

# IMPLEMENTATION PATHWAYS

CYCLING INFRASTRUCTURE



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# INTRODUCTION

## The purpose of this guide and the meaning of Net Zero for cycling infrastructure projects

Road transport currently accounts for 22% of all carbon emissions in the UK and is a major contributor to poor levels of air quality. The UK will only meet its net zero 2050 target and address the climate emergency in a meaningful way if it supports a modal shift to green and active travel. This will be achieved by implementing the necessary infrastructure, schemes and monitoring frameworks in its towns and cities that promote convenience, affordability, and safety complimented with the shifts required in behaviour.

To help reach the net zero by 2050 target, the UK government hopes to build on the surge in active travel during the pandemic, namely walking and cycling, with a £338 million package. **During the pandemic, the benefits of reducing the number of motor vehicles on roads were demonstrated through the reduced emissions and thus reduced levels of air and noise pollution.** In fact, 2020 heralded a cycling rise beyond the previous 20 years put together, with the number of miles cycled on British roads rocketing by 45.7%<sup>1</sup>. **UK towns must respond to the increase in demand for cycling by providing the infrastructure to enable all people to cycle, specifically considering all levels of confidence or experience.**

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<sup>1</sup>£338 million package to further fuel active travel boom - GOV.UK ([www.gov.uk](http://www.gov.uk))

The ICE has recommended that active travel provision should be prioritised to maintain this positive shift to healthier modes of transport<sup>2</sup>. **Green public transport, cycling and walking investment is one of the 10-point plan action areas in the UK's commitment to a Green Industrial Revolution.** This investment will not only support the net zero target, but also contribute to health and wellbeing outcomes.

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<sup>2</sup>Growing Back Better: Putting Nature and Net Zero at the Heart of the Economic Recovery ([Link](#))

**To secure these outcomes, towns in the UK must focus on enabling active travel** rather than private vehicles, even if they are electric. Research shows that lifecycle emissions from cycling can be 30 times lower than a fossil fuel car, and 10 times lower than an electric car<sup>3</sup>. Active travel elicits physical activity, which can help to prevent and manage over 20 chronic conditions and diseases, including some cancers, heart disease, type 2 diabetes and depression<sup>4</sup>. **This will not only secure health and wellbeing outcomes, but economic ones too, through savings from reduced hospital admissions and premature deaths.**

**Infrastructure that is invested in now, will potentially still be in place in 2050.** Therefore, it is important that we are focusing on the right infrastructure initiatives to support meeting net zero targets. In some cases, using existing infrastructure like disused railway lines can reduce the carbon involved in delivery.

This document sets out some guidance for how to ensure that towns in the UK are delivering cycling infrastructure to meet net zero, whilst supporting healthy, active communities.

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<sup>3</sup>The climate change mitigation effects of daily active travel in cities (2021) ([Link](#))

<sup>4</sup>Gear Change: A bold vision for cycling and walking (2020) ([Link](#))



## UNDERSTANDING THE TOWNS FUND PROJECT TYPE

Active travel will be encouraged via the provision of well-designed spaces and supporting infrastructure. The factsheets below provide examples of cycling infrastructure and associated improvements to create more people-centric neighbourhoods. Project details include design of new active infrastructure routes, and value from six towns (Mansfield, Newark-on-Trent, Ipswich, Darlington, Crawley, and Great Yarmouth) who have published their Town Investment Plans.



# NEWARK-ON-TRENT

## NEWARK CYCLING TOWN

### ENHANCE THE EXPERIENCE AND EASE FOR RESIDENTS, VISITORS AND EMPLOYEES TO PROMOTE SAFE CYCLING

Newark is promoting a modal shift to active travel to **promote positive health outcomes, reduce congestion, and reduce carbon** impact.

