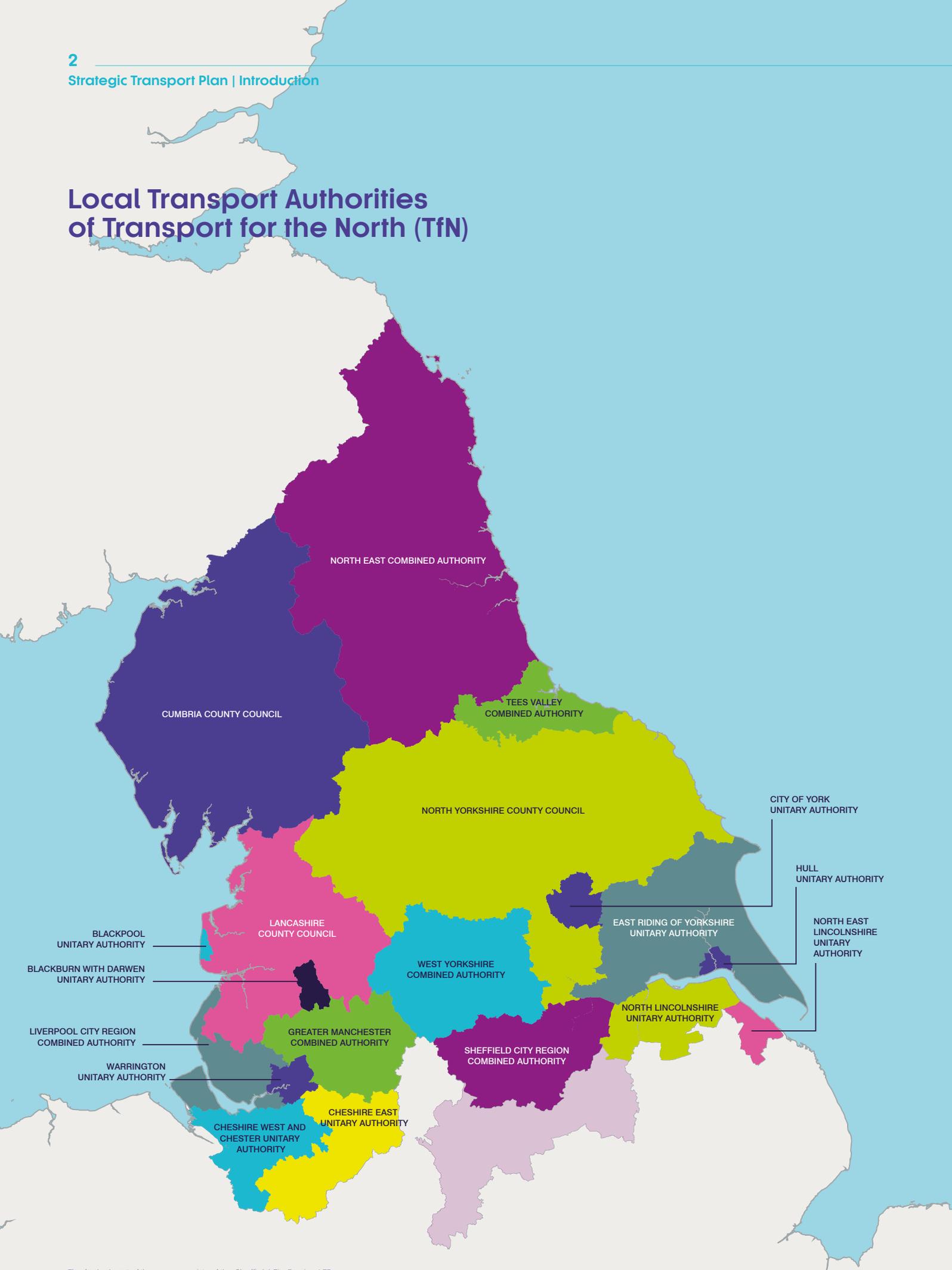


Strategic Transport Plan

Draft for public consultation



Local Transport Authorities of Transport for the North (TfN)



The faded part of the area consists of the Sheffield City Region LEP area and is not part of the constituent authority of TfN

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Chairman's Foreword

In my time as Chairman of Transport for the North (TfN), I have never ceased to be proud of the progress that we have made in establishing a credible and supportive partnership that could truly act as a united voice for the North, an idea first advocated by Sir David Higgins to rebalance the economy of the UK.

Developing this voice for the North has been a key part of TfN's work over the past two years, underpinned by the publication in June 2016 of the Northern Powerhouse Independent Economic Review. I make no apology for continuing to refer to this historic document, because it was the first of its kind, and sets out a realistic and achievable view of the considerable economic potential of the Northern Powerhouse – almost £100 billion in real terms of economic benefit to the UK and 850,000 new jobs.

Delivering this outcome would provide a major contribution to the UK economy and represents a transformation for the North, greater than has been seen in any period in the last four decades. However, I am keenly aware that we can only achieve this potential if we tackle the issues that are holding us back from fulfilling the economic opportunity. TfN's work, with our Partners across the North, has shown beyond doubt that transforming connectivity is a key part of realising our economic ambitions.

To achieve the level of connectivity required, we need a long term investment Programme for transport across the North, grounded in the needs of our identified economic strengths and addressing current constraints. Although much has been done by Local Transport Authorities and Local Enterprise Partnerships across the North in securing landmark deals with Government, what is missing is a more strategic view of transport investment that connects the economic assets across the North, both internally to create an economic mass, but also externally as part of a global marketplace.

Over the last 15 months, TfN has led the development of such a Strategic Transport Plan. This Plan is also the first of its kind and represents a business case for change – a change in relationships with Government and delivery agencies, a change in working with Partners, a change in the way that we can encourage and support entrepreneurs and businesses of all sizes to grow and investment in the North, and, above all, a sustainable change in the economy of the North of England.



John Cridland CBE
Chairman, Transport for the North

The Plan will become a statutory document after TfN becomes the first Sub-National Transport Body in April 2018. This is the first version of the Plan, and I am pleased to be able to present the work that has been done by all of the Northern Partners to date in making the case for change and setting out how we will be developing the long term Investment Programme. I encourage the North's stakeholders and transport users to engage with the Plan, and look forward to working with everyone concerned in developing it further.

Through its Industrial Strategy and Northern Powerhouse Strategy, the Government has made clear its commitment to the Northern economy. The size of the prize is simply too large to ignore for the future prosperity of the UK, and this Plan is our way of making sure that the £100 billion economic benefit and 850,000 jobs can happen. TfN and its Partners have the opportunity to deliver a new chapter in transport investment for the North and set in train changes that will have positive repercussions for future generations. In doing so we must instigate change and drive this forward in order to seize the economic prize to which we all aspire.



Introduction

About Transport for the North (TfN)

Transport for the North (TfN) was created as a pan-Northern Partnership Board of civic and business leaders from across the North, working with Highways England, Network Rail, High Speed 2 (HS2) Ltd and the Department for Transport. With the support of the business and academic communities, TfN is becoming the first Sub-National Transport Body in England and is tasked with setting out the requirements of the pan-Northern transport network through this Strategic Transport Plan for the North.

TfN's vision is of a thriving North of England where modern transport connections drive economic growth and support an excellent quality of life. TfN has a clear remit to identify and plan the transport infrastructure required to support transformational economic growth in the North. It also has a role to play in supporting local and national government, as well as the private sector and transport operators, to align local investment in public transport and active modes of travel with strategic, pan-Northern investment. This will ensure that national infrastructure projects form part of a coherent long term Investment Programme, which TfN will work to deliver with Delivery Partners and local transport authorities to deliver.

The Cities and Local Government Devolution Act enables TfN to become the first Sub-National Transport Body in England. Rail North Limited steers the development of rail strategy across the North and in partnership with the Department for Transport and co-manages the Northern and Trans Pennine Express franchises. Rail North Limited will become part of the statutory body, and arrangements will be in place for it to continue working with co-opted member authorities. The statutory instrument was laid before Parliament in Autumn 2017, following consent from TfN's 19 authorities and, following approval, will bring TfN's functions into legislation.



The Strategic Transport Plan

TfN's Strategic Transport Plan for the North sets out the case for strategic transport infrastructure investment through to 2050, incorporating new analysis and evidence from previous Rail North, Stakeholder, and Partner strategies. Once TfN becomes a Sub-National Transport Body, the Strategic Transport Plan will become a statutory document, allowing TfN and its Partners to take a leading role in developing the case for investment in the North, speaking with a unified voice to Government, and making the right transport decisions for the North.

TfN will play a key role in making the case for developing the strategic transport network needed to support transformational economic growth. It will enable the North to make a more significant contribution to the UK economy through higher productivity, increasing job opportunities and enhancing connectivity to the North's, the UK's, and the world's most important economic markets and centres. Delivering this transformation will require a sustained investment programme across the North to build and upgrade infrastructure, enhance public transport, strengthen education and skills, harness innovation and encourage smart technology. The Plan will evolve over the coming years and decades, and importantly, this will involve stakeholder engagement and consultation on plans, programmes and projects.

The Strategic Transport Plan focuses on transformational inter-city and pan-Northern connectivity improvements, ensuring that these are each in their own right drivers of economic growth in the North and the UK as a whole. This will also include improving pan-Northern access to the North's major ports and international airports.

The Strategic Transport Plan also recognises that different parts of the North will have different roles and scales in achieving transformational economic growth, but all striving for the same collective ambition and sustainable outcome. The Strategic Transport Plan supports, aligns and integrates with combined authority, city region and local economic and transport plans. TfN and its Partners share the same ambition for transformational economic growth in the North, and the Plan adds to the case for transport investment at local, regional and pan-Northern levels. More detail can be found on Page 78.

National

HM Government | Highways England | Network Rail | High Speed Two Ltd | Government Policy, Industrial Strategy, Regional and Route Strategies, Industry Processes

Pan-Northern

Transport for the North | Strategic Transport Plan

City Regions and Local Enterprise Partnerships

Strategic Economic Plans

Local Transport Authorities, Combined Authorities

Local Transport Strategies and Plans, Spatial Plans

Local District, Planning and Highway Authorities

Local Transport, Economic, Health and Wellbeing Strategies, Local Plans



Supporting sustainable transformational growth



The success of the UK in the global marketplace and the Government's Industrial Strategy depends upon transforming the economy of the North of England.

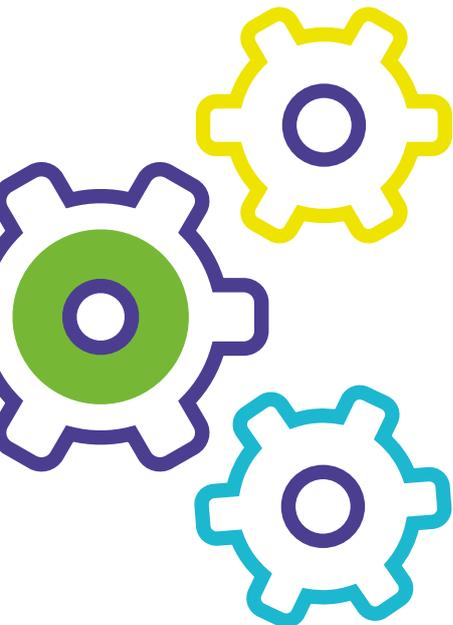
Users of the road and rail network are at the heart of the Strategic Transport Plan.

