ENGLAND'S ECONOMIC HEARTLAND

Peterborough–Northampton-Oxford Connectivity Study

[Styled cover image to be provided by EEH]

Final Report

December 2022 v2.0

Prepared in partnership with

steer wsp

England's Economic Heartland (EEH) is the Sub-national Transport Body responsible for bringing together local transport authorities in a strategic partnership for the region extending from Swindon to Cambridgeshire and Peterborough and Northamptonshire to Hertfordshire. We advise the government on the region's transport infrastructure priorities.

Our 2021 transport strategy, *Connecting People, Transforming Journeys*, set an ambitious policy framework with the vision for our transport system:

"To support sustainable growth and improve quality of life and wellbeing through a world-class, decarbonised transport system which harnesses the region's global expertise in technology and innovation to unlock new opportunities for residents and businesses, in a way that benefits the UK as a whole."

Our strategy highlights **the region's economic importance to the UK**, with its success founded on science and technology innovation, powered by a network of world-leading universities and research centres.

Based on the **requirement to achieve net zero by 2050 at the latest**, we are supporting delivery of a net zero transport network. Our strategy sets out that we will work with infrastructure owners and operators to ensure that proposals brought forward for the development of the transport system reduce reliance on the private car.

At its heart, our transport strategy is the catalyst for addressing the challenges our transport system already faces and enabling economic growth while reducing emissions.-

The transport strategy commits EEH to **a programme of connectivity studies that examine key study areas across the region in detail.** Their aim is to identify a preferred package of multimodal infrastructure, service, or policy interventions to help achieve the transport strategy's objectives.

This study covers an area including parts of Cambridgeshire, Peterborough, North Northamptonshire, West Northamptonshire, Buckinghamshire and Oxfordshire local authorities.

Each of EEH's connectivity study areas were decided based on an evidence based assessment of the connectivity challenges and opportunities against our transport strategy principles in defined areas suggested during stakeholder engagement during our Outline Transport Strategy consultation.

Projects already underway or committed (such as East West Rail) are factored into the study, with the assessment process and final recommended packages of interventions focused on what further interventions may be needed.

The "*Peterborough-Northampton-Oxford Connectivity Study*" is led by EEH, supported by the consultancy team led by Steer, supported by WSP, 5th Studio and DMS Research & Consulting.

Study aims

The policy framework set out in the transport strategy is guided by four key principles that form part of how interventions were assessed and packaged as part of this connectivity study:

1. Achieving net zero no later than 2050, with an ambition to reach this by 2040.
2. Improving quality of life and wellbeing through a safe and inclusive transport system accessible to all which emphasises sustainable and active travel.
3. Supporting the regional economy by connecting people and businesses to markets and opportunities.
4. Efficient movement of people and goods through the region and to international gateways.

This report sets out the rationale for packages of interventions which will address the objectives and critical success factors developed for the study area. Its two key sections combine to form a pre-strategic programme outline case (SPOC):

Options Appraisal Process: This aligns with the strategic and economic dimensions within the Treasury's five case model and Department for Transport's (DfT's) transport analysis guidance (TAG). This considered the context, current and future situation, a long list of interventions, and the development of packages aligned with the strategy.

Recommended Connectivity Plan: This consists of the combined packages of interventions and initial consideration at a strategic level how they could be implemented in terms of rationale for delivery (via a theory of change framework) and finance.

The overall method is summarised overleaf.

Stakeholder engagement

Development of the transport strategy involved comprehensive engagement, including two rounds of public consultation, capturing the views of our partners, stakeholders, interest groups, businesses and residents.

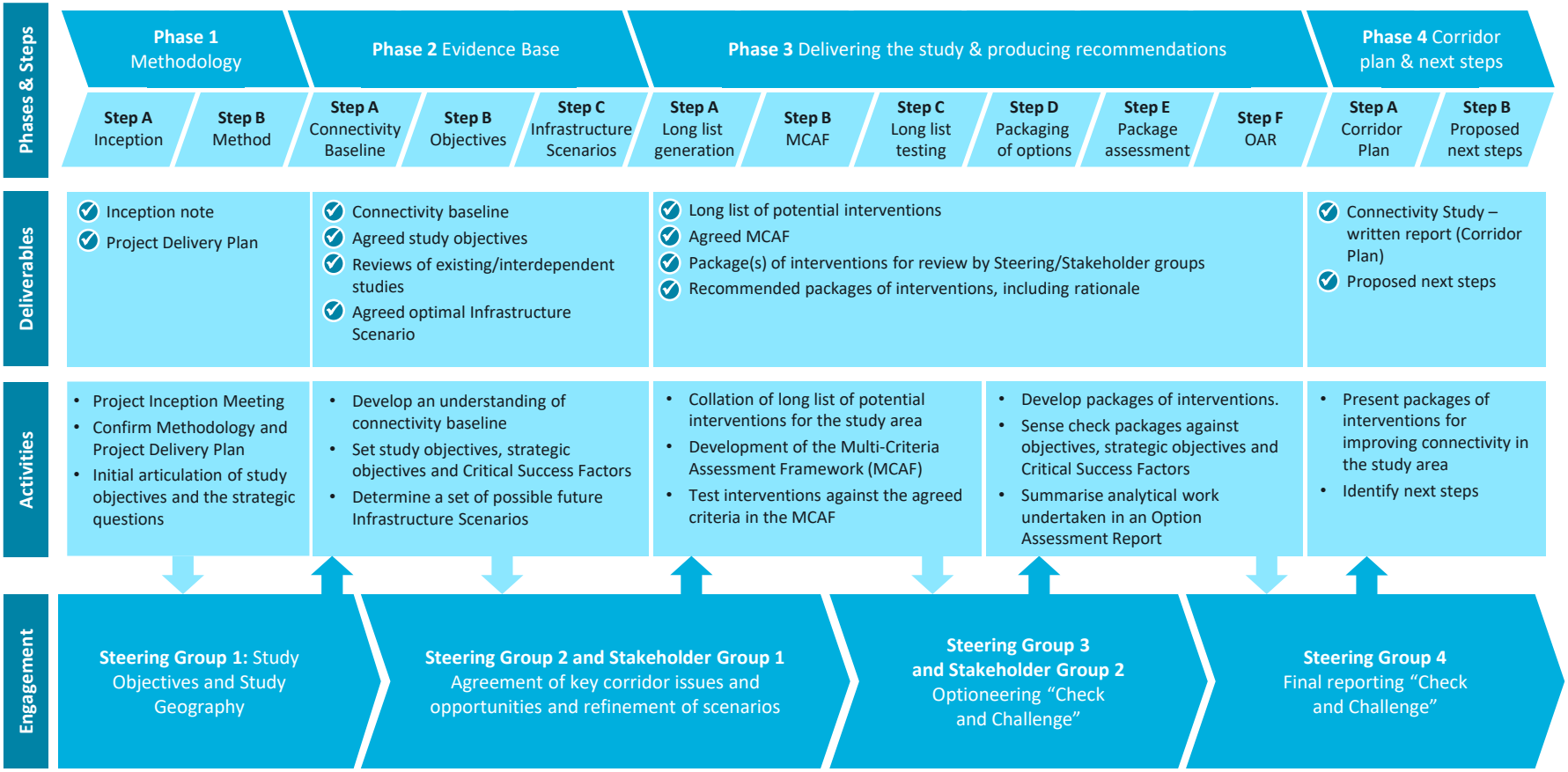
For this connectivity study, the project team worked collaboratively with stakeholders to develop the evidence base, identify possible interventions, and assess their likely impact and form them into packages.

In particular, the process highlighted increased acceptance of the need for change and the need to do so at pace, particularly with regards to decarbonisation.

Within this connectivity study, stakeholder engagement and connectivity evidence was gathered through the following forums:

- **Steering group**: Virtual workshops with local authority planning, local enterprise partnerships and transport officers to gain local insights into connectivity issues and opportunities.
- **Stakeholder group**: Virtual workshops were undertaken with transport, place and environmental stakeholder groups to gather insights on issues and opportunities and potential solutions. Topic specific one-to-one discussions were also held.
- **Call for evidence**: Call for evidence via an online survey, providing the opportunity for wider participation from members of the public, businesses and interest groups in identifying the key connectivity issues in the study area and potential interventions.
- **Expert panel**: An expert panel of public transport, active travel, road, freight and environment experts were engaged to capture any additional connectivity opportunities.

Study method



About the study area

This study examines the area comprising a long and relatively narrow arc across the north-western part of the EEH region. As well as the three larger settlements of Peterborough, Northampton and Oxford, this study also includes smaller towns along the arc, including Bicester, Brackley, Towcester, Wellingborough, Rushden, Kettering and Corby.