Newark has received confirmation of a **£0.2m investment** in cycling infrastructure as part of the Towns Fund. This will be integrated into a movement strategy for the town. The guiding principle is the creation of a '20-minute town'. The project seeks to provide affordable cycle hire and cycle hubs. Discounted community memberships have been proposed in order to ensure the project is accessible to all groups, especially economically-deprived groups, who can gain significant benefit from access to a low cost and healthy mode of transport<sup>5</sup>. The Council is also seeking to partner with provide bikeability training to ensure the community has skills to access cycling infrastructure. The project would sit alongside work already under way with Nottinghamshire County Council and the D2N2 LEP, focusing on cycling routes and associated infrastructure detailed in the county's Local Cycling and Walking Infrastructure Plan<sup>6</sup>.

<sup>5</sup>Cycling for everyone: A guide for inclusive cycling in cities and towns (2020) ([Link](#))

<sup>6</sup>Newark cycle town funding approved during Towns Fund update (2021) ([Link](#))



Jonathan Bewley, from "Cycling for everyone: A guide for inclusive cycling in cities and towns" by Arup and Sustrans



# DARLINGTON

## CYCLE DEVELOPMENT

### ENHANCE THE TOWNSCAPE AND URBAN REGENERATION

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Darlington is undertaking several projects that promote cycling, including, along the River Skerne, Victoria Road and improving access along Skinnergate in the Town Centre. The route following the River Skerne, between the historic Skerne railway bridge and the town centre, will encourage people into the area and create an important strategic link with the cycle network. The Victoria Road scheme improves the active travel route from our east coast mainline railway station and the town centre, with improvements planned to make Skinnergate a more user friendly street for active travel.

The town is securing investment for the Rail Heritage Quarter. Which is a key destination along the proposed 26-mile walking and cycling route which will follow the course of the original Stockton and Darlington Railway line, the first steam passenger rail route in the world. External to the Towns Fund, investment from the Active Travel Fund has been received to create a number of cycle and walking routes across the region. Part of this work is a project is creating a high quality cycle route into the town centre from the west.





# **CRAWLEY**

## **INVESTMENT IN A PRIORITY ARTERIAL CYCLE ROUTE FOR COMMUTERS**

### **PROVIDE A SAFE, RELIABLE AND HIGH-QUALITY CYCLE ROUTE TO ENCOURAGE ACTIVE COMMUTING**

Crawley is developing a segregated cycle track linking Crawley's key employment destinations to promote active travel that **reduces congestion**, **increases wellbeing** of the local workforce and **reduces carbon** impact.

The project will contribute to creating a priority cycle route connecting the borough's three main employment destinations with Crawley Town centre and access to a new bus station, which is being delivered by a complementary scheme<sup>7</sup>. The route has been selected based on a list of preferred routes as identified by Crawley's Local Cycling and Walking Infrastructure Plan<sup>8</sup>.

<sup>7</sup>Crawley moves to next stage to develop £21.1m Towns Fund Programme (2021) ([Link](#))

<sup>8</sup>Crawley Local Cycling and Walking Infrastructure Plan (2020) ([Link](#))



# THE BENEFITS AND OPPORTUNITIES OF NET ZERO

The business case for cycling in terms of the carbon saved for every £1 invested is one of the best carbon reduction investments a city can make and is complemented with numerous additional benefits such as air quality improvement and health.

By encouraging people to switch mode from motor vehicles to cycling (and walking), the benefits of net zero active travel include:

- A reduction to **carbon emissions**
  - People who cycle on a daily basis have 84% lower carbon emissions from all their daily travel compared to those who do not cycle.
  - When the life cycle of each travel mode is compared, taking into account the carbon generated by making the vehicle, fuelling it and disposing of it, emissions from cycling can be more than 30 times lower for each trip than driving a fossil fuel car, and about ten times lower than driving an electric one<sup>9</sup>.
- Improved **air quality** due to a reduction in emissions of particulate matter and nitrous oxide (NOx) associated with vehicle trips. It is estimated that meeting targets to double cycling and increase walking would lead to savings of £567 million annually from air quality alone, and provide opportunities to improve green spaces and biodiversity<sup>10</sup>. Furthermore, health inequalities are reduced as the most deprived people tend to live in areas with disproportionately poor air and noise quality<sup>11</sup>.