Transport plays a crucial role in the economy of towns, cities, regions and even countries, with most people using the transport network daily. An effective, efficient Northern transport network is a fundamental part of everyday life; connecting homes, businesses, jobs, health and education facilities and leisure opportunities. A transport system that is fit for purpose with strong north - south and, crucially, east - west movements will be the backbone of a strong economy for the North and for the UK.

The vision of a transformed North was set out in the *Northern Powerhouse Independent Economic Review*. It concluded that transformational growth will require investment and improved performance in a

number of critical areas, especially education, skills, innovation and inward investment, alongside transport infrastructure and services for passengers, businesses and freight. The conclusions of the *Northern Powerhouse Independent Economic Review* are reinforced by the Government's Industrial Strategy, which sets out the need to support the growth of businesses and trade in the UK's world-leading sectors.

By 2050, a transformed North could have an additional 850,000 jobs and generate almost £92 billion additional Gross Value Added, over and above 'business as usual' trends. This could result in a significant increase in travel demand. It is therefore crucial that the productivity gaps currently holding back growth are filled, to ensure that the North performs as well as the rest of the UK.





© Transport for the North
© Homes and Communities Agency



© Tees Valley Combined Authority



The North's population and economy is already growing: currently the North is home to 16 million people and 7.2 million jobs.



© EDF Energy
© Transport for the North





A corresponding step change in strategic transport infrastructure investment is vital to achieve North's economic aspirations by 2050.

This will help to:

- Transform east - west inter-city connectivity, which has not previously received sufficient attention and investment.
- Support the North's existing and future functional economic areas and assets, and supporting city regions as drivers of economic growth.
- Provide easier access to high quality jobs for more communities.
- Tackle overcrowding and congestion.
- Improve connectivity across the North's transport network.
- Make areas of the North accessible for new housing, commercial and industrial developments.
- Strengthen businesses' access to supply chains and the markets they serve.
- Access the world's most important current and future markets to support trade, inward investment, and tourism.
- Deliver a sustainable transport network that supports improving quality of life and protects the environment.
- Establish a firm commitment to create a stronger, more diverse and resilient place to do business.
- Ensure that the North is an excellent place to live, work, visit, study and do business.

The North's businesses and civic leaders have been working together to improve the connectivity of the North – from establishing Rail North, and publishing the One North prospectus in July 2014, through to publishing the Northern Transport Strategy in March 2015, and subsequent TfN updates in Spring 2016 and 2017. Building on these documents, this Strategic Transport Plan develops the case to identify the interventions needed to ensure economic centres and assets are better connected, leading to growth in productivity and jobs.

Some of the North's Local and Combined Authorities and Local Enterprise Partnerships have secured landmark deals with Government to support the development of transport investment. These plans aim to secure the labour market connectivity and network performance required to achieve city region economic aspirations. But these will not provide the degree of connectivity needed to deliver the transformational outcomes set out in the *Northern Powerhouse Independent Economic Review*. They will not extend labour, service and product markets far enough, nor support the step change in productivity needed to close the deep-rooted and long-standing gap between the North and the rest of the UK.

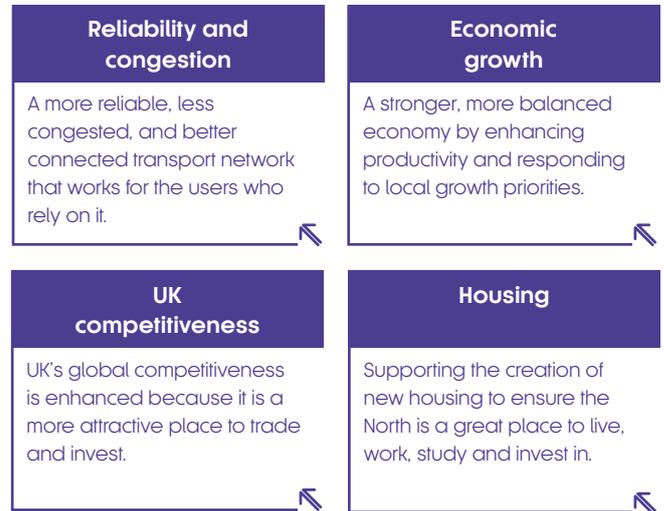
Better connections at a pan-Northern level, particularly connections between the North’s existing and planned future economic assets, will create jobs and generate growth. To realise the benefits of agglomeration and economic mass, the North requires faster, more efficient and reliable journeys on the rail and road networks – and in some cases inland waterways. It also needs capacity for the increased passenger, business and freight demand that growth will bring. The Strategic Transport Plan provides an opportunity to drive major improvements in strategic connectivity throughout the North, taking a pan-Northern view for the first time. It will encourage trade and inward investment by improving links to the North’s ports and airports, and faster links between the core cities. This will make the North a more attractive place for businesses to invest and to base themselves, and for airlines and the freight and logistics industry to serve those ports and airports.

TfN also needs to ensure that appraisal methods of transport interventions in the North properly reflect and consider the key factors impacting on economic growth in the North. This will allow TfN and Partners to present a strong, compelling case to Government and Delivery Partners to support the delivery of critical economic infrastructure. TfN welcomes the Government’s acknowledgement of this in the Industrial Strategy, and TfN will look to work with Government in the development of the Rebalancing Toolkit.

As a fundamental part of the Strategic Transport Plan, TfN is developing a long term Investment Programme, which will consist of the major, strategic interventions that the evidence suggests are required to support the transformational growth scenario set out in the *Northern Powerhouse Independent Economic Review*.

The Strategic Transport Plan and Investment Programme have a horizon year of 2050 to align with the *Northern Powerhouse Independent Economic Review*, and will enable TfN to develop a pipeline of investment, so that TfN and its Partners can work with Government to secure funding and delivery of the right schemes at the right time, providing certainty for local transport authorities to plan complementary investment.

The Strategic Transport Plan, the pan-Northern transport objectives and TfN’s programmes of work, support, complement and align with the four main goals of the Government’s Transport Investment Strategy.



Developing, maintaining and operating transport networks affects the environment, society and health. The Strategic Transport Plan will work towards a sustainable transport network that will improve the health and wellbeing of residents and visitors to the North.

Education, skills, local transport and spatial planning will still be administered at a Local and/or Combined Authority level, but the Plan can be used by Partners developing proposals for housing and commercial investments. It will help achieve their ambitions and TfN’s pan-Northern ambitions. The long term nature of the Strategic Transport Plan will provide more certainty and give greater confidence to public and private investors. The Strategic Transport Plan and long term Investment Programme will also be used by Partners to improve people’s journeys, benefiting from the investments planned to the North’s transport network

TfN's Vision and Pan-Northern Transport Objectives

Vision

“ A thriving North of England, where modern transport connections drive economic growth and support an excellent quality of life. ”

Working with Partners, a series of pan-Northern transport objectives have been developed, which in turn inform the role of the Strategic Transport Plan. The development of these objectives has also been influenced by an Integrated Sustainability Appraisal. This is embedded throughout the Strategic Transport Plan, and ensures TfN's Investment Programme develops and delivers sustainable future strategic transport interventions.

These objectives also align closely with the five foundations of productivity set out in the Government's Industrial Strategy. These foundations are infrastructure, ideas, people, business environment, and places.

Increase efficiency, reliability and resilience in the transport system

This objective aims to **improve the performance and integration of the North's strategic transport network by making the case for interventions that improve its efficiency, reliability and resilience**. The North's strategic transport networks must meet the needs of its users, whether they are residents, businesses or visitors. The management of these networks will need to be able to adapt to changing demands over the period to 2050, such as shifting commuter patterns, changing leisure aspirations, more extreme weather conditions as a result of climate change, and the emergence of new disruptive technologies, such as connected and autonomous vehicles. TfN will also identify opportunities to improve travel choices for the movement of both people and freight and to boost the resilience and sustainability of pan-Northern networks, with a particular focus on making more sustainable travel options as attractive as possible. TfN will also promote measures that help support modal shift and make the best of our existing networks, exploring new technologies and demand management tools that help to maximise network efficiency.

This Plan will:

- ✓ Promote measures that make the best use of the North's existing strategic transport networks and improve their performance, including through use of best practice measures or new innovations during construction and operation.
- ✓ Improve travel choices and user experience for the movement of people and goods across the North.
- ✓ Ensure that improvements to the performance of strategic transport networks are developed in a co-ordinated and integrated way with local networks.
- ✓ Promote measures that increase the resilience of our transport networks to the impacts of climate change and the increasing frequency of extreme weather events.



Transforming economic performance

This objective aims to **secure investment in transport between the important urban and rural economic centres and assets to support sustainable transformation of the North's economic performance.**

The objective focuses on addressing the challenges identified in the *Northern Powerhouse Independent Economic Review*. This includes securing investment in transport interventions which improve productivity and deliver agglomeration benefits between the North's important economic centres and assets, both rural and urban. It is also vital to connect the North to the world's most important economic markets to enhance trade, tourism and inward investment through international gateways.

This Plan will:

- ✓ Clearly articulate, prioritise and sequence strategic transport investment between important economic centres and assets, to important ports and airports, to support the transformation of economic performance across the North.
- ✓ Ensure TfN's long term Investment Programme aligns with and complements the development and delivery of local transport, development and economic plans and policies, and supports the delivery of transformational developments and investment.



Improve access to opportunities across the North

This objective will ensure that the Plan works for everyone who lives and works in the North through **improved access to opportunities.** Ultimately, transport is a means to an end. Economic growth in the North should be as inclusive as possible, avoiding transport poverty. Investment in the strategic transport network should enable better access to key opportunities, including employment, health, social activities and education, for all, regardless of their age, income level, and mobility. This will require a carefully co-ordinated approach to ensure strategic and local transport investment programmes and policies are aligned and complementary.

This Plan will:

- ✓ Ensure that improvements to the strategic transport networks support inclusive growth, positive health and wellbeing, and provide affordable access to key opportunities across the North, aligning strategic proposals carefully with local aspirations.



Promote and support the built and natural environment

This objective will ensure that through collaboration with TfN's Partners, stakeholders, and communities, **transport interventions across the strategic transport system protect and enhance the natural and built environment,** making sure that the North's strategic transport system is as sustainable as possible. It covers a range of issues, including the need to provide sustainable travel choices for the movement of people and goods across the North; reducing emissions and impacts from air quality and carbon from transport; making best use of existing transport infrastructure before investing in new capacity; and ensuring that new infrastructure is designed to minimise the negative impacts on both the natural and built environment, including a negative impact on biodiversity.

This Plan will:

- ✓ Promote measures that improve sustainable travel options and make best use of the North's existing strategic transport networks.
- ✓ Promote and support low carbon growth through the use of solutions that reduce carbon emissions and air quality impacts across the strategic road and rail networks.
- ✓ Ensure that environmental and sustainability impacts are a key consideration in option selection for new strategic transport infrastructure interventions.
- ✓ Ensure that improvements to the strategic transport network align with local environmental objectives, and are in accordance with the National Planning Policy Framework.



Why?