The area includes:

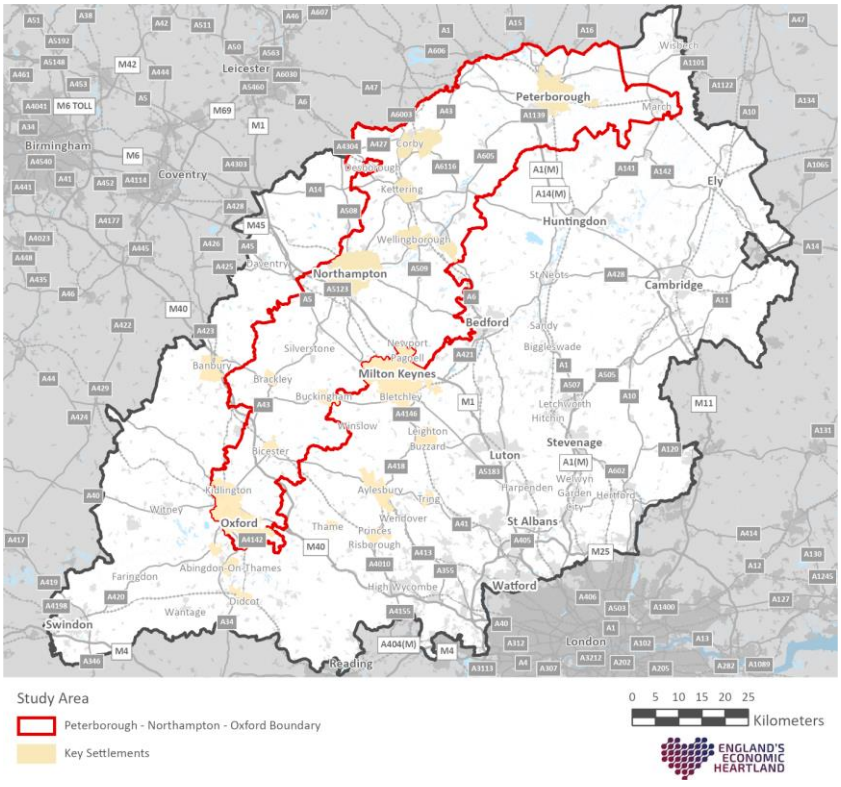
- The University of Oxford, which is top of the World University Rankings, while universities in Northampton and Peterborough have benefitted from multimillion pound investment in recent years
- The world-famous Silverstone racing circuit
- Bicester Village retail outlet, which attracts around seven million tourists per year
- The Silverstone Cluster of around 3,500 high-tech companies located within an hour's journey of Silverstone
- World-leading clusters in the life science, advanced manufacturing, agri-food and digital sectors
- Part of the East Midlands 'golden triangle of logistics'

The study area encompasses regional and nationally significant road and rail links. North-south routes include the M1, M40, A1, A34/A45, the Chiltern, West Coast, Midland, and East Coast Main Lines, as well as the, Cherwell Valley Line, Northampton Loop and Oakham to Kettering Line. East-west routes include the A41, A14, and A43, Oxford to Bicester Line, Ely to Peterborough Line and future East West Rail link (which will link Oxford to Milton Keynes by 2025).

Several large urban areas and international gateways are situated on the edge of the study area (Milton Keynes, Bedford, Birmingham, Birmingham Airport). Whilst these are not the focus of this study, they may influence future decision-making around transport interventions within the area.

There are significant opportunities and potential for investment in transport that can not only help support economic growth and levelling-up but also improve air quality, safety, health and wellbeing, support biodiversity net gain and contribute to net zero targets.

Figure 1: Study area



Where people live

The study area is polycentric, with the majority of the 1.2 million residents (as of 2019) living in the largest settlements of Oxford, Northampton, and Peterborough. Smaller settlements and rural communities are more dependent on larger towns for employment and access to key services. Between 2011 and 2019, the population of the study area grew by 7.5%[i]. Local Plans provide for significant increases in planned housing over the next 20 years. The connectivity study does not consider or influence options for future locations of growth – this remains the decision of the local planning authority through the established local plan process. Published local plans and national travel forecasts based on the government's National Trip End Model are evidence on which demand on the transport system has been mapped to inform this study.

Where people work

The area is home to a workforce of 602,000[ii], with the largest concentrations of employment in Northampton, Oxford and Peterborough. Outside these there are smaller concentrations of jobs across towns and more rural areas, resulting in a complex pattern of inter-urban commuting. The highest proportion of those are in the education and health sectors (12% in each)[iii].

Community diversity

The study area is socially and economically diverse, with pockets of deprivation found in Peterborough, Northampton, Wellingborough and Kettering, as well as the rural areas surrounding March. The average household income in the study area is £44,727[iv], with substantial variation between urban and rural communities and between residents living in the north and south of the study area. Areas of higher income households are focused to the west and north of Oxford, Bicester and across the Bicester-Buckingham-Silverstone area. Household affordability is highest in Peterborough and Northampton with lower affordability in the south of the study area, predominantly in Oxford.

Sustainable and active transport

Oxford has high levels of bus and active travel commuting, whereas Northampton residents are much more dependent on car travel. There are three main rail lines in the study area: Cherwell Valley Line, the Midland Main Line and the East Coast Main Line. Oxford, Northampton and Peterborough and surrounding towns are well connected by frequent bus services, whilst the more isolated and rural communities are poorly served.

Highway network and travel by car

The strategic highway connectivity comprises nationally significant radial routes. East-west connectivity through the area is more limited and there is no direct road link between Oxford, Northampton and Peterborough. Large parts of the highway network experience significant levels of delay and congestion in the peaks. Oxford, Peterborough and Corby have the highest number of electric vehicle charging points (EVCPs). In the smaller and rural communities, where car dependency is highest, there is limited EVCP.

Digital connectivity

Digital connectivity varies across the study area, with the lowest download speeds (less than 25 mb/s) in the rural communities. Such inconsistent coverage generates avoidable journeys, with pressure placed on local roads as those in more rural areas travel to access work opportunities and other services.

Landscape and protected areas

The geography and topography varies throughout the study area. Large areas surrounding Peterborough, excluding much of the west and much of the west of Oxford is categorised as flood zone 3. Only a small area of the study area is considered Greenbelt land, with areas around Oxford.

Carbon and air quality

In 2019, the total amount of carbon dioxide emissions in the study area equated to nearly two thirds of all transport carbon dioxide emissions in the EEH region. The largest air quality management area (AQMA) is located in the City of Oxford, with smaller, more localised AQMAs located in

Northampton, Kidlington, Bicester, Towcester, Olney and Whittlesey.

Challenges and opportunities – The need for intervention

The current challenges facing the Peterborough-Oxford-Northampton study area are primarily due to the high proportion of people living in small and medium sized settlements and rural communities which are harder to serve by active and sustainable travel modes, high levels of car usage resulting in significant levels of delay and congestion, lack of north-south rail connectivity, limited bus service provision in rural areas and lack of intra-urban high frequency bus services. Reinforcing the region's role as an economic and innovation powerhouse while also meeting the requirement to reach net zero emissions by 2050 at the latest creates a range of current and future challenges and opportunities.

These are summarised below:

Key challenges

- Transport interventions must reflect the diverse needs and demands of the study area's population. In many locations active travel is not an attractive mode choice for intra and inter-urban movements.
- Poor north-south rail connectivity within the study area and the low frequency of bus services in rural areas reduce the attractiveness of public transport and encourages the use of private car.
- High levels of car use will make it difficult to achieve net zero, particularly in Northampton and Peterborough.
- High levels of planned growth, particularly between Oxford and Silverstone, will result in significant increases in population, jobs and travel demand. This will place pressure on an already constrained transport system and could negatively impact upon the local environment, levels of sustainable travel and the quality of place.
- Capacity and congestion issues on the existing road network need to be addressed, particularly on the A34, M40, and A43

Key opportunities

- The study area is characterised by a diverse and highly skilled workforce. Transport investment will provide better connectivity between the workforce and employment opportunities.
- In areas of significant planned growth (e.g., outskirts of Northampton and Oxford and in Bicester) there is a strong opportunity to deliver high quality infrastructure that will promote active and sustainable travel.
- The most common travel to work distance for the study area ranges from 2-5km, which are achievable distances using active and sustainable modes thereby representing an opportunity to encourage modal shift.
- Transport is a significant contributor to carbon emissions in the study area. Improvements to the electric vehicle charging infrastructure will help facilitate a transition to zero emission vehicles.
- Trips between the longer distance urban areas such as Oxford, Northampton and Peterborough are currently low. However, this may be driven by existing constraints such as lack of high-quality public transport infrastructure. New / improved long-distance public transport services have the potential to increase movement and stimulate economic growth in the study area.

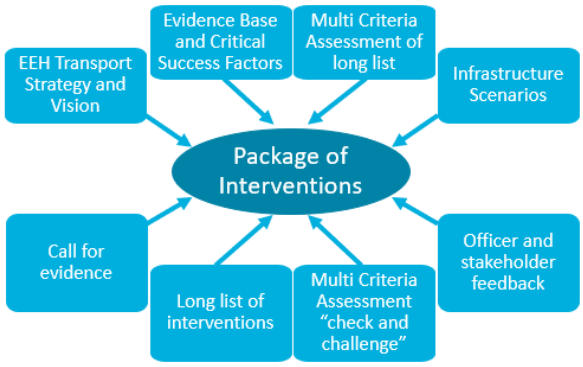
Objectives

Eighteen objectives were established for the Peterborough–Northampton-Oxford study area based on the Evidence Base and issues and opportunities identified. These are centred around the four key strategic principles set out in England's Economic Heartland's Transport Strategy.