<sup>9</sup>The climate change mitigation effects of daily active travel in cities (2021) ([Link](#))

<sup>10</sup>Gear Change: A bold vision for cycling and walking (2020) ([Link](#))

<sup>11</sup>Environmental Quality and Social Deprivation (2018) ([Link](#))





- Improvements in **noise pollution** associated with decreased levels of motorised traffic has a positive impact on mental and physical health.
- **Improved health.** People experience greater physical and mental health and wellbeing due to being more physically active and breathing clearer air. The Government document '[Gear Change: a bold vision for cycling and walking](#)' cites many ways in which regular physical activity can improve health; for instance, it reduces the risk of depression by 30%, the risk of type 2 diabetes by up to 40% and the risk of cardiovascular disease by up to 35%. In the [DfT's Active Mode Appraisal Toolkit \(AMAT\)](#), health benefits are captured through valuing a) the reduced risk of premature death and b) increased productivity through reductions to absenteeism from work. This is particularly important in areas already suffering from poor health.
- Reduced congestion on roads, leading to **improved journey times**. The scale of this benefit can vary substantially depending on the type of road and location.
- Improved **journey quality** for people cycling, which can be included as a monetised benefit in economic appraisal based on research about people's willingness to pay for different types of cycle intervention.
- **A reduced risk of road traffic incidents** due to a reduction in vehicle kilometres. This is included as a benefit in the [DfT's Active Mode Appraisal Toolkit \(AMAT\)](#), although the AMAT does not currently estimate changes in accidents resulting from changes in the number of people cycling or walking, or from changes in infrastructure type e.g. the introduction of segregated cycle lanes.
- Dedicated cycling provision can **increase the diversity of people cycling**, by providing safe and continuous routes which consider a variety of journey types (not just commuting to work). For example, a Sustrans assessment of 7 major cities in the UK found that 76% of women who cycle or would like to start, would find cycle routes along the road (but physically separated from traffic) very useful to begin cycling or cycle more<sup>13</sup>.
- Reduce existing **health and economic inequalities** by enabling access to healthy and free/low cost transport modes, relative to the operating cost of motor vehicles.
- **Increase use of public transport** where active travel is well integrated (secure cycle parking, good way finding etc.), enabling longer journeys to be made by sustainable modes. In future this could be integrated into a **network of mobility hubs** which integrate walking, cycling, public transport and micro mobility to make it easier for people to travel seamlessly, rivalling the convenience of private car use.
- Improved access to town centres, which can generate **increases in footfall** and therefore boost local spend and jobs.
- A reduction in demand for infrastructure associated with car use, such as parking spaces, can potentially enable the **land to be repurposed** for other means to deliver a just transition to net zero.
- **Reduced maintenance costs** for highway authorities as a result of fewer vehicles travelling on the road infrastructure and hence less wear and tear.
- Improved quality of public realm areas and segregation from traffic increases the public **perception of safety** in the local neighbourhood.

<sup>12</sup>Future mobility hubs (2021) ([Link](#))

<sup>13</sup>Bike Life's 'Inclusive city cycling - Women: reducing the gender gap' (2018) ([Link](#))

# BUILDING A BUSINESS CASE

There is a national push to re-prioritise street space in favour of active transport modes. Providing funding and development opportunities that are supported by connected cycle networks will play a key part in attracting business and investment opportunities into towns.

Please see the Department for Transport's '[Investing in Cycling and Walking: The Economic Case for Action](#)' for further guidance. There is also specific guidance on producing the economic case for active travel projects in [Unit A5.1](#) of the DfT's Transport Analysis Guidance.