Understanding the need for change

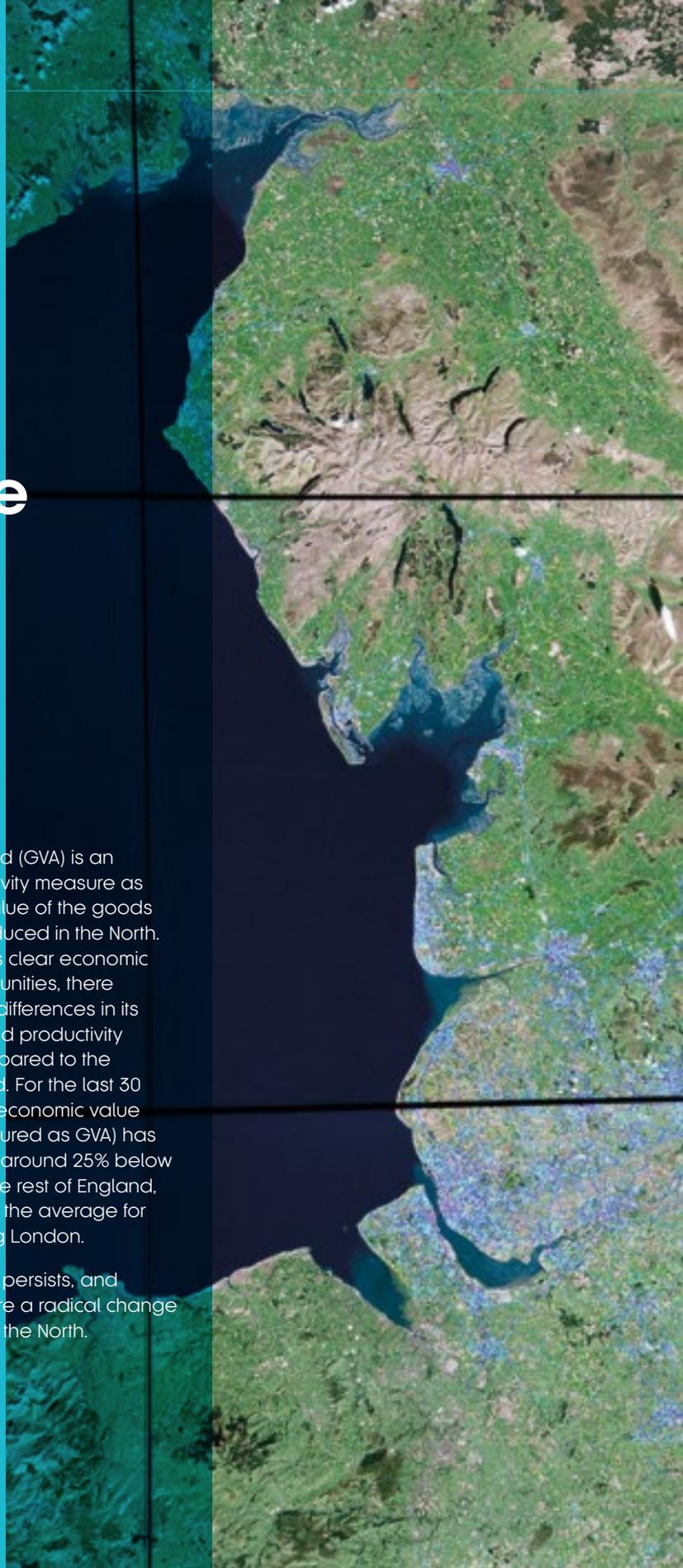
The North today

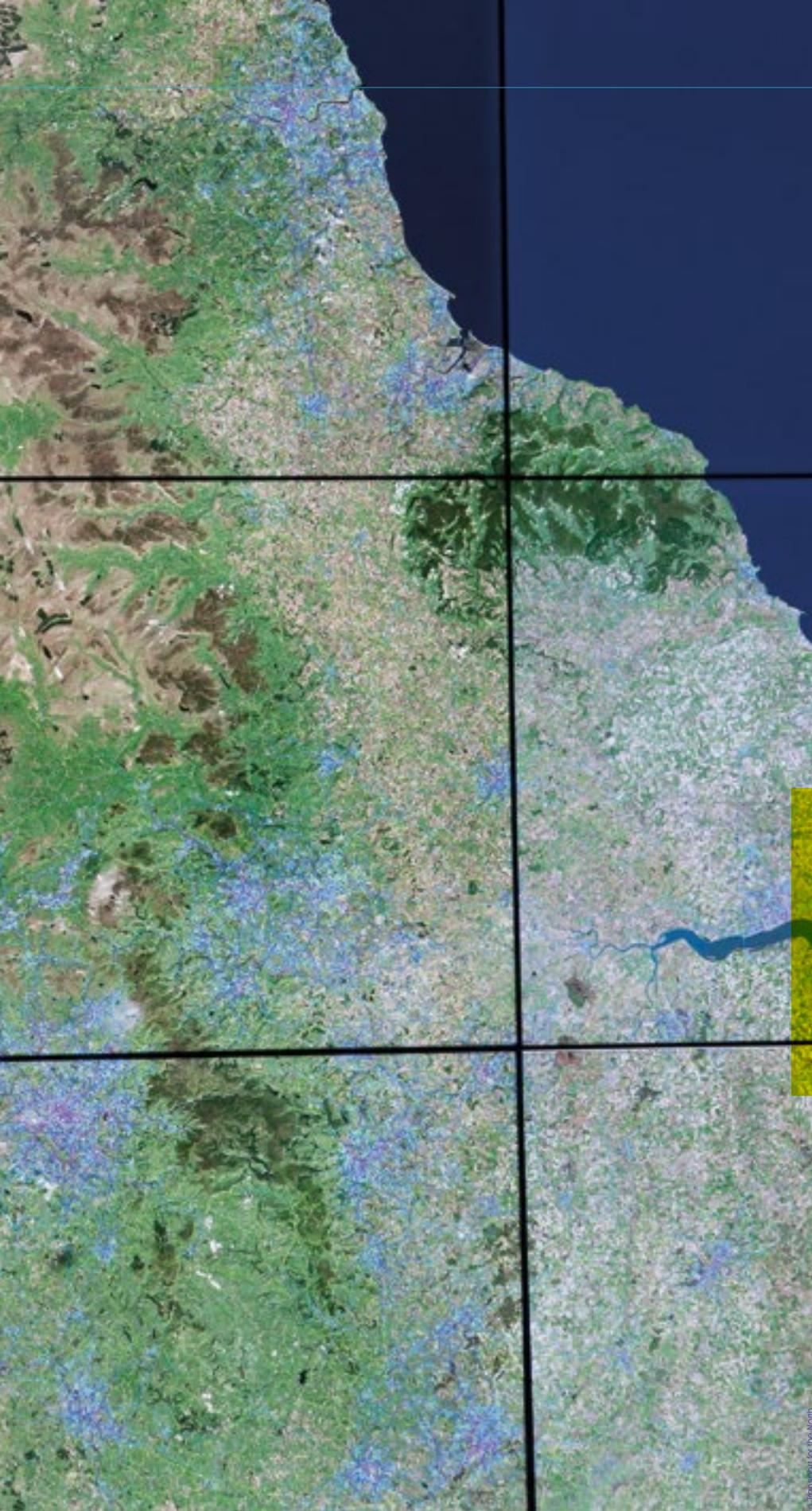
The North of England hosts some of the most iconic places in the UK, and is home to almost as many people as the Netherlands. It has a wealth of high-profile and growing UK-wide and international businesses, and a rich and diverse set of assets and talent. As the birthplace of the Industrial Revolution, the North has a long history of innovation and driving national growth.

The North is home to some of the UK's most innovative productive businesses. The North's economic centres already have many strengths, and are increasingly being given the tools to become even stronger through more powers and funding in city, devolution and growth deals. The quality of life in the North underpins its economic capabilities. In particular, it provides more affordable housing than London and the South East, varied sport and culture, and access to spectacular coastlines and countryside.

Gross Value Added (GVA) is an important productivity measure as it measures the value of the goods and services produced in the North. Despite the North's clear economic and social opportunities, there remain persistent differences in its GVA per capita and productivity performance compared to the rest of the England. For the last 30 years, the North's economic value per person (measured as GVA) has been consistently around 25% below the average for the rest of England, and 10-15% below the average for England excluding London.

An economic gap persists, and closing it will require a radical change in the economy of the North.





£7,500

The difference in per capita income between the North and the rest of England



© Transport for the North

© Centre for Process Innovation

The North today



GVA (2015)
£317bn

16
million
population



£125,237
average
house price



Five of
the UK's ten
largest cities



**6 UNESCO World
Heritage Sites**



73%
Employment
(September 2017)



25%
Productivity
gap (to UK)



77%
Economic
Activity Rate
(September 2017)



£5.7bn
Skills, housing,
trade commitments



5
National
Parks



26.3 million
domestic staying
visitors, spending
£4.8 billion



250,000 jobs
£6 billion in GVA in the
accommodation and
recreation sectors

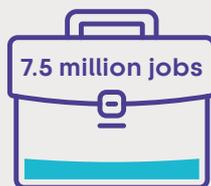
↓5%
Unemployment
rate (September 2017)



32
universities
with over 520,000 students



£4,300
Government
overall spend per
head in the North



7.5 million jobs

£240

Per head
of planned
strategic
transport
infrastructure



167,000
more businesses
in the North than in
2010, an increase
of almost a fifth



£170bn
Total spend
per year



£2bn
spending by
4.5 million
overseas visitors



£50bn
of UK goods exports
from the North

41.1m
Air passengers
per year from
Northern airports



© Tees Valley Combined Authority



© Transport for the North



© BAE Systems



© Lancashire County Council

The North's role in powering the UK economy

TfN and Partners are setting out the role that improved strategic transport will play in growing the economy, but transport alone cannot resolve this productivity gap. TfN has been developing its requirements for future transport interventions, and new analysis has helped shape where better connectivity is required to support the most productive parts of the economy.

The *Northern Powerhouse Independent Economic Review* findings characterise the North's economic position and the drivers underpinning its performance. The Review sets out a bold vision of economic transformation for the North that will rebalance the UK economy and increase international competitiveness.

Some of the factors the *Northern Powerhouse Independent Economic Review* identified as contributing towards the current productivity gap include:

- An economy that is providing insufficient high skill opportunities.
- Not enough exploitation of innovation and technology.
- Lower levels of investment.
- Lower levels of enterprise (measured by business start-ups per capita).
- Lack of agglomeration between economic centres across the North.
- Sub-optimal transport links and under-investment in transport.

The Review concluded that improving economic performance in the North could bring significant benefits for the UK economy by 2050 in a transformational scenario of around:

- £92 billion (15%) increase in GVA by 2050.
- 850,000 additional jobs.
- Productivity 4% higher than 'business as usual'.

A 'business as usual' scenario assumes the future will be like the past, reflecting both historical experience and substantial levels of previous policy intervention and investment, as well as expected UK-wide trends. This is distinct from a 'do nothing' scenario.

A 'transformational' scenario assumes the North's future performance is transformed, relative to the past, and that progress is made in tackling the range of factors responsible for the performance gap.

The Northern Powerhouse Independent Economic Review identified that promoting and growing the North's **four prime capabilities**, and its **three enabling capabilities**, could result in higher productivity and growth. These are already strongly performing and investing in the North. They are highly skilled and productive sectors that are already and will continue to compete on national and international stages, where the North has a number of comparative advantages. The prime and enabling capabilities combined create distinctive and coherent outcomes.