Key Principles from England's Economic Heartland's Transport Strategy			
Achieving net zero no later than 2050, with ambition to reach this by 2040.	***Improving quality of life and wellbeing through a safe and inclusive transport system which emphasises sustainable and active travel.***	***Supporting the regional economy by connecting people and business to markets and opportunities.***	***Efficient movement of people and goods through the region and to international gateways.***
Objectives for Peterborough – Northampton – Oxford study area			
1a – Reduce the need to travel through a suite of interventions which support alternatives to travel. **1b** – Deliver a 'smart' transport network that uses digital technology alongside other physical measures to manage transport demand, encourage shared transport and make more efficient use of the network. **1c** – Facilitate a transition to zero-emission transport modes and support greening of the grid to minimise overall carbon impacts of transport. **1d** – Promote the use of sustainable and active travel modes.	**2a** – To create a transport network within the corridor that is affordable and accessible for all and supports social inclusion. **2b** – Minimise the impact of transport-related air and noise pollution on local communities. **2c** – Facilitate increased active travel, including as part of longer first mile /last mile journeys and promote the associated health benefits. **2d** – To improve sustainable access to education, health, leisure and retail opportunities. **2e** – To provide a transport network that supports new flexible working patterns.	**3a** – To improve connectivity by sustainable means to strategically important economic assets within the corridor (including major town and city centres, Enterprise Zones, Science Parks, Research and Technology Zones). **3b** – To improve connectivity by sustainable means to medium sized towns/Market Towns and rural locations. **3c** – Enable a boost in productivity through better connecting a skilled workforce with high growth, high value opportunities. **3d** – To improve accessibility to/from new development.	**4a** – Develop a transport network which maximises the benefits of East-West rail. **4b** – To improve efficiency of movement of people and goods through the corridor and to key international gateways. **4c** – Develop a seamless, integrated network with transport users at its heart. **4d** – Facilitate sustainable first mile/last mile connectivity for people and goods in both urban and rural areas. **4e** – Enable an increase in sustainable movement of freight.

Package Development

EEH has worked with key stakeholders and technical advisors to develop a set of coherent packages that, together, are designed to deliver EEH's vision and a set of agreed objectives for the connectivity study area. The inputs informing package development are summarised below.



Critical Success Factors

Critical success factors were identified to provide an articulation of the need for intervention informed by a current and future evidence base. They also assisted in providing specificity around outcomes and supported long list assessment and option development. These are listed below:

1. Improved digital infrastructure reduces the need to travel.
2. The carbon emissions of transport are reduced to net zero by 2050.
3. Improved transport connectivity enables sustainable and high-quality development growth, helping to address inequalities and accessibility issues.
4. The benefits of new technologies that enable improved connectivity are accessible to everybody.
5. There is a step change in public transport connectivity within and between our urban areas (including Market Towns) and areas of strategic interest.
6. A high-quality, sustainable, integrated an accessible transport network connects the study area's strategic economic assets.
7. Rural and more deprived communities are well connected to key opportunities by the public transport network.
8. Public transport provides a competitive alternative to car for longer distance trips in the study area.
9. The transport network supports sustainable distribution of goods within and through the study area.
10. Active travel mode share within and between our towns and cities increases.

Long List Generation

An initial long list of interventions and options was developed from a wide range of sources, including a review of local transport planning policy documents and of the challenges and opportunities identified in the people, place and connectivity evidence base and input from stakeholders. In total, **114** interventions were included in the long list. These covered a wide range of topics including highway interventions, mass rapid transit (MRT) interventions including complementary bus and shared mobility options, rail interventions and strategic mobility hubs, active travel including walking/wheeling, cycling and micro-transit, and technology-enabled solutions including alternative fuels, connected and autonomous mobility, shared mobility and new integrated ticketing and business models.

Multi-Criteria Assessment

A multi-criteria assessment framework (MCAF) was developed and used as an early assessment and sifting tool for this study. The MCAF was used to sift out options that perform poorly, and to organise and compare options to help develop coherent packages of interventions. For each option, the following was assessed against of range of **strategic, economic** and **deliverability criteria**.

In addition to these three assessments above, assessment was made against the **critical success factors** and a set of **alternative futures,** allowing a test for resiliency against plausible futures.

Infrastructure Scenarios

Infrastructure scenarios represent different voices and approaches to infrastructure planning all of which could contribute to realising EEH's transport strategy and addressing the objectives and critical success factors of the connectivity study. The scenarios were used as a framework to guide package development with the infrastructure types replaced with specific interventions from the short list of schemes.


Tickets and trains
GET AHEAD
BY TRAIN
Corby

The Connectivity Plan

Delivery of the connectivity plan for the Peterborough-Northampton-Oxford area will enhance the region in its role as an economic and innovation powerhouse, as well as support the move to net zero transport tailpipe emissions.

It represents a comprehensive package of interventions which together meets the specific needs of the area, addressing the objectives and critical success factors identified by key stakeholders.

The connectivity plan is resilient to future changes to travel patterns and is optimised for a desirable 'high tech' future which includes widespread digital connectivity and technical innovation in the transport sector.

Decarbonisation

EEH seeks to achieve net zero carbon no later than 2050, with an ambition to reach this by 2040. This connectivity plan seeks to support these goals by decarbonising existing transport modes, supporting people to shift to more sustainable modes and reducing car use.

We have identified the opportunity for a step change in bus service provision within and between major conurbations within the area including mass rapid transit schemes for Oxford, Peterborough and North and West Northamptonshire. Bus segregation and priority infrastructure will improve journey times and reliability and make bus a more attractive option, in turn encouraging mode shift and limiting the carbon impact of travel.

Infrastructure enabling a smart and efficient highway network accelerating uptake of alternative fuel vehicles will also be delivered. This includes roll out of roadside electric vehicles charging points and connected autonomous vehicles supported by establishment of multi-modal mobility hubs and sustainable first mile /last mile urban freight delivery. This will enable smart, efficient, and decarbonized freight and highway trips. Our rural communities will also be supported in making low carbon choices via rural hubs and demand responsive transport.

Locally decided measures to manage demand on the transport network are being progressed by partners to reduce the impact of vehicles, and carbon, thereby improving health and wellbeing for their residents, visitors and businesses.

Innovation

Our transport strategy highlights the vital role our region plays for the UK economy, with its success founded on science and technology innovation, powered by a network of world-leading universities and research centres. This includes but is by no means limited to the universities of Oxford and Cambridge.

The study area is home to many of EEH's key innovation assets which can bring even more benefit to the region and wider community when we invest in the transport and digital infrastructure that connects them and upon which they rely. Optimising these assets involves investing in the transport and digital infrastructure upon which they rely.

An important part of the solution also includes allowing greater opportunities for new mobility and innovative ideas from the public and private sector to come forward, and more quickly.

While the East West Rail route east of Bicester falls outside of the study area, through interchange at Milton Keynes, Bedford, St Neots area and Cambridge the project presents an excellent opportunity to open passenger flows between Oxford and Peterborough, Northampton, and settlements in North Northamptonshire. In the longer-term, Northampton and Peterborough could form part of a wider East West Main Line, as outlined in Network Rail's Strategic Statement published March 2022.

Station improvements including those at Peterborough and Northampton will support this enhanced integration and increase the potential for interaction and knowledge spill overs, supporting improved innovation outcomes.

Sites such as Silverstone and Colworth Park are at the cutting edge of research and innovation. Delivery of infrastructure including bus and active travel routes and enhanced service provision, bringing frequent, reliable, and sustainable transport options to these enterprise zones from key towns and mainline stations, will support these areas.

Economy

The connectivity study area is a national driver of economic growth, home to more than 600,000 jobs. Investment in transport infrastructure is required to better connect skilled employees with high value jobs, helping businesses thrive.

Connectivity within the study area is currently focused around the highway network and interventions will seek to make best use of existing highway infrastructure to improve safety and reliability for all road users including for inter-urban public transport and active travel. Highway improvements including the A509 Isham bypass, A14 junction improvements and A45 Stanwick to Thrapston will improve safety and reliability on these routes for all users.

Ensuring the freight can be transported from and through the connectivity plan area is a priority. Improved opportunities for rail freight interchange at Bicester, and development of new rail freight paths via East West Rail, Welland Valley and Market Harborough will support increased freight movement by rail.

HGVs using A34 and A45 will be benefit from targeted improvements to junctions and signals.

Map Key

Connectivity study boundary

Key urban areas

Package 1 - Making best use of roads

- Bus-based MRT within major conurbations
- Arterial bus priority on key routes/key pinch points
- Enhanced Inter-urban public transport network
- Bus improvements (freq. and operating hrs)
- *Roadside infrastructure to optimise the performance/safety of autonomous vehicles (not mapped)*
- *Dynamic signage on key routes (not mapped)*

Package 2 - Supporting Rail to provide reliable strategic connectivity

- Station improvements to improve rail/bus/active travel integration
- New passenger flows making the most of East-West rail
- Line and service enhancements
- Line reinstatements and developing Rail based MRT system in major settlements
- New stations/re-opening