Planning and designing streets and neighbourhoods with safety and enjoyability at the forefront will make cycling and walking more appealing to those living in the town and local area. Changes in current design guidance, drawing on national advice in [DfT's Cycle Infrastructure Design guide](#), will be needed to **achieve good street design and drive change in community perception as well as attract new residents to the area**. Creating safe and enjoyable places promotes a sense of ownership over public space.



## THE PROJECT LIFE-CYCLE AND KEY INTERVENTIONS

From the design right through to implementation and monitoring, there are many opportunities to make emissions reductions at each stage of a new cycling development project. Depending on the scale of the project, achieving net zero can take time. The project should adopt near-term targets, drive rapid emissions reductions, and align with the leading global commitments on emissions reduction. The following interventions can be considered to develop cycling projects to drive down emissions and meet the needs of residents.



# DESIGN AND PLANNING

CLEAN AIR ZONE

When designing a vision for a new cycling infrastructure project with net zero principles, it is important to inspire creativity and keep community at the heart of the project.

This diagram illustrates what net zero cycling infrastructure might look like when integrated throughout a town. The infrastructure allows residents, workers and students to enjoy easy access to all amenities required for day-to-day living, whilst breathing clean air, partaking in physical activity, connecting with nature, and enjoying smoother and less noisy journeys through reduced congestion and traffic accidents. Being creative about the use of space, such as giving street and car parking over to cycle storage and lanes as well as natural features, will increase the quality of life for all.

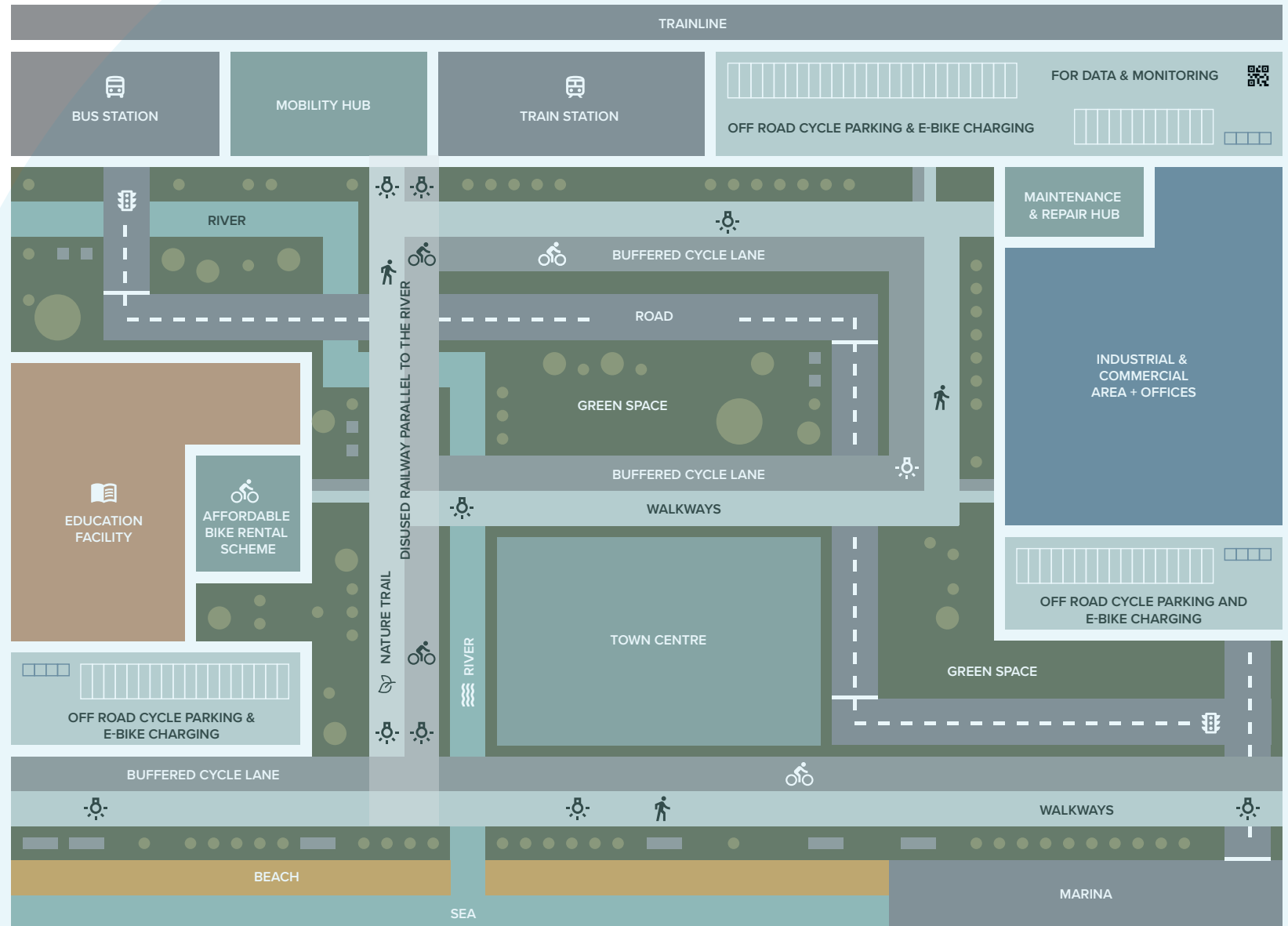
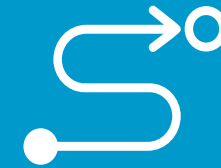


