4.4 Linking Communities

4.4.1 Northern Ireland town and city urban road network and streetscapes often work against their essential place making function and as such can be unattractive to pedestrians and cyclists.

4.4.2 Walking networks in Northern Ireland towns could be considered reasonable in terms of linking communities to essential services and public transport options.

4.4.3 However further improvements would enhance existing networks and encourage increased use by both pedestrians and cyclists including:

- **Public realm** improvements & high-quality mixed-use space – improvements to the aesthetic quality of areas in order to attract pedestrians / cyclists and boost local retail **economies**.
- **Traffic calming** – changes to the road and / or parking environment to reduce vehicle speed.

4.4.4 There are a number of viable active travel interventions which would enable Northern Ireland communities to achieve improved linkage including:

- **Reallocation of Road Space**
- **Parking Demand Management**
- **Low Traffic Neighbourhoods (LTNs)**
- **15 Minute Neighbourhoods**
- **Quiet Lanes**
- **20mph Zones**

4.5 Smarter Choice Measures

4.5.1 Smarter choice measures seek to encourage sustainable and active travel decisions through open engagement with individuals and communities using policy measures i.e. behavioural change.

4.5.2 There is a need to encourage car users to firstly consider alternative

Key References

LTN 1/20 Cycle Infrastructure Design
 DfT Local Cycling and Walking Infrastructure Plans Technical Guidance
 Case study: Newham and Waltham Forest Low Traffic Neighbourhoods
 DfT Manual for Streets 1&2
 DfI Creating Places: Achieving Quality in Residential Environments
 The Road Traffic Regulation (Northern Ireland) Order 1997

Key References

DfT TAG Unit M5.2 Modelling Smarter Choices
 DfT TAG Unit A5.1 Active Mode Appraisal
 DfT – Smarter Choices – Changing the Way We Travel 2004
 DfT Enabling Behaviour Change Information Pack 2017
 DfT Local Sustainable Transport Fund Evaluations

transport options for particular journeys before deciding to travel by car. There is also a further need to move away from thinking that provision of infrastructure is the only answer; consideration of **demand management** moving forward will ensure co-ordination with 'soft' policy measures. The promotion of improvements that can be achieved from the implementation of demand management will aid in wider acceptance and make smarter choices more appealing. For instance, a reduction in on street parking presents potential public realm opportunities, making town centres more appealing and accessible by active modes.

4.5.3 Recognising the potential benefits of smarter choice measures should be an integral part of any proposed active travel strategy or scheme. Not only can such measures reduce congestion, they can also give people genuine travel choices and also contribute cost effective solutions in line with Government policy such as improving accessibility and social inclusion, encouraging regeneration, reducing pollution and carbon emissions and helping to increase physical activity.

4.5.4 There are several widely referenced smart choice measures including:

- Workplace & school travel plans
- Personalised travel planning
- Public transport information and marketing
- Travel awareness campaigns
- Home working / shopping
- Car clubs & car sharing schemes

4.5.5 There are a number of ways smarter choices can be approached including:

- **Promotion** of new routes and events
- **Behaviour change** programmes that are impactful through challenge, facilitation, encouragement or provision of information
- **Incentivised and targeted** travel awareness campaigns offering discounts / savings to those travelling by sustainable modes
- **Collaboration** with other departments, public transport providers to ensure maximum impact
- **Education programmes** through local schools to shape future attitudes and travel choices
- **Improving organisation of service** to meet the needs of particular groups of people

4.5.6 Considering the Covid-19 pandemic, a number of well documented smarter choices are already in place such as home working / shopping. Furthermore, since the publication of DfT Smarter Choices in 2004, changes in thinking have occurred leaning more towards mobility innovation including micro-mobility i.e. Ebikes, Mobility as a Service (MaaS) i.e. digital services to integrate transport modes and payment functions and shared mobility such as bike, ride and car sharing.