In addition to the prime and enabling capabilities, it is crucial that the wider economy is also supported. This is all underpinned by the North's excellent quality of life, which enhances the economy. The North also has strong performing universities, exciting cultural hubs, stunning natural assets, and affordable housing.

The three enabling capabilities provide essential services to the prime capabilities but are also important growth sectors in their own right.

Prime capabilities

Advanced manufacturing

The North has strengths in advanced manufacturing, including through highly productive, automated and digital manufacturing techniques and processes. There is also a strong presence automotive manufacturing in the North. These include expertise in textiles, research and design, and metallic and non-metallic production processes. The GVA growth in advanced manufacturing predicted from 2015 to 2050 is expected to increase from £33.4 billion to £58 billion (£2011). Productivity as measured by GVA per job is also expected to rise from £58,000 in 2015 to over £178,000 in 2050¹.

Energy

41% of England's energy is generated in the North, with 31% of the UK's total renewable electricity was generated in the North in 2015. The North's energy strengths include offshore wind, nuclear research and processing, new technologies including biomass and hydrogen, and electricity distribution. Developing new technologies for energy security, production, distribution, and storage is also crucial. The GVA growth predicted from the energy capability from 2015 to 2050 is from £8.9 billion to £15.3 billion (£2011). Productivity as measured by GVA per job is also expected to rise from £77,000 in 2015 to £170,000 in 2050².

Health innovation

The North has a strong health innovation presence, with pioneering clinical research particularly in life sciences, cancer and ageing. The North exported £7.3 billion worth of pharmaceutical products in 2015, accounting for 45% of all medicinal exports attributable to the UK. The GVA growth predicted under the transformational scenario up to 2050 is a rise from £17.5 billion to £43 billion (£2011). This capability includes productivity GVA per job rising from £31,000 in 2015 to £67,000 in 2050³.

Digital

The North has strengths in as cognitive computation, simulation/modelling, financial technology, cyber security, high performance computing, data analytics (big data), and strengths in media. There are seven of the UK's 27 key tech clusters in the North. The GVA growth predicted to 2050 is a rise from £9.2 billion to £41.1 billion (£2011). Productivity as measured by GVA per job rising from £71,000 in 2015 to £190,000 in 2050⁴.

Enabling capabilities

Financial and professional services

Providing key business, legal, insurance and financial services that support the North's prime capabilities and perform important day-to-day functions which keep the wider economy functioning.

Logistics

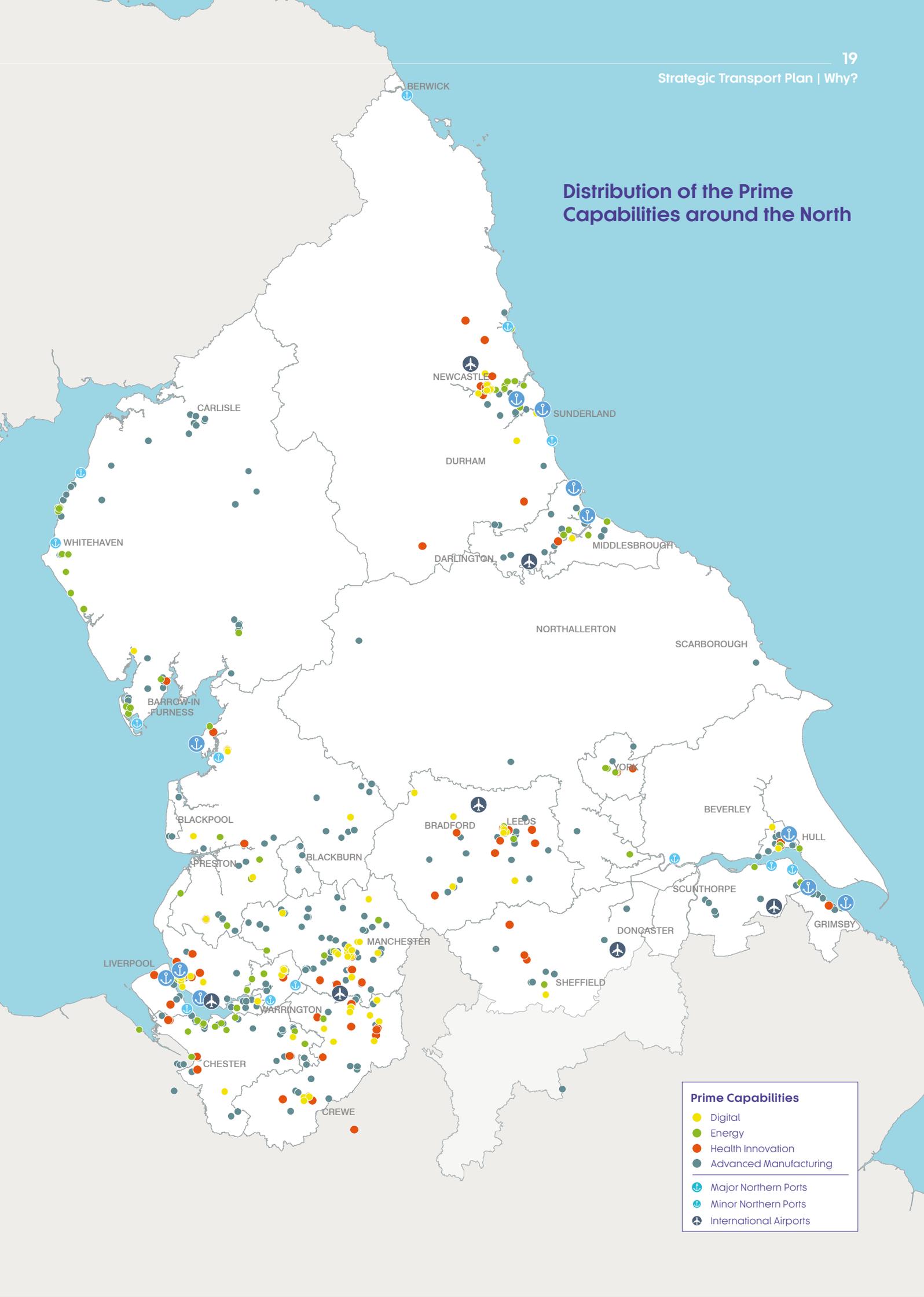
Through significant private sector investment and innovation, airports, ports and wider logistics are delivering a more efficient Northern infrastructure. The North has existing capacity to relieve demand, drive economic growth and enhance Britain's international connections and trade links.

Education (primarily higher education)

Research capability and technical expertise that underpins the prime capabilities, provides access to global networks, and also provides a supply of skilled labour and export strengths.

^{1,2,3,4} Northern Powerhouse Partnership (2017) – Powerhouse 2050: The North's Routemap for Productivity

Distribution of the Prime Capabilities around the North



Prime Capabilities

- Digital
- Energy
- Health Innovation
- Advanced Manufacturing

Major Northern Ports

Minor Northern Ports

International Airports

The prime capabilities are spread across the North, with clusters of certain sectors and types of businesses in specific areas. This is illustrated in the map on page 17. The businesses that make up the prime capabilities are varied, ranging from large multi-nationals to small and medium-sized enterprises (SMEs) that have been formed and grown in the North. The dots on the map provide a spatial indication of the geographical distribution across the North. Additionally, the enabling capabilities are also widely located and distributed in the North. This combination of economic activity and capabilities supports and exemplifies the North and its potential. Improved transport connectivity can ensure that the clusters of activity that have a strategic connectivity challenge can grow, and support transformational economic growth.

The prime and enabling capabilities currently account for:



2.1m jobs

30% of all jobs are in the North



£100bn+

Around 35% of the North's GVA

Whilst the Northern Powerhouse Independent Economic Review identifies these capabilities as having the strongest potential to grow, it is recognised that other sectors, industries and the wider economy must also grow.

The Northern Powerhouse Independent Economic Review suggests that the transformational scenario could be achieved if the necessary steps are taken to enable the following to occur in the North:

- Substantial growth in the four prime and three enabling capabilities.
- Consequent positive effects on suppliers based in the North.
- Better, faster, more frequent transport links between key settlements, and increasing the pool of workers available to work in higher productivity urban locations, thus increasing the effective scale of cities and the associated benefits of agglomeration.
- Improvements in productivity across the wider economy and a higher employment rate.
- Positive effects on private and public services that serve the population which has a higher income.
- A growing population as more people respond to new opportunities, and a retention of skills and labour.

For businesses looking to invest and/or grow in the North – including those not categorised as prime or enabling capabilities – enhanced transport and improved connectivity is a factor in their decision-making. Improvements to the transport network, for both physical and trading links, as well as investment in education, skills and innovation, would make the North one of the prime locations in the UK and the world. This will in turn develop and grow productivity in businesses, increase the number of start-ups and improve productivity to at least the UK average. It would also increase innovation and export rates to at least the European average.

	2015	2050 Business as usual scenario	2050 Transformational scenario (baseline for TfN)
 Employment	7.5 million	8.3 million	9.2 million
 GVA (2011 prices)	302 billion	603 billion	695 billion

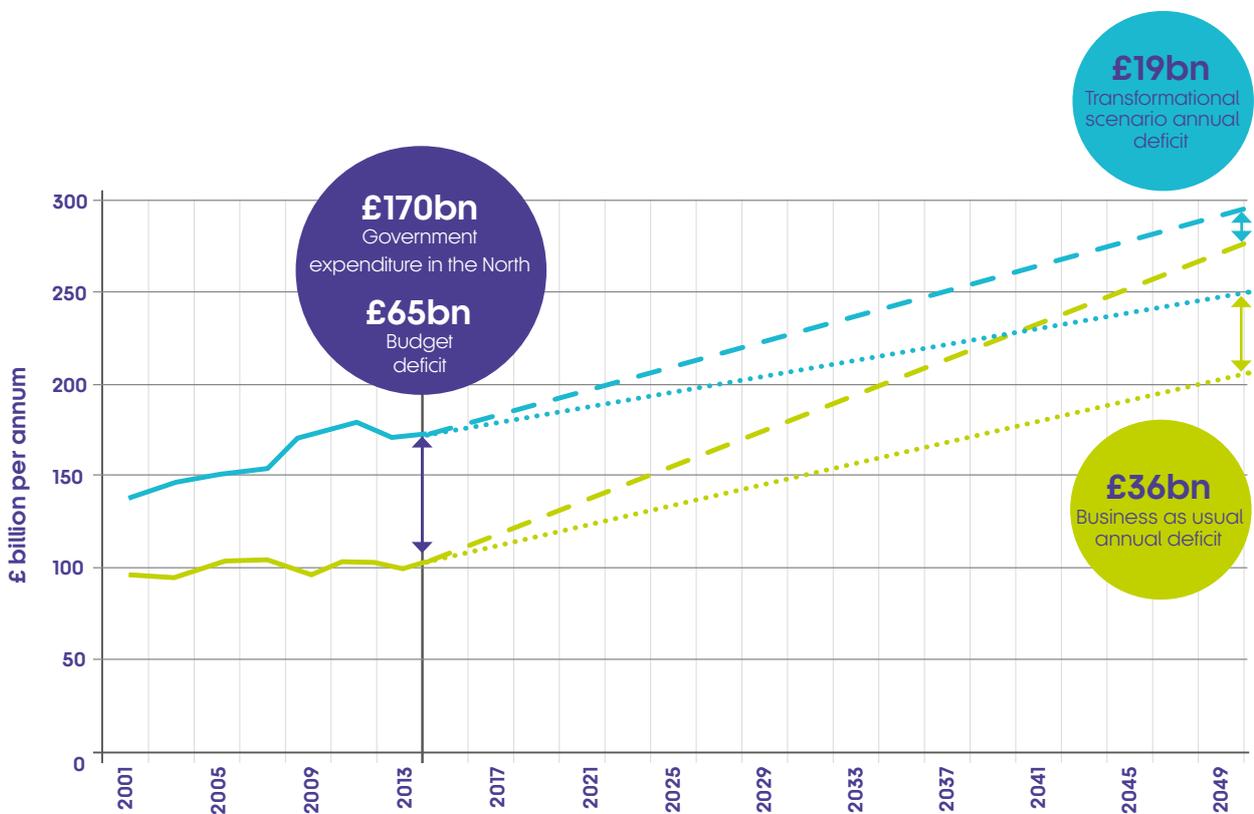
Investing in growth

The Government has set up the National Infrastructure Commission (NIC) to provide expert advice and independent recommendations on the country's strategic infrastructure. The NIC has highlighted the important role of transport infrastructure in the economy and in people's daily lives. It is also crucial that strategic transport investment decisions in the North are informed by and made by TfN and its Partners to ensure that funding is directed towards the most critical infrastructure needs.