Fig. 1 Illustration of best practice cycling infrastructure

# THE PROJECT LIFE-CYCLE AND KEY INTERVENTIONS



The following should be considered during the design and planning phase of a cycle development project:



Planned transport upgrades present an opportunity for carbon reductions through adapting the design to champion active travel.



Temporary or pop-up cycle lanes that allow for social distancing could be maintained or expanded to maintain momentum for active travel.



Setting specifications with low carbon criteria ensures net zero aspirations are understood from the offset.



Electric cycles, scooters and associated charging infrastructure should be considered to enable residents, workers, and visitors to travel further and more easily.



Provision for cycle hubs, secure cycle parking, repair services and affordable cycle schemes should be considered during the design and planning phase, and engagement with providers of such schemes is encouraged.

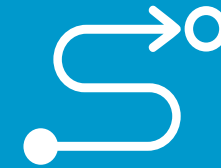


Engaging stakeholder groups such as the county council, local emergency services, businesses, charities and voluntary groups e.g. LTNs.



Careful design and selection of construction materials can reduce long term maintenance costs.

# THE PROJECT LIFE-CYCLE AND KEY INTERVENTIONS



## POLICY, FRAMEWORK AND EVIDENCE ALIGNMENT:

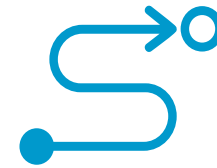
### National level:

- [Cycling and Walking Investment Strategy \(2020\)](#). This is the first report to Parliament on progress in delivering CWIS.
- [Cycling and Walking Investment Strategy \(2017\)](#). This was the first ever statutory CWIS and set out plans to “make cycling and walking the natural choices for short journeys, or as part of a longer journey, by 2040”.
- Government’s [‘Gear Change: a bold vision for cycling and walking’](#) July 2020, “putting cycling and walking at the heart of transport, place-making and health policy”, including investment in infrastructure.
- [Cycle Infrastructure Design Guidance \(2021\)](#) [Local Transport Note 1/20](#) provides comprehensive cycling design guidance.
- [Decarbonising Transport. A Better Greener Britain \(2021\)](#) outlines how decarbonisation can be achieved across transport sectors, with walking and cycling being key to this.
- The Government’s [Inclusive Transport Strategy \(2018\)](#) to achieve equal access for all.
- The [Future of Mobility Strategy \(2019\)](#) outlines the government’s approach to maximising the benefits from transport innovation in cities and towns.
- Public Health England: [‘Working Together to Promote Active Travel’](#) May 2016 identifies walking and cycling as the main focus to increase physical activity.
- The National Institute for Health Research report, [‘Moving Matters – Interventions to Increase Physical Activity’](#) July 2019 emphasises the need to provide suitable environments to support physical activity.