4.5.7 This change in thinking provides opportunity in Northern Ireland particularly in encouraging active travel between peri-urban areas. E-Bikes present an opportunity not just for first / last mile journeys but for journeys between 5 and 15 miles whilst provision of MaaS presents opportunity to simplify the process for the majority of users.

4.5.8 In a local context, considerations should be given to understanding journey purpose and whether smarter choice measures are applicable. The Travel Survey for Northern Ireland 2017-2019 details typical trends in journey purpose at a Northern Ireland level only; noting that the main journey purposes are for leisure purposes at around 29% and commuting at 20%.

4.6 Accessibility to Public Transport

4.6.1 Public transport accessibility by active modes creates a cohesive network allowing users to make longer journeys without the use of the private car. Improvements should be sought at **transport interchanges**, bus terminals and rail stations.

Key References

[Strategic Plan for Greenways NI](#)
[CIHT Buses in Urban Developments](#)
[SUSTRANS Traffic Free Routes and Greenway Design Guide](#)
[Electrically Assisted Pedal Cycles Regulation NI](#)

4.6.2 Bus and rail services in Northern Ireland ensure direct access to public transport to more than 83% of the population with 68% within 30 minutes travel time of a large town or city. With an increased focus on sustainable transport, consideration to the re-opening of old railway lines would aid in achieving a more integrated multi-modal transport system.

4.6.3 Whilst urban bus services have been enhanced due to the introduction of the services such as the Glider rapid transit in Belfast and higher frequency services, for those living in rural areas a private car may still have to be used to access services due to poor walking and cycling links. Therefore, consideration to upgrading accessibility for active modes would provide users with realistic mode choice.

4.6.4 Accessibility to public transport by active travel can be facilitated by:

- Providing affordable ticket prices
- Flexibility in stops
- High quality travel information
- Provision of high-quality walking and cycling infrastructure, cycle parking, storage lockers etc. for 'first and last mile' journeys

4.6.5 Encouraging active travel for first and last mile journeys present opportunities to reduce air pollution, noise and collisions caused by excessive car traffic in congested areas around rail and bus stations. Improving active travel accessibility to public transport improves neighbourhoods located close to public transport stations through the removal of congestion, therefore supporting a greater sense of place and community cohesion for residents.

4.6.6 At user level, **personalised travel programmes** focused on workplaces and communities may improve the perception of services and options available to users in terms of multi-modal journeys. Engaging in conversations about travel habits and sustainable transport options within localities may encourage modal shift.

4.6.7 Further expansion of Park and Ride provision and the development of a network of greenways in Northern Ireland will strengthen accessibility to public transport in by active modes.

4.7 Costing and Funding

4.7.1 The successful delivery of active travel interventions requires careful consideration of scheme costs, funding resources and investment return in terms of scheme benefits. Potential generated revenue, from say parking acts, should also be considered which can then be reinvested in further active travel schemes and improvements.

4.7.2 The consideration of costs and funding should be explored fully through the development of a business case in line with Northern Ireland Guide to Expenditure Appraisal and Evaluation (NIGEAE), providing assessments of:

- Strategic fit
- Option appraisal
- Achievability
- Value for money
- Affordability.

4.7.3 It should also contain an economic appraisal and other information including the proposed arrangements for financing, management, marketing, procurement, monitoring and evaluation of the proposed active travel intervention.

4.7.4 A business case is developed through three stages including a Strategic Outline Case (SOC), Outline Business Case (OBC) and Full Business Case (FBC). Business case development should take cognisance of the following guidance and assessment tools:

- The HM Treasury Green Book - Central Government guidance on how to appraise and evaluate public policies, projects and programmes based on the principles of welfare economics.
- The DfT Transport Appraisal Guidance (TAG) is the Department's internal guidance on business case making.
- The DfT Value for Money Framework – Tool to help decision makers judge whether the expected cost of the intervention is justified by monetising expected benefits to the public and society.
- The Active Mode Appraisal Toolkit (AMAT) is a spreadsheet model developed within the DfT to estimate key economic impacts from cycling and walking interventions. It follows the appraisal guidance consistent with that set out in the TAG guidance.
- DfT Early Assessment and Sifting Tool (EAST) – A decision report tool to allow decision makers to summarise and present evidence on options in a clear and consistent format. The tool is designed to be consistent with Transport Business Case principles.