Package 3 – Supporting mode shift to active and sustainable modes

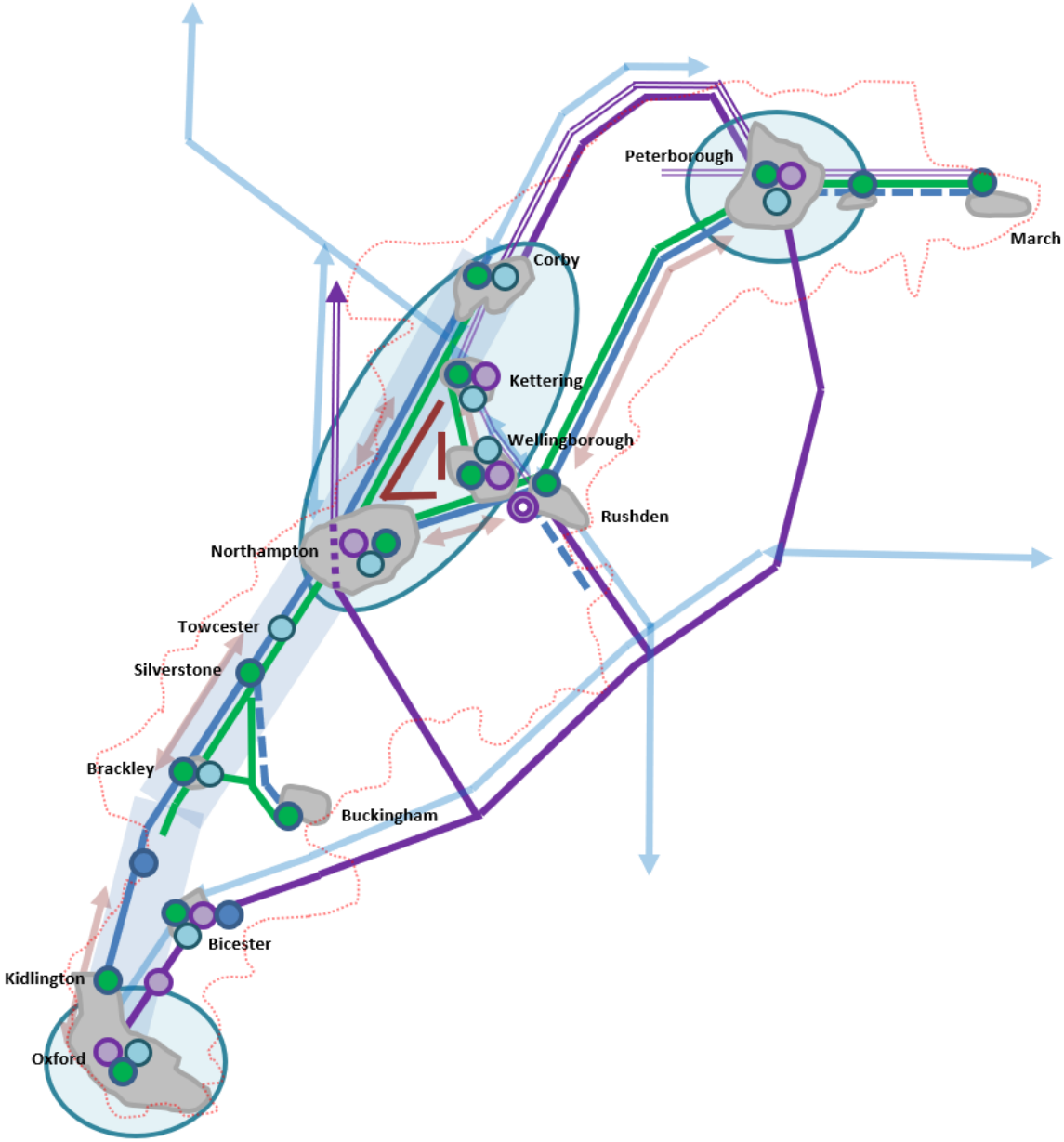
- Network of multimodal mobility hubs
- Inter-urban active travel network
- Support delivery of MaaS (not mapped)
- Increased adoption of shared transport incl. DRT (not mapped)
- Ensuring seamless wireless connectivity on key public transport routes
- Behaviour change campaigns

Package 4 – Enabling sustainable, planned development and a decarbonised fleet

- Highway - enabling access to development (for all modes)
- Highway - Improved reliability and safety packages
- *Accelerate uptake of alternative fuel vehicles through infrastructure* ***(not mapped)***
- *Integrated land use and transport planning* ***(not mapped)***
- ***Digital hubs (not mapped)***

Package 5 - Sustainable and efficient freight solution

- First mile/last mile - sustainable urban goods transport
- Freight connectivity (road)
- Freight connectivity (rail)



Package 1: Making best use of roads

This package will support improved sustainable connectivity through a study area which is heavily reliant on its highway infrastructure for inter-urban trips. This is achieved through improved and enhanced inter-urban road network for all users. This includes improved bus frequencies and operating hours, supported by arterial bus priority at key pinch points, to secure improved journey times.

Bus based mass rapid transit schemes will support intra-urban trips (including those between the key settlements in North and West Northamptonshire).

Improved connectivity by public transport to key economic assets such as Silverstone and Colworth Park help drive innovation.

This shift will see this package support growth in economic activity while reducing carbon, nitrogen oxide (NOx) and particulate matter (PMx) emissions.

Overview

This package is based on moving more people, more reliably and more quickly by making better use of existing road infrastructure with higher capacity vehicles including:

- bus based mass rapid transit (MRT) within major conurbations;
- arterial bus priority on key routes and improvements in bus frequency; and
- enhanced inter-urban transit network.

Interventions include:

- bus-based mass rapid transit systems in Oxford, Peterborough, and Northamptonshire
- inter-urban bus priority measures in targeted locations connecting key urban areas such as Bicester, Brackley, Corby, Kettering, March and Wellingborough.

Benefits for the study area

Highlight package benefits by 2050 (as modelled by EEHELUM) include:

- £105 million GVA uplift per annum (by 2050, 2018 prices).
- ~10,000 tonnes less vehicle CO2e emissions.

Key links to other packages

Local and regional benefits from improved bus services will be far greater where combined with improvements to improve integration with other modes, allowing a step change in connectivity within the area.

Bus integration will be key element of station improvements at Peterborough, Northampton, Wellingborough, Kettering, Bicester, Oxford and Oxford Parkway as set out in package 2.

A wider network of multimodal mobility hubs will provide further opportunities for integration between bus and all available travel options including innovative, decarbonised local shared options.

Finally, the bus fleet itself will be decarbonised as detailed in package 4.

Enabling actions support achievement of net zero carbon

To ensure delivery of interventions is aligned with EEH's transport strategy vision of net zero carbon by 2050 at the latest, consideration needs to be given to:

1. making sure alternatives are in place before road space is reallocated to allow road users to shift modes and or routes where possible,
2. making sure alternatives are understood to ensure road users understand the benefits of changes being made and any objections are addressed or at least limited, and
3. continual improvement to understand how things like bus rapid transit can best meet the needs of local users.

Map of package

Connectivity study boundary

Key urban areas

Existing rail network
Existing key road network

Bus-based MRT within major conurbations
- Northamptonshire MRT: Northampton-Wellingborough-Kettering-Rushden-Corby
- Oxford Bus Based Rapid Transit
- Peterborough MRT

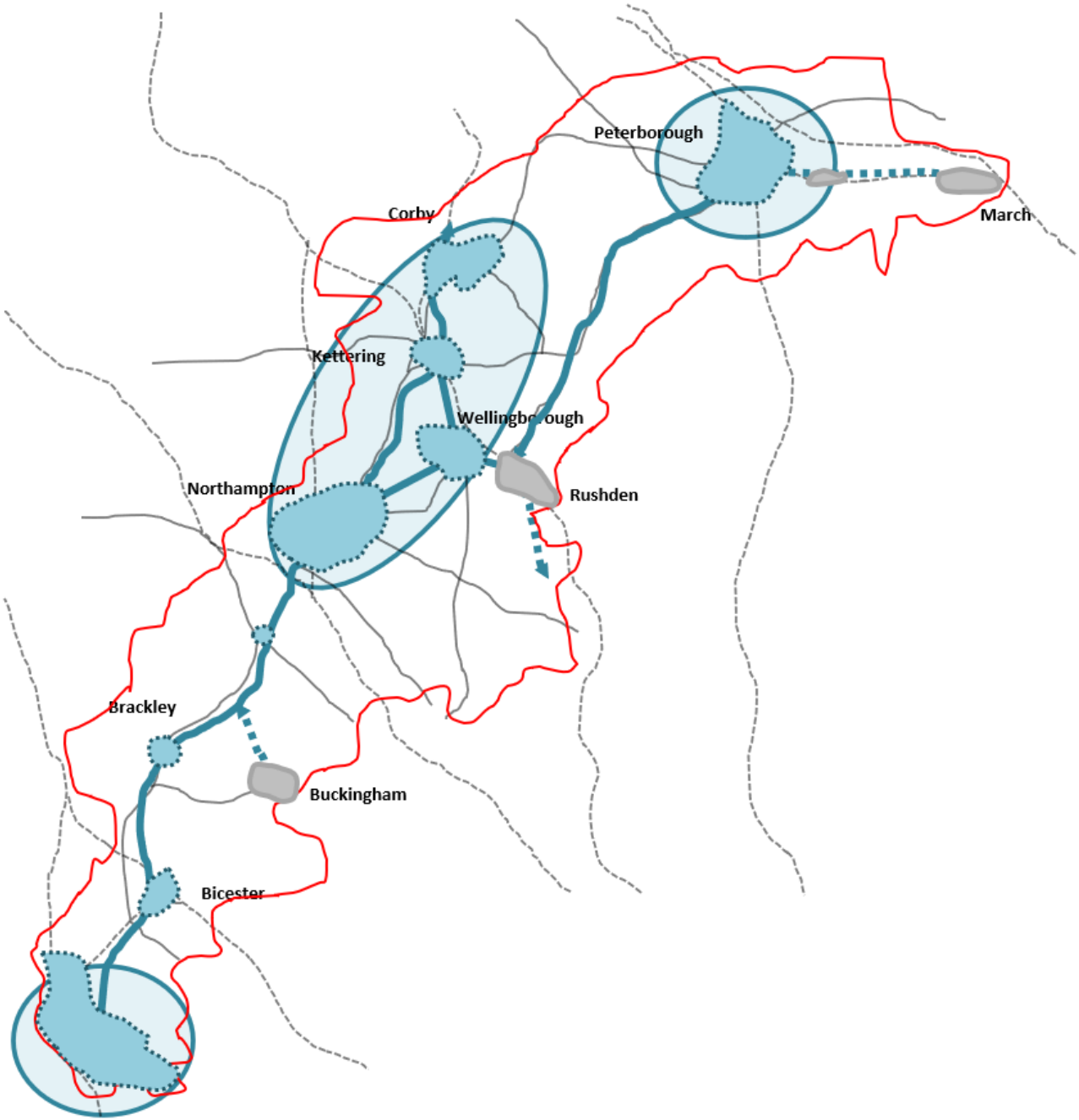
Arterial bus priority on key routes/key pinch points
- Peterborough
- Corby
- Kettering
- Wellingborough
- Northampton
- Towcester
- Bicester