### Local level:

- “Local Cycling and Walking Infrastructure Plans” (LCWIPs)

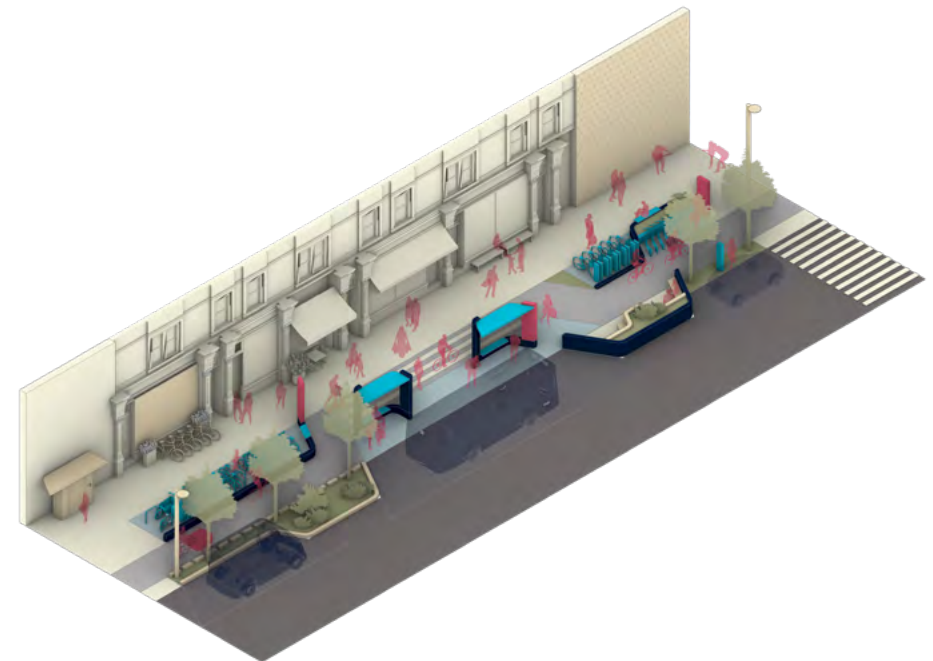
# THE PROJECT LIFE-CYCLE AND KEY INTERVENTIONS



## CONSTRUCTION

The following should be considered during the construction phase of a cycle development project:

- Engagement with community groups will be important as towns may have an active cycling community who would support these interventions, or appeal to people who currently do not cycle for various reasons including, but not limited to, lack of facilities. They can also help with training sessions to get locals confident enough to get on bikes.
- The use of natural materials or materials with lower embodied carbon should be prioritised for example carbon absorbing concrete.
- Materials and labour for construction projects should be locally sourced where possible.
- Integration of nature-based solutions should be considered: permeable paving; planting; trees; swales; and urban meadows. These will help minimise the urban heat island and can help to reduce flood risk. Nature-based solutions are also very popular with residents due to the uplift in value achieved.



# THE PROJECT LIFE-CYCLE AND KEY INTERVENTIONS



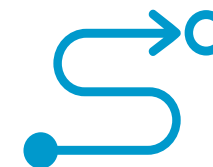
## OPERATION

Routine and seasonal maintenance plays a major role in cycle safety. The Government's [Cycle Infrastructure Design](#) document sets out general maintenance considerations in design and what typical maintenance routines look like. Regular inspections enable maintenance works to be cost effectively programmed and prioritised. The use of digital applications and remote alerts could improve repair times and monitoring of programmed maintenance schedules.