4.7.5 There are a number of **funding opportunities** for active travel schemes in Northern Ireland as shown in Table 4.

Table 4 – Funding Opportunities

Potential Funding Sources	
DfI Capital Grants Funding	DEARA Environment Fund
DfI Small Grants Programme	Department for Communities
Blue / Green Infrastructure Investment Fund	Tourism NI
Local Council Funding	Peace Plus Programme
Big Lottery Fund	Tackle Rural Poverty and Social Isolation (TRPSI) Funding

4.8 Active Travel Delivery

4.8.1 Completion of steps one to six, as outlined in Figure 1, should result in successful delivery of active travel interventions. Further considerations to ensure ongoing success of active travel schemes include:

- Scheme promotion – Ongoing promotion on both a local and regional level of active travel schemes will encourage usage. Collaborative working with key stakeholders such as Translink, Tourism NI etc will aid in promotion to a wider network of users.
- Ownership and Maintenance – Responsibility for schemes should be clear in order to ensure interventions are maintained to a high standard for users. Funding pathways may allow budget for ongoing maintenance or revenue streams can also be explored.
- Evaluation and review – Schemes should be monitored and reviewed periodically to ensure that they continue to be successful and deliver the required function.
- Further Enhancements – Active travel interventions may evolve over time due to increased usage and therefore further enhancements should be considered if applicable.

5. Recommendations

5.1 Introduction

5.1.1 Northern Ireland is moving forward in terms of sustainable approaches and delivery. The proposed options that have been discussed in this report are outlined in a number of current policy documents with commitments to change from public bodies including:

- The Department's forthcoming Energy Strategy.
- The Department's Planning for the Future of Transport – Time for Change document.
- The emerging Council Local Transport Plans and subsequent Local Development Plan.
- The update of the Regional Strategic Transport Network Transport Plan (RSTNTP).

5.2 Recommendations

- 5.2.1 This report, including the How to Guide, provides a useful framework, outlining proposed methods and requirements to enable active travel delivery. This document can be used by the Department to develop and deliver at pace, sustainable transport measures which result in meaningful and permanent modal switch from private car in order to support transport decarbonisation and contribute positively to the development of the Northern Ireland Energy Strategy.
- 5.2.2 Transport is a key contributor to Northern Ireland's energy use and therefore successful delivery of active travel will contribute to targets aiming to decarbonise the Northern Ireland energy sector by 2050.
- 5.2.3 Prioritisation of options which can be delivered in town centres within a short timeframe will act as a basis on which to improve on with other options detailed within this report (full list of options listed in Appendix C).
- 5.2.4 A number of active travel interventions have been implemented to a degree in a worldwide response to the Covid-19 pandemic for example in Northern Ireland provision of temporary active travel schemes such as cycle lanes have required the reallocation of road space. However, this now needs to be considered on a permanent and more significant basis.
- 5.2.5 The use of active modes is higher than recorded historically as the population adjusts to the 'new normal' therefore implementation of appropriately targeted schemes may encourage a move towards permanent modal shift.
- 5.2.6 Outside of town centres it is recommended in the short term that shared use cycle paths are delivered, providing connections from segregated town centre infrastructure to residential areas; further complemented by the provision of LTNs.
- 5.2.7 Delivery of the proposed options may require the amendment of existing legislation such as parking orders which would be Council led and Traffic Regulation Orders (TROs) led by DfI. Any proposed changes to off street parking would be subject to Council approval and DfI holds responsibility for on street parking.
- 5.2.8 Local development plans are currently being updated by local Councils and will set out how each Council area will look in the future by deciding on the type and scale of development. Active travel should also be considered in the development of these plans to ensure that land-use policies and zonings enable more sustainable travel options.
- 5.2.9 Initiating engagement with relevant departments and stakeholders regarding short term option delivery should also be a priority in order to maximise on the active travel momentum caused by the Covid-19 pandemic.
- 5.2.10 In terms of next steps, it is recommended that **short term** options are considered a priority in town centres to improve accessibility for all including:
- Reallocation of road space including segregated cycle lanes in town centres
 - Parking demand management including consideration of improved public realm