Enhanced Inter-urban public transport network
- Rushden, Warth Park, Thrapston, Oundle and Peterborough via the A45 and / or A605.
- Oxford and Northampton via Silverstone, Bicester, Brackley and Towcester.
- Dynamic signage on key routes A34, A43, A1139, A45

Bus improvements (freq. and operating hrs)
- March - Whittlesey – Peterborough
- Colworth Park – Rushden
- Buckingham to Silverstone

Service quality improvements (not mapped)
- Increased availability of Real Time Information
- Develop Enhanced Partnerships or Franchising
- 15min bus frequency for intra-urban services
- Extension of bus operating hours
- Local free public transport schemes

Additional interventions (not mapped)
- Roadside infrastructure to optimise the performance/safety of autonomous vehicles



Package 2: Supporting rail to provide fast, reliable strategic connectivity

Rail is the most efficient way to move large numbers of people longer distances. This package is expected to increase daily return trips by 35%. East West Rail will present the opportunity to establish new passenger flows between both Peterborough and Northampton, to Oxford, helping to optimise and distribute the benefits of East West Rail throughout the connectivity study area and beyond.

Improving and expanding the rail network stimulates mode shift particularly for more strategic trips and a reduction in car use, supporting a reduction in transport's carbon impact. Improvements in journey times and reliability for all rail users reduces barriers to interurban connectivity supporting increased business interaction, knowledge spillovers and potential for agglomeration.

Overview

This package is based on making the most of the existing rail network while also creating new capacity due to:

- station improvements to improve rail/bus/active travel integration;
- making the most of East West Rail; and
- line enhancements and rail-based MRT system in major settlements.

Interventions include:

- investment in strategic transport interchanges at Kettering, Wellingborough, Northampton, Oxford, Oxford Parkway, St Neots/ Sandy and Bedford.
- new passenger flows making the most of East West Rail.
- line enhancements and reinstatements.

Benefits for the study area

Highlight package benefits by 2050 (as modelled by EEHELUM) include:

- £35 million GVA uplift per annum (by 2050, 2018 prices)
- 45% increase in daily return rail trips each weekday

Key links to other packages

Station improvements such as those at Peterborough and Northampton will support improved integration with a greatly improved active travel and bus network delivered by packages 1 and 3 respectively, ensuring that benefits are spread from these hubs.

The impacts of package 1 are expected to deliver a 30% increase in daily return weekday bus trips – this provides the opportunity for improvements in the form of rail-based MRT, as demand increases.

Line enhancements and reinstatements such as the Welland Valley Rail line and Northampton Market Harborough support opportunities for new freight flows as identified in package 5.

Enabling actions support achievement of net zero carbon

To ensure delivery of interventions is aligned with EEH's transport strategy vision of net zero carbon by 2050 at the latest, consideration needs to be given to:

- improving station connectivity ahead of services to maximise use of local walking, cycling and public transport connections by new and existing travellers;
- car park management to minimise their use by those with alternatives and grow potential catchment areas; and

integrate/simplify ticketing to reduce barriers for using new and existing rail services.

Map of package

- Connectivity study boundary
- Key urban areas
- Existing rail network
- Existing key road network
- Other key EW rail interchange

Station improvements to improve rail/bus/active travel integration

- Kettering, Wellingborough, Northampton, Oxford, Oxford Parkway, Bicester and Peterborough
- Step-free access at all stations to improve the accessibility
- Integrated bus and rail timetables

New passenger flows making the most of East-West rail

- Oxford-Northampton via EW Rail interchange at Milton Keynes
- Oxford-Kettering via EW Rail interchange at emphasizes Bedford
- Oxford-Peterborough via EW Rail interchange at St Neots

Line and service enhancements

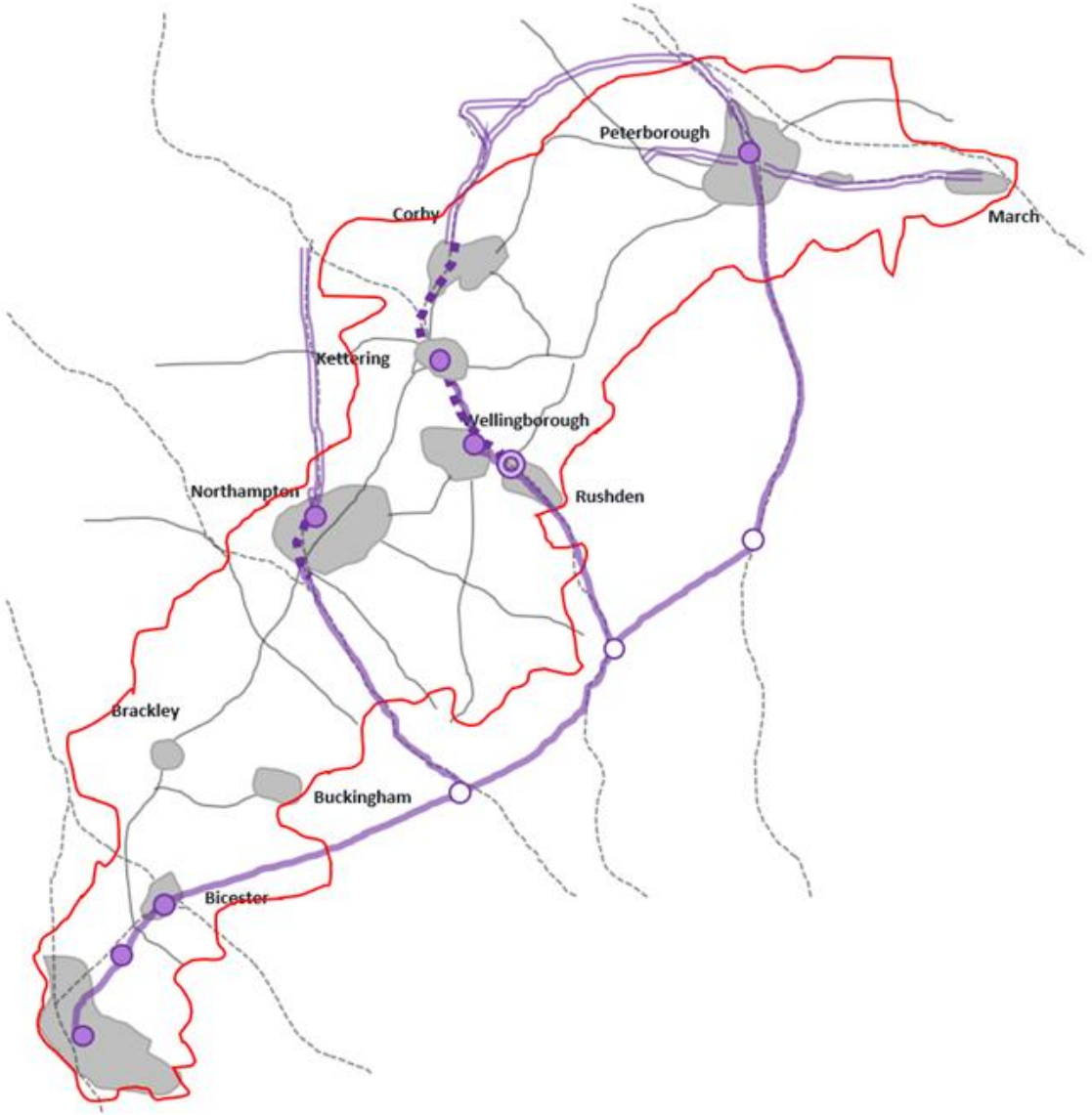
- Address journey times and capacity constraints through Northampton
- Improved service provision along Rushden - Wellingborough – Kettering – Corby corridor for local flows

Line reinstatements and developing Rail based MRT system in major settlements

- Reinstatement of the Welland Valley Rail (Luffenham chord/Manton chord) providing connectivity between Peterborough and Corby (and beyond).
- Re-open Wansford to Peterborough railway/Nene Valley Railway and associated park and ride
- Develop ultra-light rail corridor between Peterborough and March
- Northampton-Market Harborough - addressing need for connection between Northampton and Midland Mainline

New stations/re-opening

- Irchester



Package 3: Supporting mode shift to active and sustainable modes

When delivered in an integrated way, the benefits of the interventions in this package will allow all those living in and visiting the study area to obtain the various physical and mental health benefits from choosing these active travel options. The package also includes interventions which will further improve integration of all sustainable modes, making them easier to use, including a network of mobility hubs, associated innovative shared transport options, and an improved, integrated, consistent ticketing offer.

Reducing car use will be a key benefit of this package, especially for shorter trips, achieving significant reductions in associated carbon and NOx and PMx air quality emissions. This package will also improve the resilience, safety and comfort of the overall transport network for existing active travel users.

Overview

This package is based on reducing barriers to more people more often choosing to walk, cycle, etc. due to:

- improved walking and cycling infrastructure as part of inter-urban active travel network,
- network of multi-modal mobility hubs, and
- demand responsive transport (DRT) in rural areas.