# THE PROJECT LIFE-CYCLE AND KEY INTERVENTIONS



## MONITORING AND EVALUATION

There is an established approach for quantifying many of the benefits delivered by cycling infrastructure. Steps to execute this include:

- identifying the benefits to be included;
- calculating a method for estimating each benefit, and ensuring that this is robust and based on solid evidence;
- estimating the baseline, including the number of trips affected (this could be based on counts of people / vehicles where this exists, but there are also tools that can potentially be used such as the [Propensity to Cycle Tool](#) and [Datashine](#));
- estimating the impact of the proposed scheme (guidance in TAG Unit A5.1); and where possible, quantifying and monetising the benefits using AMAT (links to resources below) or a bespoke tool.

A monitoring framework could be adopted to monitor impacts that are identified at the appraisal stage. Effective monitoring will help to identify actions that are not having the desired effect and understand where barriers or constraints have arisen. This can help the town to make changes as required to ensure targets for the uptake of new cycle infrastructure are met. TAG Unit A5.1 sets out considerations for monitoring and evaluating impacts.

Sharing the findings of monitoring activities with the wider stakeholder networks, such as the county council, local emergency services, charities, voluntary groups and businesses such as those with shopfronts near a planned cycle route or local bike rental schemes, is important because it maintains engagement and attracts ongoing support and investment.

Additionally, the introduction of a forum or a digital framework could be used to engage the general public and aid monitoring and usage of the infrastructure and associated cycling facilities. A digital framework could include features such as Internet of Things (IoT) sensors and analytics, digital technologies such as smartphone applications and QR codes on electric charging infrastructure, using MaaS (Mobility as a Service) to facilitate real-time journey information and integrated payments, and installing physical assets and infrastructure such as fibre and WiFi along cycle routes for connectivity.

Overall, these digital measures would provide useful information on actual uptake of new infrastructure and its efficiency as well as enhance the active mobility journey experience.



# LIST OF EXISTING GUIDES

GUIDE	AUTHOR	LINK
How to achieve a walking and cycling transformation in your city	C40	<a href="#">Link</a>
NACTO's urban bikeway design guide	NACTO	<a href="#">Link</a>
Walking and Cycling Benefits Tool	C40	<a href="#">Link</a>
UK Government's Cycling and walking investment strategy: active travel investment models	UK Government	<a href="#">Link</a>
15-minute cities: How to develop people-centred streets and mobility	C40	<a href="#">Link</a>
Grow Cycling: A Toolkit to Rapidly Grow Cycling in Your City	ITDP	<a href="#">Link</a>
Designing for all ages and abilities: contextual guidance for high-comfort bike facilities	C40	<a href="#">Link</a>
Streets for Pandemic Response and Recovery	NACTO	<a href="#">Link</a>
Cycle Infrastructure Design guide Local Transport Note 1/20	Department for Transport	<a href="#">Link</a>
Active Mode Appraisal Toolkit User Guide (AMAT)	Department for Transport	<a href="#">Link</a>
TAG: social and distributional impacts worksheets	Department for Transport	<a href="#">Link</a>
Propensity to Cycle tool	PCT	<a href="#">Link</a>
Datashine	UCL	<a href="#">Link</a>
Investing in Cycling and Walking: The Economic Case for Action	Department for Transport	<a href="#">Link</a>
Cycling for everyone: A guide for inclusive cycling in cities and towns	Arup / Sustrans	<a href="#">Link</a>
Creating a Mini Holland in Waltham Forest	Waltham Forest Council	<a href="#">Link</a>
Future Mobility Hubs: Supporting the transition to sustainable journeys	Arup / Go Ahead	<a href="#">Link</a>

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