- Targeted behavioural change campaigns
- Improved active mode accessibility to / from public transport

Appendix A – Barriers to Active Travel

Barrier	Description	Comment
Lack of Segregated Infrastructure	Lack of segregated cycling and walking network	Provision of fully segregated cycling / walking infrastructure is lacking in urban areas and is the preferred infrastructure for users.
Safety	Conflicts with traffic and personal safety	Real and perceived safety issues can act as barriers to active travel particularly around pinch points where cars have priority. Issues also exist in some areas around personal safety.
Mindset	Perception that car travel is the most convenient	Embedded perception in Northern Ireland that car travel is the most convenient particularly due to urban sprawl and out of town shopping locations. The layout of the current network favours car travel above other modes.
Long Distance Trips	Longer distance trips with multiple destinations	Perception that completing longer distance trips by active modes with multiple destinations i.e. kids drop off to school, commute, retail trips etc. is time consuming and not feasible. Current network layouts with poor linkages and access presents a physical barrier.
Spatial Issues	Large rural population	One third of the Northern Ireland population live in rural areas and sustainable transport has historically worked better in urban areas where people are located in relatively close proximity to each other and infrastructure is more readily available. Rural areas lack active travel connectivity.

Barrier	Description	Comment
Ability	Varying levels of cycling and walking ability	Real and perceived barrier to active travel in terms of physical ability and also confidence levels.
Public Transport Connections	Lack of active travel connections with existing public transport	Lack of safe and convenient walking and cycling routes to public transport services particularly in rural areas.
Affordability	Affordability of equipment or services	<p>Low income households who do not own a car may also find cycling or public transport unaffordable.</p> <p>2016 Urban Villages research in Belfast shows that in North Belfast 38% of respondents did not have access to a bike and 5% could not afford one. In South Belfast 46% did not have access to a bike and 3% could not afford one.</p> <p>Furthermore 14% of respondents in North Belfast and 16% in South Belfast considered public transport too expensive.</p>
Pollution	Poor air quality	Poor air quality related to congestion in urban environments is significant for active travel particularly those users using on road facilities. Belfast is reported by INRIX as being a highly congested city compared to other cities in the UK.
Social Exclusion	Exclusion of certain groups from active travel	Certain groups i.e. elderly, mobility impaired can feel excluded from active travel. This may also be the case for ethnic minorities due to cultural perceptions as researched by TfL and highlighted by the Governments Social Exclusion Unit.

Barrier	Description	Comment
<p>Parking</p>	<p>Dominance of car parking and lack of cycle parking</p>	<p>cities have large amounts of unregulated parking spaces. Parking is also not significantly expensive even within the city centres therefore encouraging</p>
<p>Funding</p>	<p>Lack of Government funding</p>	<p>Pre-covid, designated funding for smaller active travel infrastructure schemes was not as readily accessible.</p>
<p>Established Policy</p>	<p>Historical planning policies and standards</p>	<p>Policy has historically favoured the ‘predict and provide’ method, prioritising underestimating benefits associated with walking</p> <p>building residential dwellings in rural greenfield / areas. Rural population growth around 10% higher than urban population</p>