The Government has set the NIC a fiscal remit that Government investment in areas covered by the NIC, which include transport, will rise to over 1% of GDP by 2020-21. The fiscal remit also proposed that the NIC should make recommendations on the assumption that spending on infrastructure will be between 1% and 1.2% of GDP each year from 2020 to 2050. This timescale matches TfN's long term Investment Programme. The North will, therefore, need to receive a sustained increase in infrastructure investment, reflecting both the need and opportunity.

In all regions of the UK except London, Government expenditure exceeds tax receipts, leading to an annual budget deficit. A deficit in transport infrastructure investment is one of the reasons why the North contributes less per annum to the Exchequer. As a result of the fiscal deficit, currently 15p in every £1 spent by the Government in England is borrowed.

Boosting the economy of the North would reduce the deficit highlighted above, by reducing work-related welfare benefits and by increasing real wages and spending power. Analysis commissioned for TfN demonstrates that investment in infrastructure, such as transport, generates economic and social benefits. This evidence indicates that investment in the North will reduce the North's fiscal deficit, with projections showing that the North gap is closing by 2050. While Government spending is expected to continue to rise, predictions for population growth and economic growth indicate that Northern tax revenues will grow more quickly than expenditure.



Projection of tax receipts and Government expenditure in the North of England 2001 – 2050 (2013/2014 prices) Transformational vs Business as usual



Investment in transport can:



Increase employment and real wages

which has a social benefit via taxation.



Increase competition

leading to increases in net business productivity and output.



Support health and wellbeing

increasing life expectancy.



Increase land values

supporting investment and regeneration.



Stimulate agglomeration economies

by effectively increasing proximity, raising productivity and wages, and retaining a skilled workforce.



Reduce journey time

increasing productivity and output.



Reduce transport costs

lowering prices and thereby allowing for an expansion of output.



Strengthen our global reach

by making it easier, faster and more reliable for people and goods to access the North's airports and ports.

Economic Infrastructure – Transport's role in the economy of the North

Growth in the North's economy will rely on increasing the productivity of its people and businesses. To support this, there needs to be more opportunities to do business in the North and beyond. Transport investment can act as a key enabler to support the growth of the economy of the North. Investment in the critical transport infrastructure required to drive growth is essential.

By connecting the North's cities, international gateways and towns, transport investment will facilitate the exchange of goods, services, knowledge and skills. It can also create agglomeration economies centred on areas of commercial specialisation. This can, and does already, include the prime and enabling capabilities.

The economic geography of the North is also different from the rest of the UK – with what has been termed a polycentric system of economic centres. This means that the North needs to capitalise on the potential of all its cities, towns, economic centres, infrastructure and assets. Transforming the North through an improved multi-modal, integrated transport system for personal and business travel and freight could:

- Strengthen the economy of the North and the UK by improving business connectivity.
- Create a rebalanced economy with higher levels of investment in drivers of growth in the North, and greater tax receipts.
- Increase competitiveness and innovation by boosting employment, productivity and wages.
- Enhance connectivity to leisure and tourism opportunities across the North.
- Maximise the benefits from agglomeration, proximity and knowledge spill-overs.
- Strengthen the North's cross-border relationships with North Wales, the Midlands, and Scotland.

There are economic benefits of agglomeration for people and businesses in the North:

- Good transport links help to attract and retain highly skilled workers and improve productivity by enabling longer distance commuting.
- Business would benefit from a larger labour pool, making it easier to find and attract skilled labour.
- Ideas could be exchanged and diffused more efficiently and frequently, especially those in the prime and enabling capabilities that are driven by face-to-face interaction, as well as improving access to supply chains.

Delivering agglomeration benefits in a polycentric system is a challenge, as each area would ordinarily compete for growth and investment, driven in part by existing governance and competitive funding regimes. It is also a challenge to ensure that transport networks do not produce unacceptable environmental and social impacts. Different areas of the North have distinct strengths, so this challenge needs to be tackled through coordination and commitment to a long term Investment Programme.

By taking a long term view, TfN aims to deliver consensus, greater coordination and ultimately greater benefits. If this is not coordinated, there is the risk that the current trajectory of economic and job growth will persist, and a transformed North will not be achieved.

Beyond local areas, transport links to other parts of the North and the UK are critical to local long term success. The Strategic Transport Plan will help to facilitate joined-up, sustainable infrastructure development. Pan-Northern transport improvements will support the economy through multiplier impacts, providing enhanced connectivity between adjacent functional economic areas, and to shared Northern, national and international gateways. This transformation of pan-Northern connectivity can in turn result in improved local connectivity, delivering economic and social benefits.

To bridge this gap, Government has committed to £22 billion of capital investment for transport projects across the North over the period from 2015/16 to 2020/21, of which around £7 billion is for strategic transport projects, wholly within the North.

Despite the positive steps Government is taking, there remains a significant investment deficit. To transform economic growth, the North requires carefully **coordinated investment** in more than just transport infrastructure with a further £5.7 billion of investment committed across schools, housing, innovation centres, trade support, and business support and finance schemes in the period up to 2020/21.

Driving economic growth and productivity in the North will rely upon the enhanced connectivity, economic contribution, and qualities of the **North's urban and rural areas**. More than 2.1 million people in the North live in communities officially classified as rural, accounting for 14% of the total population. More than 121,000 businesses operate from the rural North. Many of these businesses are demonstrating vision, ambitions and the ability to grow. These aspirations can be supported by enhanced strategic pan-Northern connectivity.

Rail freight analysis shows strong growth in north-south routes as well as east-west routes. These are popular with passengers and freight because they are direct, and they provide access to key ports and markets. These routes are already short of capacity, with conflicts between passenger and freight movements. Transformational growth analysis within the Great Britain Freight Model (GBFM), along with future intelligence from the private sector freight and logistics businesses on key committed schemes, will identify where the market is expected to grow, and the associated interventions required.

International connectivity starts on the ground. To ensure that the North has robust and extensive connections to global destinations, the North's ports and airports must be connected to economic centres and assets. Greater international connectivity will boost business efficiency and increase trade, inward investment and Foreign Direct Investment.

In particular, this means supporting the North's highly productive, internationally regarded prime and enabling capabilities as set out in the *Northern Powerhouse Independent Economic Review*. Improved international connectivity will also benefit the wider supply chain and visitor economy across the North, as well as creating agglomeration effects from faster, more reliable connections between key areas of employment.

The visitor economy and related employment is really important to the North. It is complex to quantify the importance of the visitor economy, as it includes not just direct employment, but areas where employment is supported by visitor and business spend.

Increasing the **visitor economy** will require easy and accessible transport connections so that national and international visitors can access attractions across the North. Improved connectivity would enable more visitors to travel directly to the North, making it more likely that they will spend more time and money here. With improved local, regional and international connectivity, the number of visitors and tourist trips to the North could be greatly increased.

At the same time, it is vital that the transport network does not restrict tourism. Opportunities to enhance the built and natural environment through a carefully designed and operated transport network should be seized.

Quality of life is a critical factor in attracting and retaining skilled workers and inward investment to the North. In this context, there is a strong rationale for a pan-Northern story on the quality of life in the North. The North's cultural and sporting assets also contribute to the North's export income and are an important source of employment.

Forecasting future transport demand in a transformed Northern economy

The high level economic growth forecasts identified in the *Northern Powerhouse Independent Economic Review* have been examined to understand where this growth is most likely to happen. The map opposite shows the spatial distribution of the transformational scenario in terms of the provided change in GVA per person.

A significant proportion of this growth is focussed on major towns and cities, but there are opportunities to achieve transformational growth across all parts of the North.

The map shows that transformational GVA growth is spread across the North, and not just in the large conurbations. TfN's long term Investment Programme will ensure that these pockets of economic growth are supported by strategic, intra-regional connectivity.

To help develop the Strategic Transport Plan, TfN has produced a Northern Transport Demand Model that estimates how changes in employment, population and the transport network affect travel patterns across the North. The model forecasts transport demand on the road and rail networks in 2050 using different potential futures based upon the findings of the *Northern Powerhouse Independent Economic Review*, as well as to predict demand for travel to and from other parts of the UK.

Transport demand in this context refers to the amount and type of travel people choose to undertake. This will ensure that the Strategic Transport Plan and the interventions in the Investment Programme are supported by robust analysis.

To estimate how and where trips are made in the North, the model needs to know the cost – in time and money – of travel between each area. To establish the base scenario, data was extracted from existing regional transport models and data sets.

The model uses a dynamic, multi-modal simulation to predict how economic activity will generate demand for travel. This analysis includes the impact of a transformed economy with 1.2 million more people and 850,000 more jobs than the business as usual scenario.