Interventions include:

- a strategic network of multi-modal mobility hubs throughout the area;
- support to delivery of consistent fares, integrated ticketing and mobility as a service
- development of shared transport options including bike share, car clubs, car sharing, micro-mobility and rural DRT.

Benefits for the study area

Highlight package benefits by 2050 (as modelled by EEHELUM) include:

- 15% increase in active travel trips
- £60 million GVA uplift per annum (by 2050, 2018 prices)

Key links to other packages

A more consistent, integrated ticketing offer, in time developed in a full mobility as a service (MaaS) product, and the network of mobility hubs will support transfer from local active trips to inter-urban trips by bus (package 1) or rail (package 2).

The mobility hubs will enable the benefits of the connectivity plan to be felt across the area, including our market towns, smaller rural settlements and sites such as Silverstone. These mobility hubs will also present an opportunity for provision of public electric vehicle charging facilities as provided in package 4.

Safety and reliability benefits delivered through package 4 will further support use of active modes on key corridors such as the A45, A509, A605.

Enabling actions support achievement of net zero carbon

To ensure delivery of interventions is aligned with EEH's transport strategy vision of net zero carbon by 2050, consideration needs to be given to:

- effectively manage existing walking and cycling routes, such as ensuring enforcement action against illegal pavement parking, and
- ensuring schemes are integrated into existing urban environments and greenway networks, especially at either end of new walking and cycling routes delivered in a phases, and
- embedding mobility hub principles into local policies to ensure private developments reinforce rather than contradict interventions.

Map of package

Connectivity study boundary

Key urban areas

Existing rail network

Existing key road network

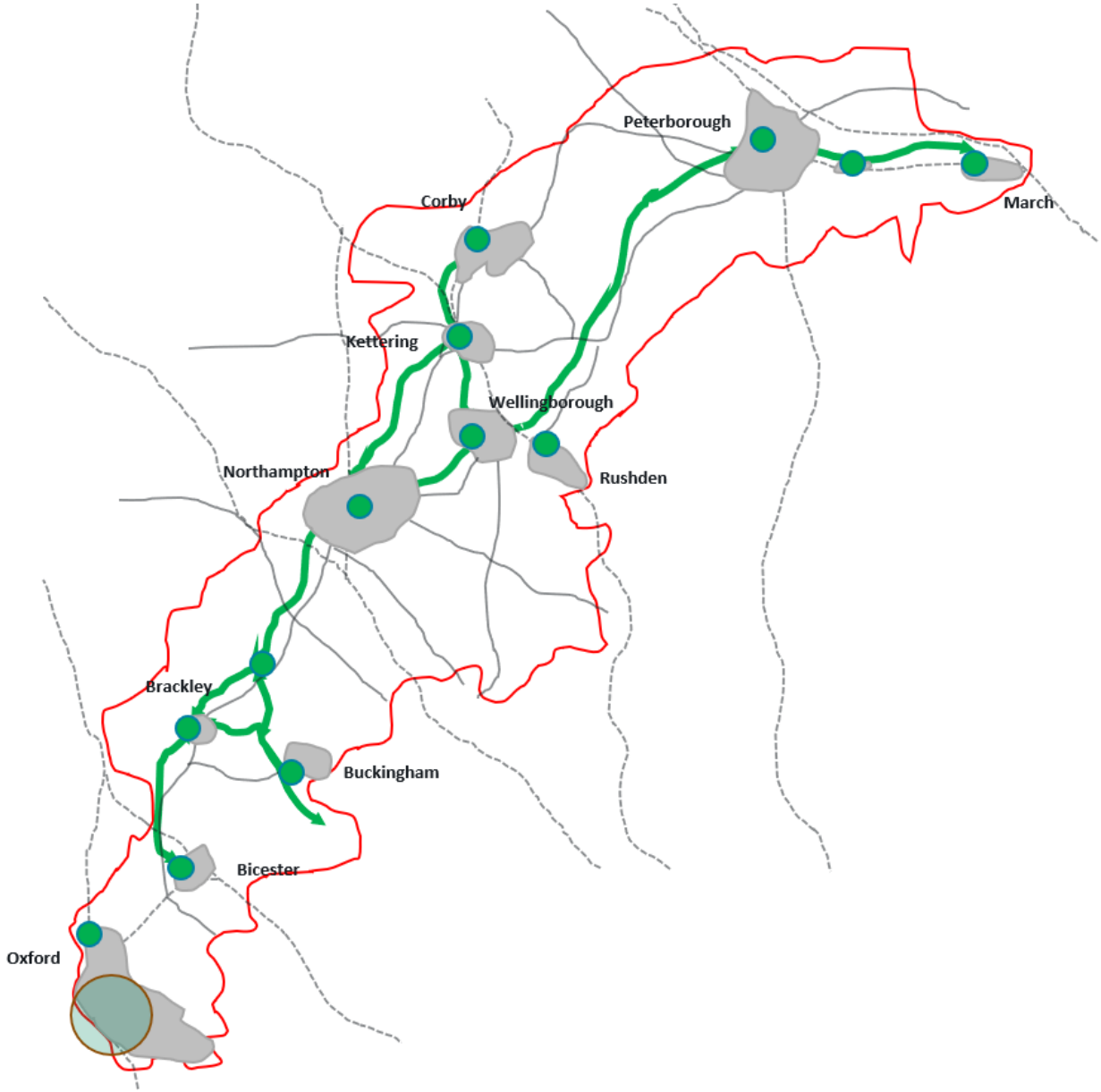
Network of multi-modal mobility hubs
- Oxford outer P&R sites
- Strategic network of mobility hubs

Not mapped
- Expansion of car sharing/car club schemes
- Develop micro-mobility modes such as bike share, e-bikes and e-scooters
- Development of car clubs/car sharing in rural areas
- Multi modal, integrated, consistent fares and ticketing
- Mobility as a Service (MaaS)

Inter-urban active travel network
- Winslow – Buckingham – Silverstone
- Brackley –Silverstone –Towcester – Northampton
- Northampton –Wellingborough
- Northampton – Kettering
- Corby – Kettering – Wellingborough
- Peterborough - Whittlesley – March
- Peterborough to Northampton (including Greenway)
- Improvements to National Cycle Network

DRT in rural areas (not mapped)
- Peterborough, North Northamptonshire, West Northamptonshire, Buckinghamshire and Oxfordshire

Additional measures (not mapped)
- Ensuring seamless wireless connectivity on key public transport routes
- Behaviour change campaigns
- Sharing good practice/learning regarding hybrid working with SMEs based in the study area



Package 4: Enabling sustainable, planned development and a decarbonised fleet

A key benefit of this package is to reduce dependency on private vehicles, particularly through providing access for all modes to housing, education, leisure, and employment opportunities. While integrated land use planning helps to centralise activities and reduce the need for travel, transport planning under this package helps to ensure people have a choice of mode, allowing them to choose the most sustainable and suitable for all or part of any given journey

Deploying charging (and or refuelling) infrastructure for zero emissions vehicles enables those who still choose to drive to do so with reduced environmental impact. It also supports expanded use of zero emissions buses, as well as even more sustainable electric modes such as e-bikes and e-scooters.

Overview

This package is based on increasing access to housing and facilitating shift to zero emissions vehicles due to:

- enabling highway access to development for all modes (car, bus, etc),
- provide infrastructure for alternative fuel vehicles (e.g. electric charge points), and
- Integrated land use and transport planning.

Interventions included

- improved highway reliability and safety packages on key routes
- support for roll-out of alternative fuelled vehicles

Benefits for the study area

Highlight package benefits by 2050 (as modelled by EEHELUM) include:

- £30 million GVA uplift per annum (by 2050, 2018 prices)
- ~20,000 tonnes less vehicle CO_{2e} emissions

Key links to other packages

Decarbonised bus fleets will be critical to realising the environmental benefits from bus improvements in package 1, maintaining the relative benefits of mass transit even as private vehicles are increasingly low or zero emissions.

In line with EEH's transport hierarchy, improved highway reliability and safety packages will support further complement the inter-urban active travel routes identified in package 3. This will give people the confidence they can make these trips in a safer more reliable way.

Integrated land use and transport planning interventions such as residential and workplace parking standards and travel planning, will provide additional incentivisation to use active modes, bus and rail and the associated improvements set out in packages 1, 2 and 3.

Enabling actions to support achievement of net zero carbon

To ensure delivery of interventions is aligned with EEH's transport strategy vision of net zero carbon by 2050 at the latest, consideration needs to be given to:

- ensuring charging infrastructure is in place across all regions to facilitate decarbonised journeys to, from and within the region,
- proactively communicate the benefits of integrated land use and transport planning from similar and or nearby areas before initiating local projects, and
- using events and temporary interventions to gain local buy in ahead of permanent changes.

Map of package

Connectivity study boundary

Key urban areas

Existing rail network

Existing key road network

Highway - enabling access to development (for all modes)

- A new road which will relieve traffic from the north of Northampton and surrounding villages.
- A509 Isham Bypass
- A43 dualling between the A45 and A14.
- A509 dualling of Park Farm Way west of Wellingborough.