Appendix B – Opportunities for Active Travel

Opportunity	Description	Comments
Covid-19	Prompted changes in attitude and activity	The pandemic has changed attitudes and behaviour towards commuting, congestion and environmental impacts.
	Flexible working arrangements	The pandemic prompted a more flexible approach to the working day with varying hours and a dramatic reduction in the traditional commute to offices.
	Pop-up active travel schemes	In response to the pandemic i.e. reduction in traffic, low public transport use, pop up active travel schemes encouraged active travel.
Net Zero Carbon	Carbon Neutral Society by 2050	The Energy Strategy for Northern Ireland is currently undergoing consultation. It presents the Government's commitments to working towards a carbon neutral society by 2050. The consultation document considers travel and how an interventionist approach is required to shaping choices in order to deliver behavioural change.
Funding	Blue / Green Infrastructure Fund	Prompted by the pandemic as well as shifts toward sustainable development delivery; the Department has pledged £20million to funding for community led active travel schemes.
Policy Making	Shift in policy making towards healthier streets	The Healthy Streets approach has been widely adopted across the UK and prioritises walking cycling and public transport in order to create a healthy society with improved air quality and reductions in congestion.
Transport Methodologies	Decide and Provide Methodology	Traditionally transport infrastructure has been based on a 'predict and provide' approach which has been found to act as a barrier to sustainable transport with transport considered too late in the design process. Therefore, methodologies are shifting towards a 'decide and provide' approach which decides on the preferred future and provides the means to work towards it, which also accounts for uncertainty. The 'decide and provide' approach accounts for uncertainty through scenario

Opportunity	Description	Comments
		<p>planning i.e. plausible future year scenarios accounting for social trends. Furthermore, the DfT has committed to the development of an uncertainty toolkit in 2021 which is recommended for use alongside the ‘decide and provide’ approach when available.</p>
<p>Public Transport Network</p>	<p>Proposed public transport upgrades</p>	<p>Translink continue to invest in the public transport network with provision of the Glider bus service, construction of the Transport Hub in Belfast and introduction of new systems. These upgrades may encourage active travel for the part of the journey i.e. walking/cycling to access public transport services.</p>
<p>Alternative Modes</p>	<p>Ebikes / Scooters</p>	<p>Ebikes and Scooters are becoming increasingly popular. Ebikes have been approved for use on public roads via the Electrically Assisted Pedal Cycles Regulations NI however Scooters are not approved and can only be used on private land. Both modes may act as a popular mode for ‘last mile’ journeys in the future.</p>
<p>Park & Ride</p>	<p>Additional sites</p>	<p>Park and Ride sites have proven to be popular in Northern Ireland with six additional sites announced in 2020 / 2021. Continued expansion of the network would improve modal shift to more sustainable modes and could also provide active travel linkages.</p>
<p>Green Infrastructure</p>	<p>EV network expansion, Greenways and Quiet Lanes</p>	<p>The Energy Strategy for Northern Ireland proposes to develop an EV Charging Infrastructure Plan to support the upgrade and expansion of the charging network. The strategy includes forecasting for the need for charging points but also management and standards.</p> <p>A network of Greenways is proposed for Northern Ireland in both urban and rural areas allowing for direct linkage by active modes.</p> <p>Quiet Lanes in rural areas to enable safer links for active modes.</p>

Appendix C – Options for Active Travel

Option	Comments	Timeframe	Locality
Parking Demand Management	Controlling the availability and cost of parking through enforcement, longer parking control operation times, tariffs, shorter duration limits, tiered rates of charging and reducing existing on street parking stock.	Short Term	Town Centres
Reallocation of Road Space	Area specific reallocation of road space i.e. urban areas to include pedestrianisation, bus priority lanes and segregated cycle lanes.	Short Term	Town Centres
Behavioural Change Campaigns	Incentivised and targeted campaigns offering discounts / savings to those who travel by sustainable modes. Advertising campaigns to highlight additional offerings i.e. new links / legislation etc.	Short Term	NI Wide
Public Transport Linkage	Provision of increased linkage to walking and cycling routes, provision of services in areas where there is currently low service provision etc.	Short Term	NI Wide
Low Traffic Neighbourhoods (LTNs)	A LTN is a group of residential streets where temporary or permanent measures are implemented to restrict the passage of through traffic (such as through the use of bollards and planters) whilst still allowing pedestrians, cyclists, disabled users and emergency vehicles to travel through the area.	Short Term to Medium Term	Outside Town Centres
20mph Zones	The use of speed restrictions and traffic calming measures to reduce the adverse impact of motor vehicles in built-up areas primarily focused on improving road safety	Short to Medium Term	Areas with road safety issues
Ban on Pavement Parking	Provision of legislation to ban anti-social parking on pavements to improve accessibility for families, elderly and mobility impaired.	Short to Medium Term	Town Centres