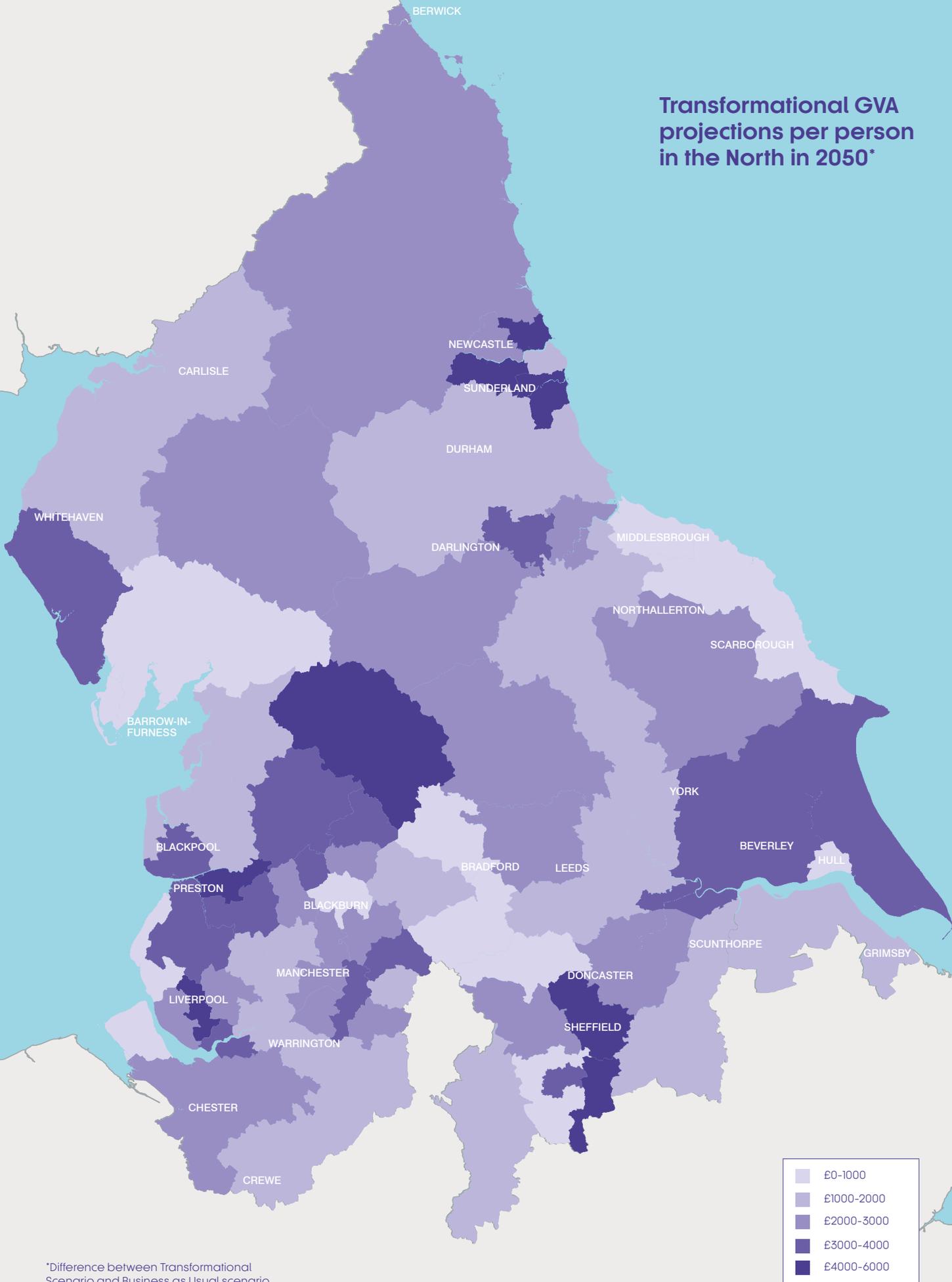
The approach was also developed to explicitly capture the uncertainty surrounding future outcomes. It uses a foresighting approach to define several future scenarios representing the potential variation in the key assumptions that drive travel demand. The assumptions have been grouped so that each scenario represents a coherent and plausible future. No one scenario is more likely than another – but taken together they represent the likely range of outcomes in travel demand in the North.

TfN's Partners can shape these scenarios through their land use and transport plans and the digital infrastructure they provide. However these are not totally within their control; TfN's Partners will continue to develop and implement plans, policies and strategies that will affect the travel demands and associated economic growth of the North.

Housing has a key role to play in supporting economic growth across the North in attracting and retaining skilled workers. There are currently around 6.5 million households in the North, but there is a new housing delivery challenge. Analysis has shown that over 50,000 new dwellings per year could be required to support a transformed North. In 2016-17, 32,650 new homes were completed in the North.



Transformational GVA projections per person in the North in 2050*



*Difference between Transformational Scenario and Business as Usual scenario

The areas of uncertainty can be summarised as follows.

Enabling policy and plans represent the uncertainty in how local planning processes and policies (local government priorities, land use and development planning, local transport planning) will affect two key drivers of future transport demand:

- Level of future housing development and employment growth that occurs in urban centres (centralised) as opposed to the suburbs (dispersed).
- Level of improvement achieved in travel conditions (journey times, reliability and travel experience) within and between local transport authority areas.

Technological and socio-cultural change represent the uncertainty in how technologies such as autonomous vehicles, alternative fuels and digital connectivity will evolve and affect three key drivers of future transport demand:

- Cost of energy (and the consequent effect on travel costs).
- Capacity and usage of the road network.
- Decision to undertake activities face-to-face or digitally.

When combined, the two dimensions create four different future scenarios in a transformational economic growth scenario, in the context of forecasted population growth and increase in employment.

All scenarios are possible, with this forecasting providing an initial understanding of the potential demand. TfN will be undertaking further work to analyse and assess future travel demand across the North, including through the Strategic Development Corridor programmes, which could also affect how people use the inter-urban network, as well as the pan-Northern network. More detail is set out on pages 82 and 83.

Enabling policy and plans

Technical and socio-cultural change



Total demand for rail travel is expected to be up to 4 times higher than today. This would mean an increase in the current total of 178 million trips in the North to around 760 million trips by 2050.

The strongest growth in rail demand is between the largest urban centres in Greater Manchester, Liverpool, Sheffield, Leeds, Hull and Humber, and the North East. In 2015 approximately 43 million trips were made between these centres. By 2050 this is forecast to increase to between 105-281 million trips, between 4 and 6 times the level today. In a more connected and integrated North, the level of rail commuting could increase by up to 8 times the level today.

In a transformed North, total demand for road travel is forecast to increase by up to 54% by 2050. This would mean an increase in the current total of 126 billion vehicle kms travelled in the North to 193 billion vehicle kms by 2050. Road demand growth in a less connected North could be half that amount.

Under Scenarios 2 and 4 (a more connected North), the growth in road travel demand between Local Enterprise Partnership areas is greater than that within those areas. In 2015 approximately 34 billion vehicle kms were travelled between these areas in the North. By 2050 this is forecast to increase to between 37-68 billion vehicle kms.

TfN will use this analysis to ensure that its work programmes identify the interventions required to support this growth. These interventions will be developed over time and form part of the long term Investment Programme.

TfN has developed a high-level intermodal freight tool which models the benefits of modal shift between road and rail. To help people understand the modal shifts, the data is mapped directly onto the North showing the differences in road and rail flows on the networks. This is a ground-breaking tool and will change the way the North thinks as TfN builds future business cases, including the role of the freight network in supporting the delivery and operation of major strategic developments across the North.

More detail on how TfN will be taking forward the initial future demand analysis is set out in pages 82 and 83.

Further work by TfN will ensure that it includes the latest traffic growth trends from across the North, as well as what the implications may be through travel demand management, and network capacity changes from interventions such as Connected and Autonomous Vehicles.



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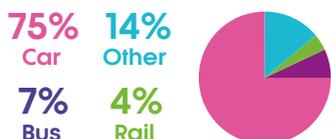
Northern transport network challenges and opportunities

An examination of past performance has highlighted two key deficiencies that define the role of TfN and this Strategic Transport Plan. Firstly, a co-ordination deficit: governance and funding approaches have driven competitive behaviours in the short term, and a move away from regional spatial planning has left a gap between integrated transport and spatial planning at the pan-Northern level. Secondly, the significant investment deficit means that year after year the North has fallen behind the levels of investment experienced elsewhere. By tackling these two deficits now, TfN can help transform economic performance. Existing challenges for the strategic transport network in the North are:

- Across the North, there are significantly more trips undertaken on the road network than on the rail network. Road networks have played a key part in shaping the North's economic geography and they will continue to have a very important role in enabling the North's economy to grow. There are also current and emerging pressures on efficiency, reliability and resilience on the road network constraining potential growth.
- The North has some of the most crowded rail services in the UK, and its current rail network cannot support many more trains in certain sections of the network. Work on the Great North Rail Project, and franchise agreements, provide opportunities to address capacity and frequency of services.
- The current disparate ticketing arrangements, and its complex fares regime within the North and for services beyond the North, that make the rail network expensive and unappealing for some users.
- East – West connectivity which is a barrier for future growth in the North. Currently the M62 is the only high standard East - West link across the Pennines between Derby in the South and Edinburgh in the North. Other major arteries including the M1, M6 and M56 corridors are also already heavily congested and are acting as major barriers to transforming the North's economy. Therefore, there needs to be resilient alternative road routes. For the rail network, existing East – West services and routes are slow and lack capacity, which impacts freight as well as passenger services, limiting connectivity to many of the North's important economic centres, ports, and airports.
- The network's role in supporting intra-city region and local transport authority trips will also be vitally important, and the interface between the key strategic roads and other local roads, as well as bus and light rail will be critical to the success of local economies, and the overall pan-Northern economy.
- Transport has a significant role to play in meeting commitments to reduce greenhouse gas emissions, to improve air quality, and to support and protect biodiversity. The Government has set a target to reduce carbon emissions by 80% by 2050, which investment in the North's transport network can support. Future planning and management of the transport network should ensure it adapts to the challenges of climate change, including extreme weather events and flood risk, and that it will enhance biodiversity, water quality, and the natural and built environment.



Mode shares for travel to work





- The transport network can have negative impacts on people's health, through factors such as air pollution, noise, vibrations and safety incidents, as well as a lack of access to good quality walking and cycling infrastructure. However, there are opportunities to reduce transport poverty and improve access to health services, recreation facilities and green space. Improvements to the strategic, pan-Northern network can support the case for improvements at a local level to improve bus, walking and cycling infrastructure.
- It is important that all members of society feel able to use the transport network with confidence. Issues such as affordability, security and physical access, as well as ease of navigation and ease of use, are crucial. Improving the journey experience, for example through smart ticketing, will help with this.
- Under a transformational growth scenario, it is predicted that there will be 75 million international air passengers per year by 2050, which is 12 million more than the business as usual scenario trajectory. Achieving this level of growth will require significantly improved surface access to airports across the North. Improving surface access will also enable more residents to access the significant numbers of jobs provided in and around our global gateways.

TfN also welcomes the recognition that a major investment in the UK's infrastructure is required, particularly for TfN this needs to be in transport infrastructure in the North. This can ensure that the Strategic Transport Plan and Investment Programme, with its targeted investment and priorities, can be supported. This will ensure that they contribute towards access to job opportunities through modern and accessible infrastructure, supporting increased productivity and future growth for the North and the UK as a whole.

There are already significant challenges to overcome, and opportunities to exploit, for the transport system in the North. When transformational economic growth is factored in, synergies between road and rail will be critical to addressing these challenges and opportunities.

Transport has at least three main roles that help to drive the economy, and the associated agglomeration benefits for the North described earlier:

- **Connecting people** - improving access to work opportunities, giving businesses access to a wider labour market, and improving access to leisure and tourism assets.
- **Connecting businesses** - improving connections to collaborators, clients and competitors, including those within the prime and enabling capabilities.
- **Moving goods** - supporting businesses to move freight and goods in efficient, multi-modal ways.

Connecting people



Connectivity between the North's economic centres and assets

The North's transport system needs to be accessible, resilient, safe, and accommodating for the free-flowing movement of people for work, business and leisure. Better transport links make jobs more accessible including for those in the North's deprived areas. For an employee seeking work, better links increase the number and range of jobs available. For an employer, better connectivity increases the number of potential workers it can hire and the range of its labour market. Additionally, not all the North's economic centres are in the largest towns and cities, so a nuanced approach is required to ensure the skills and jobs can reach the labour markets they require. In addition to pan-Northern connectivity enhancements, improved inter-urban connections will increase labour pools and assist with agglomeration in the North, strengthening the case for inner city living with connected places across the North.