- A14 junction capacity improvements at the Junctions 7 and 8 to the south west and north west of Kettering

Highway - Improved reliability and safety packages

- A605 between Thrapston and Peterborough
- A45 between Wellingborough and Northampton
- A45 Improvements between Stanwick and Thrapston
- A509 between Wellingborough and Kettering
- A43 between Corby and Northampton
- A43 between Towcester and Brackley
- A34 between Bicester and Oxford
- A1139 in Peterborough
- Using real-time data e.g.. traffic and pollution sensors, and roadworks to help optimise road network performance

Accelerate uptake of alternative fuel vehicles through infrastructure (not mapped)

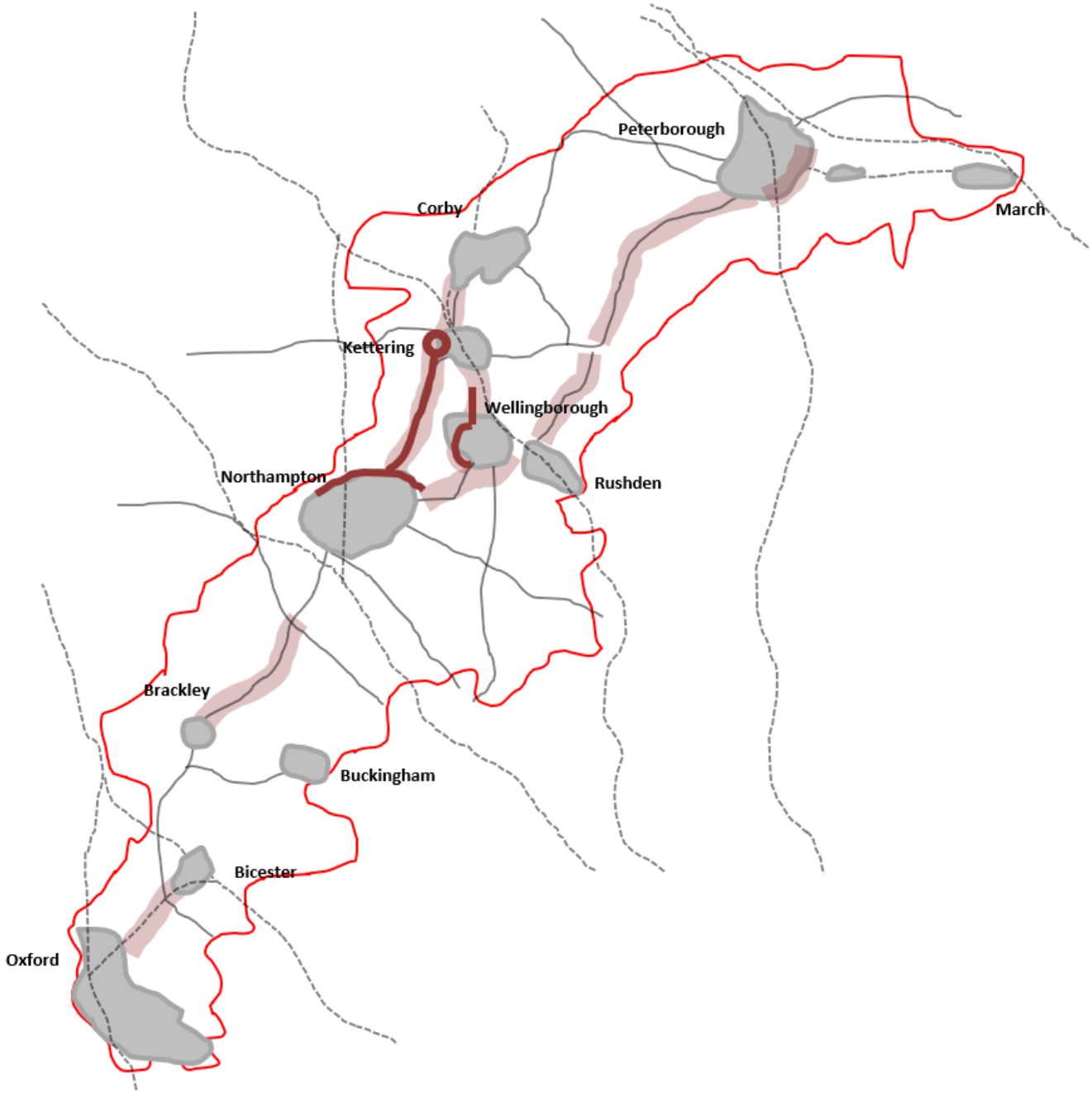
- Roll-out of electric charge points/hydrogen fueling stations across the study area for zero emission buses.
- Expansion of the electric vehicle charge point network in urban and rural areas consistently

Integrated land use and transport planning (not mapped)

- Residential & Workplace Parking Standards
- Delivery of school, workplace, railway stations and residential travel plans

Increase digital connectivity (not mapped)

- Support digital hubs in rural areas



Package 5: Sustainable and efficient freight solution

The package would play a role in supporting continued local economic growth by supporting more sustainable freight movement by facilitating transfer of freight to rail (via strategic rail freight interchange), and utilising new opportunities for rail freight paths via East West Rail, Welland Valley and Northampton-Market Harborough.

The package would also tackle key congestion bottlenecks on the A34 and A45 where freight is a large proportion of total traffic, making the highway network more reliable and safer for all road users.

Developing freight consolidation centres, combined with innovative first mile/last mile zero emission vehicles for local freight distribution, along with innovations in logistics planning will improve efficiency of the freight network. These innovative and dynamic systems will also benefit our more rural communities and market towns.

Overview

This package is based on improving capacity for freight movements with reduced environmental impact due to:

- greater use of sustainable urban goods transport for first and last mile (incl. greater use of freight consolidation hubs, etc), and
- improvements to both road and rail based strategic freight corridors.

Interventions include:

- providing more sustainable first mile and last mile freight delivery options, including freight consolidation centres on the outskirts of towns
- freight friendly highway interventions on strategic links and optimising rail freight.

Benefits for the study area

Highlight package benefits by 2050 (as modelled by EEHELUM) include:

- £80m GVA uplift per annum (by 2050, 2018 prices)
- Reduced congestion on local roads from better coordination of deliveries

Key links to other packages

Increasing usage of rail for long distance freight and expanding local consolidation and sustainable first/last mile delivery will particularly support package 1 by reducing demand for existing road space. Mobility hubs as identified in package 3 also present opportunities for consolidated local deliveries via interventions such as parcel lockers.

This package links strongly with new proposed rail flows identified in package 2, enabled via East West Rail, the Welland Valley Line and Northampton – Market Harborough.

In the medium to long term, improvements in digital connectivity and increased levels of automation as detailed in package 1 will also improve the efficiency and capacity of local, national and international freight networks.

Enabling actions to support achievement of net zero carbon

To ensure delivery of interventions is aligned with EEH's transport strategy vision of net zero carbon by 2050 at the latest, consideration needs to be given to:

- upgrading walking and cycling infrastructure where possible ahead of freight consolidation hubs going live to help ensure their success,
- providing long term infrastructure pipeline and delivery plan to give certainty and foster private sector investment in freight terminal and other supporting infrastructure, and
- working closely with Great British Railways and others to ensure appropriate balance between freight and passenger services.

Map of package

- **Connectivity study boundary**
- **Key urban areas**
- **Core freight network**
- **Priority corridors - short term enhancement**
- **Existing RFIs**
- **Existing key road network**

First mile/last mile - sustainable urban goods transport

- Strategic rail freight interchange (Public proposal)
- Strategic rail freight interchange (Private proposal)