Option	Comments	Timeframe	Locality
15-minute Neighbourhoods	People living within cities should meet their daily needs within a 15-minute walk or cycle including access to public transport which would enable longer distance	Short to Medium Term	Outside Town Centres
Park and Ride Network Expansion	Continued expansion of Park and Ride sites particularly in rural areas.	Short to Medium Term	Rural areas and along key commuter routes
Quiet Lanes	Appropriate for more rural locations providing shared space private car with reduced speed	Short to Medium Term	Rural Areas
Permanent Active Travel Schemes	Considering the success of pop up active travel schemes and progressing to more permanent installations.	Short to Medium Term	Town Centres
Green Infrastructure	Provision of a greenway network and increased linkages to areas of green space accessible by active modes.	Short to Medium Term	NI Wide
Intelligent Transport Systems	Provision of network wide Real Time Passenger Information. Provision of Mobility as a Service (MaaS) which integrates various modes of transport along with information and payment functions into a single mobility service.	Medium Term	NI Wide
Planning Policy Reform	Shift in planning in terms of land-use policies and delivery in terms of housing, employment and town centres adopting sustainable approaches. DfI is developing Local Transport Studies which encourage active travel and will inform the Local Development Plan.	Medium to Long Term	NI Wide
Clean Air Zones	In areas of poor air quality, high emission vehicles are banned, or tiered charges are applied depending on the vehicle's pollution level i.e. daily charges	Long Term	Areas with notable poor air quality i.e. town and

Option	Comments	Timeframe	Locality
	within different zones implemented via ANPR.		city centres
Congestion Charging	Congestion charging is often expected to decrease car-based demand due to additional personal cost however this can depend on the level of charges and the availability of realistic alternatives. The charging schemes require significant investment, enforcement and monitoring.	Long Term	City Centre
Workplace Parking Levies (WPL)	A WPL involves charging employers for parking which they provide to staff, either by taxing the employer directly or the employer can pass the cost to their employees. The revenue generated is then reinvested into public transport and active travel infrastructure.	Long Term	Town and City Centres
Parking Benefit Districts (PBDs)	PBDs allow parking users to pay the market prices for parking spaces and restrict parking permits; the revenue generated is used to pay for public services in those areas. They aim to reduce the provision of free or cheaper parking in towns and reduce vehicle circulation.	Long Term	Large Residential Areas in Town / City Centres

Appendix D – Resources / References

Research References

- AECOM (2021) Active Travel in Town Centres
- Belfast City Council (2016) Belfast Integrated Parking Strategy and Action Plan
- British Cycling Benefits of Investing in Cycling
- British Parking Association (2013) Rethink Parking on the High Street: Guidance on Parking Provision in Town and City Centres
- The Chartered Institution of Highways & Transportation (2005) Parking Strategies and Management
- The Chartered Institution of Highways & Transportation (2019) Better Planning, Better Transport, Better Places
- CBI and KPMG (2021) Greener Miles; Delivering on a Net-Zero Vision for Commuting
- Climate Change Committee (2020) Sixth Carbon Budget, The Path to Net Zero
- CPRE (2103) Guide to Quiet Lanes
- Cycling UK (2016) Cycling and the Economy
- Department for Infrastructure (2020) Electrically Assisted Pedal Cycles (Construction and Use) Regulations (Northern Ireland)
- Department for infrastructure (2021) Making Belfast an Active City – Belfast Cycling Network
- Department for Transport & Department for Communities and Local Government (2007) Manual for Streets
- Department for Transport & Department for Communities and Local Government (2010) Manual for Streets 2
- Department for Transport (2017) Typical Costs of Cycling Interventions (Cycle City Ambition Schemes)
- Department for Transport (2018) Local Sustainable Transport Fund Case Study Evaluation – Impact of Sustainable Transport Measures on Town Centres
- Department for Transport & Sustrans (2019) Common Misconceptions of Active Travel Investment – A Review of Evidence
- Department for Transport (2019) Future of Mobility: Urban Strategy
- Department for Transport (2020) Public Opinion Survey on Traffic and Road Use
- www.enjoywalthamforest.co.uk
- European Commission (2020) Multimodal Optimisation of Road Space in Europe