Employers in the North draw workers from smaller areas than those in the South. In 2011, almost 500,000 commuters travelled over 30km to work in London – double the number who commute that distance across all six major city regions in the North. This limited reach of labour markets means that Northern workers have fewer job opportunities, and Northern employers have much smaller labour markets. This is holding back wages and productivity and makes the North a less attractive place for businesses.

A relatively small proportion of the North's population commutes by rail. This is due to factors such as the cost, convenience and perception of the rail network, as well as capacity constraints on both intra and inter-urban rail services. There is an increasing demand for rail travel between and within economic centres. Many journeys between Northern economic centres are slow and infrequent – both in absolute terms and compared with journeys to and from London.

People and businesses want faster, frequent, reliable services to access the North's ports and airports. These surface access improvements, alongside additional direct air connections, will support an increase in capacity and demand. In turn the surface access improvements to airports can then stimulate growth around airports, making them more attractive places to invest and do business. This includes Manchester Airport, which could benefit from HS2 and Northern Powerhouse Rail services.

Multi-modal connectivity improvements

For rail users, multi-modal travel needs to become easier as rail can deliver large numbers of passengers to, from, and within the North, especially in peak periods. The overall journey experience is an important factor in each passenger's decision to use rail, so it's important to provide a journey experience that encourages passengers to choose rail over their car for shorter and longer journeys. To improve journeys, enhance onward connectivity, and offer greater choice, opportunities for interchanges between modes of travel need to be improved.

The visitor economy is a key element of the North, including the five National Parks. The Lake District National Park has an objective to have 50% of visitors arrive by rail, which enhanced pan-Northern connectivity can help support and deliver. TfN also wanted to support the North's five National Parks' objectives to protect and care for the landscape, and promote the understanding and enjoyment of the Parks, as well as supporting the North's wider rural economy.

The North needs more enhanced interchanges at railway stations and strategic park and ride facilities for multi-modal journeys to better connect the road and rail networks. Improved interchanges and onward travel options for the HS2 and Northern Powerhouse Rail networks will also be required to ensure people benefit from proximity to high-quality links across the UK. At a local level, improvements can also be made to connect bus and cycling provision with the wider transport network. The North has also seen progress in bus investment through alliances such as in the Liverpool City Region.

People should be able to have a seamless travel experience, including improved ticketing and better journey information. Currently, integration is poor and information and ticketing systems are fragmented and complex. This improved travel experience should be possible not just on pan-Northern routes, but also at a local level, including on light rail and buses.



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Delivering nationally significant infrastructure projects, major employment and major local development approvals

Transport investment stimulates other investment. This can be residential, commercial and industrial. Road and rail will continue to play a significant role in the movement of materials and workers to support the construction industry in delivering housing growth, as well as the transport infrastructure itself. For those seeking employment, transport projects require more skilled labour across the North to construct them. This will support growth, whereby new homes can be built for people to live, work and learn, and businesses expand and create more jobs.

HS2 will be, and is, unleashing development. Growth strategies are under development, centred on the North's future HS2 hubs, including Crewe, Manchester Piccadilly, Manchester Airport, Leeds and Sheffield. The strategic transport network needs investment across all modes to create the access to labour markets. TfN will help to promote and stimulate this investment at a regional and local level.

Cross-border connectivity with the North's economic neighbours

Access to opportunities should not be limited by administrative boundaries: the North's functional economic geographies go beyond its borders. The transport network needs to support the movement of people within and beyond the North. The Major Road Network and the rail network play a critical role in realising the economic potential of our border areas and of our neighbours, by moving goods and labour across the borders every day. The North also facilitates the through-movement of people.

There are existing strong economic relationships with the North's adjacent regions, with the most notable movements, including North Wales - Cheshire and Warrington, and the Liverpool City Region; Scotland - Cumbria and the North East; East Midlands - Hull and Humber and the Sheffield City Region; West Midlands - Cheshire and Warrington, Greater Manchester and Liverpool City Region. TfN is working collaboratively with Midlands Connect, Transport Scotland and the Welsh Government.

TfN also wants to work with the Welsh Government to ensure that modern, connected infrastructure supports cross border movements, through schemes such as the North Wales Metro / Growth Track 360, as set out in the Welsh Government's *Prosperity for All* national strategy.

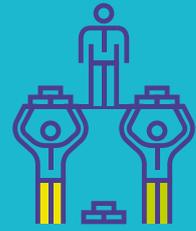
Supporting the international connectivity of the North

The North of England received around 41 million visitors in 2016, indicating the scale and popularity of its tourist offer. As an estimate of the economic impact of tourism, the *Northern Powerhouse Independent Economic Review* identified that there are around 600,000 jobs (8% of the North's total) in the accommodation and recreation, and food and beverages sectors. The current GVA of these sectors stands at nearly £12 billion, around 5% of the North's total GVA.

Harnessing this strength will require investment in developing easy, integrated and accessible transport connections to enable visitors and residents to access Northern gateways. By 2050, there is potential for the North to have 75 million air passengers per year, with all air freight flying from the North's airports, compared with just 4% in 2016.

Ultimately, if more passengers can access the North's airports by road and rail within a 1 to 2 hour catchment, then more airlines are more likely to open new European and Intercontinental services from the North's airports.

Connecting businesses



Connectivity between the North's economic centres and assets

Sustainable growth can occur when businesses, employees and customers are better connected through transport. The industries identified as the four prime and three enabling capabilities, as well as businesses in the wider economy, are spread across the region. Improving connectivity has the potential to increase trade, collaboration, share ideas and reduce costs for businesses and their operations.

The *Northern Powerhouse Independent Economic Review* provided a picture of the existing economic links. Enhancing these links will strengthen agglomeration and support the growth of those capabilities. The industrial links that need improving include those between:

- The professional service sectors located in all our towns and cities, with concentrations in Leeds City Region, Cheshire West and Chester, and Greater Manchester City Region
- The aerospace and defence industry in Brough, Central Lancashire and Barrow, and materials and process research and development in Greater Manchester and Sheffield
- Advanced manufacturing, vehicle manufacturing, energy and health innovation capabilities in the Atlantic Gateway, Teesport Gateway and Cheshire Science Corridor, the North East, Cheshire West and Chester, Hull and Humber, Alderley Park, and West and South Cumbria (the highest proportion of manufacturing workers in the UK), and universities, consultancies and international airports
- New advanced manufacturing capabilities at both the International Advanced Manufacturing Park in the North-East and the Advanced Manufacturing Innovation District in the Sheffield City Region, and firms in their hinterland, the wider North of England and beyond
- The agricultural food production and food industry in York, North Yorkshire and the East Riding of Yorkshire, Hull and Humber, Cumbria, and Leeds City Region

- The freight and logistics sector, serving businesses via our ports, airports and inland distribution facilities, such as iPort in Doncaster and the new Liverpool2 deep-water container terminal, to enhance connectivity for people and businesses across the North and the UK
- The energy industry, including the nuclear and off-shore power generation in Cumbria, Tees Valley and Lancashire – this means links with processing facilities in Cheshire, Warrington and Cumbria and with the research and development organisations in Lancashire, Greater Manchester and the Sheffield City Region.

Poor road and rail connectivity between economic centres is affecting the capability clusters and preventing the growth in supply chains. This is also true for a number of economic assets outside the urban cores.

This means that TfN needs to determine interventions that will best support businesses in rural and urban economic centres across the North. Improved connectivity will also facilitate more face-to-face interaction and support stronger service and product markets. Existing road links are not always efficient, resilient, or reliable enough to support these connections. Similarly, rail connectivity needs to support businesses, as well as being better connected globally.

Multi-modal connectivity improvements

Different types of businesses use and rely on different modes of travel. Some physically move goods, others require the movement of people's minds and ideas through collaboration. Businesses need a seamless journey experience across the North, so that their operations can grow and meet their daily business requirements.

For businesses and collaborators, transport investment will open up and support major development sites. Clusters can grow in the same vicinity, and an improved transport network can aid collaboration and the supply chain to connect localities across the North and beyond.



Delivering nationally significant infrastructure projects, major employment and major local development approvals

For businesses, the transport network plays a critical role in delivering major development sites and nationally significant infrastructure projects. This is especially hard in areas that are isolated, or where the topography makes moving materials by road difficult. A lack of suitable provision on the road and rail network, which impacts on reliability and resilience, could hold back nationally significant infrastructure projects, particularly in more remote areas, or areas not served by rail.

Examples include the Moorside Nuclear Power Station, the International Advanced Manufacturing Park in Sunderland and South Tyneside, and Liverpool2 - the new £400 million deep-water container terminal at the Port of Liverpool.

Cross-border connectivity with the North's economic neighbours

Links with the North's neighbouring economies play a critical role in realising the economic potential of both the North and the UK. Without interventions, the current links will not fully support growth in either one of these economies. Businesses within the North have supply chains, competitors and collaborators that are beyond the geographical boundaries of the North. Connectivity should not be hindering the potential for growth, but supporting it. This includes physical links to the Midlands, North Wales, and Scotland, as well as through ports to Northern Ireland, Ireland, Europe and beyond.

Supporting the international connectivity of the North

There were around 2 million return business-related air trips to and from the North in 2016. £5 billion of current GVA in the North from air passengers is derived from business productivity brought about through direct international air connections to and from the North's airports.

A key challenge is to attract more businesses to take advantage of the North's prime and enabling capabilities. To achieve this, it needs to be easier, cheaper, faster and more reliable to travel to and from the North's gateways. The Independent International Connectivity Commission found that, of the additional 12 million additional passengers required under the transformational growth scenario, there would be 1.5 million more business trips than the baseline scenario, adding over £4 billion to the economy.

If the existing capacity available at Northern airports is supported, business-related air passengers would make up a higher share of the North's travel market than today. Under the transformational growth total of 75 million passengers, this would see an additional 10 million business passengers flying to the North's airports. Achieving this growth would more than double the economic contribution of Northern airports, reaching £13 billion (from £5.5 billion in October 2016).

Increasing the range of global destinations and the frequency of direct international services to and from the North will boost efficiency, encourage entrepreneurship, enhance employment opportunities and increase foreign direct investment, inward investment and export opportunities. Securing international routes to new destinations relies on demonstrating a sufficient passenger and goods demand. This means that good surface access across the North, which increases airport and port catchment areas, is crucial. This is the case for strategic transport interventions such as HS2 and Northern Powerhouse Rail at Manchester Airport, and other interventions across TfNs Strategic Development Corridors.

Moving goods



Connectivity between the North's economic centres and assets

The strength of the North's logistics offering is its true multimodality. 33% of the UK's freight is currently moved from the North's ports. Significant growth is taking place, reflecting the investment and aspiration of port operators. Investments at Liverpool, Immingham and Tees Port have opened the Northern market places to global trade with container and other movements. This increases the attractiveness of the North for business, strengthening the economy, and encouraging job creation. The TfN Enhanced Freight and Logistics analysis shows over 50% growth in both road and rail freight, which will play a significant role in providing goods and materials to achieve the GVA growth outlined in the *Northern Powerhouse Independent Economic Review*.