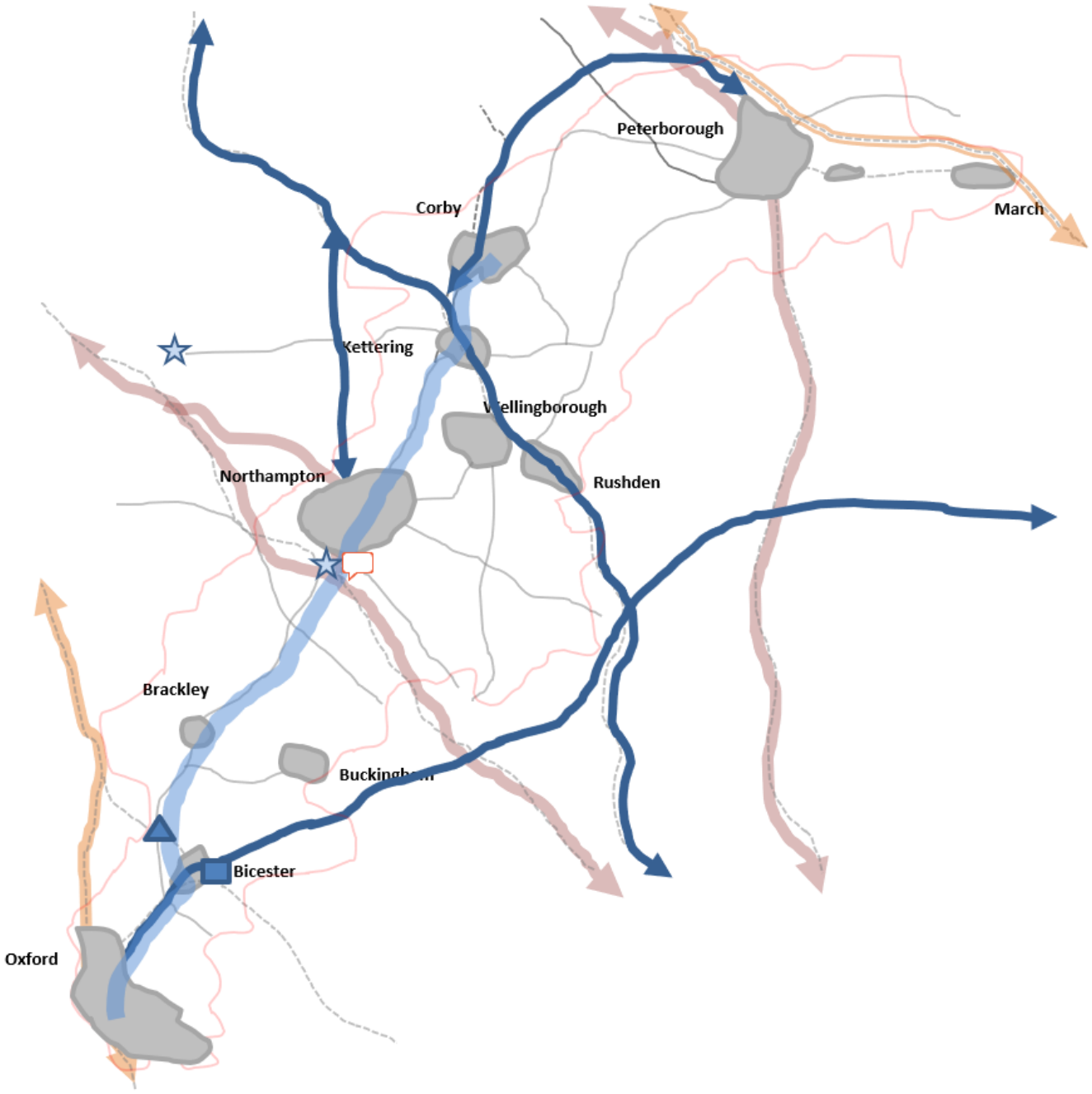
Not mapped

- Freight consolidation centres on the outskirts of towns
- Freight hubs on SRN
- Local rail routes to link into rail hubs to support industries which need to shift out of area in bulk.
- First Mile / Last Mile Sustainable freight delivery
- Work with freight haulage sector to develop digital frameworks for how and where freight is moved
- Shared passenger and freight services (rail, or historic models such as post-bus style services)

Freight connectivity

- Improvements to strategic freight corridors A34/A43 (Oxford - Bicester - Northampton-Kettering - Corby) incl. HGV lanes at key junctions/HGV signal priority.
- Improvements to strategic freight corridors A45 (Northampton to Wellingborough) incl. HGV lanes at key junctions/HGV signal priority.

- Freight paths on EWR
- Freight paths via Welland Valley Rail
- Freight paths via Market Harborough




OMAFIETS.NL

Demand Management

Demand management measures, such as behaviour change initiatives and optimisation of assets, seek to promote alternatives where private car (particularly single occupancy car use) is a less efficient use of limited road space and increase the appeal of alternatives such as shared transport, public transport and active modes of travel. The nature of the interventions influence travel patterns, increasing mode shift away from car, reducing carbon emissions and improving quality of life through placemaking and improved health through an increase in active travel and improvements in air quality.

Through the iterative process of the development of this study, the impact of demand management was modelled and highlighted the benefits that demand management could bring to mode shift, providing it was at the right scale. Demand management solutions should be considered either nationally, within the geography of individual local authority areas, or both. A region-wide demand management solution is not currently as aspiration of the EEH Board.

Partners, such as Oxfordshire County Council are seeking to capitalise on the benefits of demand management. Through the Central Oxfordshire Travel Plan, measures such as traffic filters and workplace parking levy are proposed, as well as further roll out of a live trial of a Zero Emission Zone, alongside a comprehensive package of sustainable travel measures.

Funding generated by interventions such as workplace parking levies can be utilised to fund improved public transport measures, a benefit of the approach in a background of funding constraints.

Impact Assessment

Package Modelling

EEH commissioned Steer to develop a model to test the impact of the packages developed within the connectivity studies on transport and socioeconomic outcomes up to the year 2049. This model, known as the England's Economic Heartland Economy and Land Use Model (EEHELUM), is a transport and land use model that simulates the interaction of transport, people, employers and land use over periods of time. To model each package in EEHELUM, adjustments were primarily made to the generalised journey times (GJTs) within and between each zone (by mode) to reflect the anticipated impact users will get from the proposed interventions identified. The packages were modelled in EEHELUM from a base year of 2022 and run for 28 years to 2049. The results are presented as a comparison to a business-as-usual Scenario (BaU), which is based on the national trip end model (NTEM) which also projects employment and population growth to 2050.

Benefits

The table below summarises the key modelled impacts of Peterborough-Northampton-Oxford combined package (compared to a BAU scenario for 2049) against the high-level cost estimates. Though a Benefit Cost Ratio (BCR) and Value for Money assessment is not appropriate at this stage in the business case development process overall economic benefits (in terms of GVA per annum and Carbon) are expected against the schemes costs for the combined package.

Costs

The construction and maintenance cost estimates have been prepared to a level of detail commensurate with the maturity of the design of the interventions and the current level of detail available on the proposals. Items have been priced using either published costs, estimated based on similar known schemes or built up based upon industry standard rates. All estimates have a base year of 2022. To reflect the lack of maturity of the design, risk allowances have been applied to the higher range costs at levels commensurate with SOC estimates, informed by DfT's transport analysis guidance (TAG) as detailed in the table below. Operations cost estimates have been presented as low, medium and high range of costs. This reflects a level of uncertainty in cost estimating accuracy, due to the lack of maturity of the design and available detail for many schemes. The low costs are based on estimated delivery costs in 2022, medium applies a +10/+15% increase and High accounts for additional risk and optimism bias as set out below.

Figure 2: Package modelling outputs and costs

	Change against BAU 2049 in socioeconomic indicators within the study area				Costs (Mid Cost - £m 2022 prices)		
	Population	Jobs	GVA (£m per annum)	Carbon ($KTCO_2e$)	Construction	Maintenance & Renewal	Operations
BAU 2021	1,260,000	1,120,000	41,000	600			
BAU 2049	1,460,000	1,300,000	75,000	310			
Package 1 – Making best use of roads	+4,200	+1,300	+105	-10	1,360	100	Medium
Package 2 - Strategic Rail Connectivity	+900	+500	+35	-	1,490	40	High
Package 3 - Supporting Mode shift to Active Modes	+2,900	+700	+60	-10	400	30	Low
Package 4 - Enabling sustainable development	+1,900	+600	+30	-40	1,350	100	Low
Package 5 - Sustainable and Efficient Freight	+3,300	+1,100	+80	-	1,400	50	Low
Combined Impact against BAU 2049/Cost	**+13,200 +1%**	**+4,200 +0.3%**	**+310 +0.4%**	**-60 -19%**	**6,000**	**320**	

Next Steps

Funding

There are a number of funding sources to potentially support infrastructure investment and other resource intensive programmes in the Heartland including central government funding, national roads fund, third party contribution (such as developer contributions) and local rates/levies. New funding sources may also become available over time which EEH and its partners will work to being primed to secure.

Investment sought within this plan is additional to funding required to invest in local bus services and maintenance of our transport assets.

It is recognised that funding is nationally challenging, and therefore a range of funding and financing models will need to be analysed and considered. In this regard, EEH will identify alternative models for transport investment within the region and seek to produce a prospectus aimed at investors and developers within EEH to attract funding for new schemes.

In addition, some interventions are revenue generating and might only require 'seed-corn' funding to mobilise the intervention. Furthermore, new funding and financing models could include a 'beneficiary pays' approach to reduce reliance on central government grants if the relevant powers are available locally.

EEH we will also determine how regional strategic transport investment schemes are prioritised, drawing from recommendations across our technical work programme from previous years; and develop a prioritised pipeline.

Governance

The Strategic Transport Leadership Board, Transport Officer Group (TOG), steering groups and stakeholder groups are part of the EEH governance process and are key to the successful development of the connectivity study. The steering group is composed of local transport authorities, local planning authorities and local enterprise partnerships. Stakeholder groups will include infrastructure owners (National Highways and Network Rail), transport operators (e.g. bus operators association, TOGs, Department for Transport (DfT), environment and business groups (including statutory and non-statutory), Homes England, National Trust, Department for Digital, Culture, Media and Sport (DCMS), national interest and mode specific groups (e.g. Sustrans) amongst others. Based around these groups, EEH will consider its governance structure for its transport strategy and associated investment pipeline.

Delivery Plan

Planning timescales have been considered as well as the scale and complexity of each scheme, its current stage of scheme development (e.g. pre-feasibility through to construction and evaluation) and what powers and consents are required, along with major considerations such as securing funding and land assemblage.

Based on stakeholder input intervention phasing was considered in the short, medium and long term. Short term schemes were judged to have a construction start date between 2025 and 2032. Medium term schemes were judged to have a construction start date between 2033 and 2040. Long term schemes were judged to have a construction start date 2041 onwards.

Subject to agreement, the assumed scheme promoters include Network Rail, local transport authorities, National Highways and Active Travel England. It should also be noted that there is an

important role for the private sector, partnerships, and innovative funding and financing tools.

Wider Next Steps

As the sub national transport body for the region, EEH will continue to lead on delivery of the investment pipeline, working with officers and the Strategic Transport Leadership Board to scope its onward development. The connectivity studies, alongside other technical work currently being commissioned by EEH, will also inform the investment pipeline. Specifically, EEH will:

- Ensure completion of other connectivity studies currently under development (funding dependent);
- Determine scope and appoint team to deliver the EEH investment pipeline

Get in touch

England's Economic Heartland Strategic Alliance
EEH Business Unit
c/o Buckinghamshire Council
Walton Street
Aylesbury
HP20 1UA

For general enquiries please contact 01296 382703
or email englandseconomicheartland@buckscc.gov.uk
www.englandseconomicheartland.com
Sign up for our newsletter – just scroll to the bottom of our homepage
@EconomicHeart

---

[i] ONS

[ii] ONS

[iii] Business Register and Employment Survey

[iv] House Price Statistics for Small areas (HPSSAs)