- Halpern C. and McArthur J. (2019) Road Space Reallocation: Organisational, Institutional and political dimensions
- Journal of Transport and Health (2020) A Natural Experimental Study of New Walking and Cycling Infrastructure across the UK: The Connect2 Programme
- Marsden G. et al (2021) DecarboN8 - At a Crossroads: Travel Adaptations during Covid19 Restrictions and Where Next?
- Northern Ireland Executive (2010) Sustainable Development Strategy – Everyone’s Involved
- Public Health England (2016) Working Together to Promote Active Travel
- Shoup D. (2004) Parking Benefit Districts The Ideal Source of Public Revenue
- Shoup D. (2016) Parking Benefit Districts
- Sustrans (2003) Graz Study
- Transport for London (2007) Congestion Charging in Central London: A Retrospective
- Transport for London (2018) Walking and Cycling the Economic Benefits
- Transport for London (2020) Active Travel Funding – Lessons learned from Phase 1 and opportunities for Phase 2
- Transport for London (2020) Mayor’s Guidance on Workplace Parking Levy
- Transport for Scotland (2021) Guidance for Community Bike Share Schemes
- TRICS (2021) Guidance Note on the Practical Implementation of the Decide & Provide Approach
- Ulster University Research on Property and Planning Centre (2019) Creating a more effective and sustainable housing development model for NI
- Global Energy Review (2020) www.iea.org
- We are Cycling UK (2014) Contra-flow Cycling
- https://www.ageuk.org.uk/globalassets/age-uk/documents/reports-and-publications/reports-and-briefings/active-communities/rb_june15_the_future_of_transport_in_an_ageing_society.pdf
- <http://content.tfl.gov.uk/barriers-to-cycling-for-ethnic-minorities-and-deprived-groups-summary.pdf>

How to Guide References

- The Chartered Institution of Highways & Transportation (2018) Buses in Urban Developments
- Department for Infrastructure (2000) Creating Places: Achieving Quality in Residential Environments
- Department for Infrastructure (2016) Exercise-Explore-Enjoy: Strategic Plan for Greenways NI

- Department for Transport (2004) Smarter Choices – Changing the Way We Travel
- Department for Transport & Department for Communities and Local Government (2007) Manual for Streets
- Department for Transport & Department for Communities and Local Government (2010) Manual for Streets 2
- Department for Transport (2013) Transport Analysis Guidance Unit M5.2 Modelling Smarter Choices
- Department for Transport (2017) Enabling Behaviour Change Information Pack
- Department for Transport (2017) Local Cycling and Walking Infrastructure Plans Technical Guidance
- Department for Transport (2020) Local Transport Note 1/20 Cycle Infrastructure Design
- Department for Transport (2020) Transport Analysis Guidance Unit A5.1 Active Mode Appraisal
- Department for Transport Local Sustainable Transport Fund Evaluations
- Newham and Waltham Forest Low Traffic Neighbourhoods | Enjoy Waltham Forest
- Sustrans (2021) Traffic Free Routes and Greenway Design Guide
- UK Government (1997) The Road Traffic Regulation (Northern Ireland) Order
- UK Government (2020) Electrically Assisted Pedal Cycles Regulation NI