To achieve the infrastructure growth, such as HS2 and Northern Powerhouse Rail programmes, huge bulk movements of aggregates and steel will be required to deliver the enhancements. Quarries within the North will deliver materials needed and will be transported most efficiently by rail. The North also produces the highest quality railway tracks with over 1 million miles of rail being produced in Northern British Steel plants alone.

Where modal shift from road to rail has occurred, it has often been driven by journey time unreliability on key congested highway routes, and has been replaced with a reliable timetabled rail freight service from origin to destination which more closely meets customer needs.

Road freight will continue to be the dominant mode by which goods are transported it is inherently less expensive to handle goods by road, by comparison with rail freight, it is free at the point of access, not restricted to a timetable, and there are lower handling charges. Road freight will not be able to meet the needs of heavy bulk markets, even with the emerging technological change. To strengthen strategic connections, TfN has developed a Major Route Network, which includes those linked to key freight distribution and processing sites. TfN is developing metrics to ensure journey times and reliability on these roads can be maintained and improved. Train movements can offer an alternative way to move aggregates and bulk products for engineering and housebuilding necessary for population increase. However, the road haulage industry is flexible and has already changed the way it operates logistically to ensure the increase in next day deliveries meets demand.

TfN's Enhanced Freight and Logistics Analysis has looked at the future of road freight operations, where new technologies including Connected Autonomous Vehicles stand to revolutionise the movement of goods and has the potential to deliver improvements in emissions levels across the North. It is not the only answer to the growth in commodity movements being predicted.

Currently, the commodities that arrive at Northern ports stay primarily within the North, with the biggest flows between the ports using east-west routes. This is driven by high volume flows of biomass and construction aggregates from ports and quarries. Significant flows to the South centre on Daventry and the East Midlands. The use of these rail freight interchanges for Northern flows indicates that the North needs to develop rail freight interchanges that would increase the options for handling freight flows across the North. Additionally, the North recognises that in the interim, enhancements in the southern infrastructure will help deliver journey speed increases from Southern Ports.

Investment in Liverpool2 and continuing growth of the Humber Ports has given strength to the concept of a Freight Superhighway connecting Liverpool and the Humber, as well as wider benefits for freight movement across the North to other ports. This concept is endorsed by IPPR North and supported by the Northern Ports Association. TfN has the opportunity to bring ports businesses groups together, supported by and working with the Association to enhance engagement with freight businesses that are not as strongly aligned to the ports in other ways. Where modal shift from road to rail may not currently be seen as economically viable, TfN has the opportunity to create the right conditions for a paradigm shift in the way that freight is viewed in the North. To achieve this, freight routes must be direct and not circuitous which is a significant constraint at present.

TfN's Enhanced Freight and Logistics Analysis has identified four principles for multi-modal transit improvements:

- East-West connectivity.
- North-South connectivity.
- General capacity enhancements.
- Intermodal connectivity.



© Sheffield Doncaster Airport



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To help ensure the correct modal mix is planned for in the most efficient way, TfN will collaborate with industry. This will help ensure TfN understands freight needs so the investment is balanced and delivered in the right places, in a sustainable way.

Reducing carbon emissions is now imperative. The Government's Clean Growth Strategy includes the desire to work with transport and logistics industry to reduce the impact of freight emissions across all modes including road, rail and shipping. TfN will work with Partners and stakeholders to understand the different options for the North to move towards delivery of alternative fuelling and operation.

Multi-modal connectivity improvements

The connectivity of goods moved in the North can also be improved, particularly with the interchange between road and rail. TfN sees the benefit of developing sites with multimodal access which can accommodate the efficient transfer of goods between modes for storage and onward distribution. There are currently too few gauge cleared rail routes capable of accommodating container trains, and no suitable routes across the Pennines that can accommodate the largest inter-modal deep-sea shipping containers on standard wagons. This increases the cost of rail journeys, and prevents the growth of a market based on east-west import and export using Northern ports.

Delivering nationally significant infrastructure projects, major employment and major local development approvals

The North's ports are investing to cater for a greater share of the inter-modal freight market, but they are limited by the capacity of the rail network, and inadequate road access to and from ports. Attractive market conditions must be created to enable the private sector to expand airports and ports, and for shipping lines and airlines to improve international connectivity. Freight is also crucial in supporting the energy sector by supporting the delivery of major projects, including the movement of fuel and waste and supporting the delivery of major construction projects, such as the Moorside Power Station.

Cross-border connectivity with the North's economic neighbours

TfN will make improvements to the North's transport network that will support economic movement for people and goods from outside the North. The sections of the Major Road Network that cross boundaries provide long-distance links on the trans-European road network. This includes the M6 north of Carlisle, which connects to the ports of Glasgow and Cairnryan, and the A55/A494/M56 and the A55/A550 to Wales and through to the Port of Holyhead. There are also crucial rail freight movements that need to be supported.

Supporting the international connectivity of the North

Air freight has a significant economic value, and industries that rely on transporting high-value goods quickly around the globe (for example just-in-time services) depend on it. Whilst 11% of air freight is customs cleared in the North, only 4% is flown from the North. This reflects the dominance of the direct, long-haul passenger flights that provide most of the air-freight capacity. Increasing the North's direct air connections will increase its air-freight capacity, meaning that fewer goods need to be transported across the UK. In turn, this could reduce congestion and carbon emissions on north-south corridors.

The North and its airports and ports could increase their capacity to handle freight by both air and sea. The Independent International Connectivity Commission was of the view that securing more direct long-haul passenger services would increase capacity for high-value, time sensitive air freight. This would enable businesses in the North to make full use of our international gateways, trading more directly and effectively with Partners around the world.

For the end-to-end freight journey to be as efficient as possible, the North needs better surface access to ports, airports, and intermodal terminals – enhancing the 'last mile' of these journeys. This means creating better road connections and additional rail freight paths, which TfN will explore as part of its Strategic Transport Plan.

What?

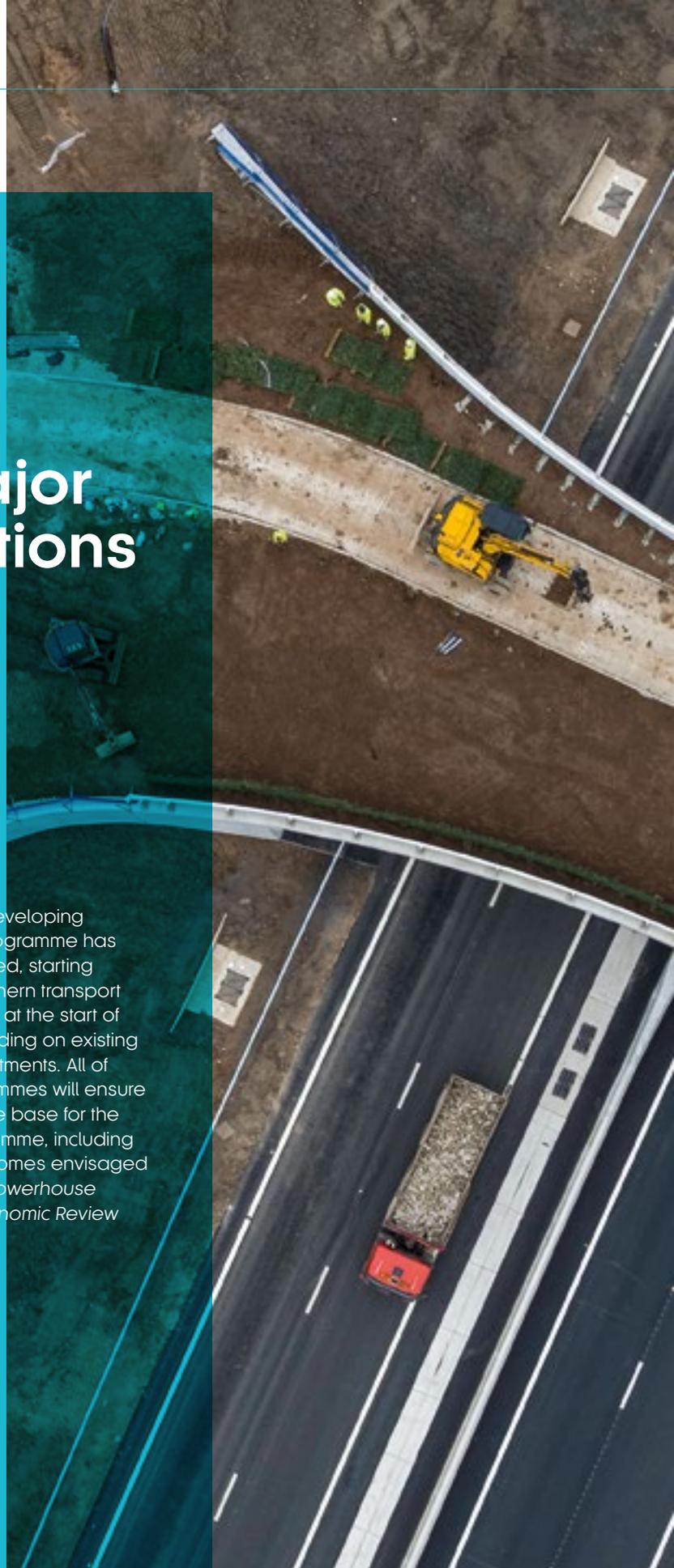
Identifying the major strategic interventions

Current transport commitments in the North

TfN's long term Investment Programme recognises that there are existing transport commitments in both rail and road across the North.

As a fundamental part of the Strategic Transport Plan, TfN is developing a multi-modal, long term Investment Programme that will benefit both passengers and freight. This will consist of strategic transport interventions that the evidence suggests are required to support the transformational growth scenario set out in the *Northern Powerhouse Independent Economic Review*.

The process of developing the Investment Programme has been evidence-led, starting with the pan-Northern transport objectives set out at the start of the Plan, and building on existing investment commitments. All of TfN's work programmes will ensure a robust evidence base for the Investment Programme, including ensuring the outcomes envisaged by the *Northern Powerhouse Independent Economic Review* are delivered.





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Current rail commitments in the North

For many years there has been under investment in rail infrastructure and trains in the North. The North has a very substantial rail network with around 500 stations, yet achieves only around 3.7% market share. But as a result of the actions of Rail North, significant enhancements are now in progress or planned over the coming years.

Rail North, along with the Department for Transport, has already shaped the transformational investment in the North's two new rail franchises, Northern and Trans Pennine Express. These franchises will provide more frequent services to more places, with shorter journey times, providing over 2,000 additional trains per week in the North. The £1.2 billion investment includes 500 brand new carriages for the North as well as removing the outdated Pacer trains, and the introduction of the Northern Connect network.

New rolling stock is also being procured to transform the transport system including recent investment in new rolling stock for the London Midland, Virgin West Coast, and Virgin East Coast franchises for north-south services. The Liverpool City Region is investing £460 million to replace 52 trains on the Merseyrail suburban electric network. These brand new trains will enter service at the end of 2020. TfN also welcomes the Government's commitments in the Autumn 2017 Budget to invest £337 million to replace the Tyne and Wear Metro rolling stock, reducing running costs, boosting performance and increasing reliability. In the North East, Nexus is in discussion with the Government

for a further £518.5 million to continue with the programme of essential Metro renewals throughout the next decade.

The Great North Rail Project is Network Rail's programme of improvements to transform train travel in the North. This includes connectivity benefits, journey time improvements, capacity enhancements, and reliability improvements. Completed and current projects include North West electrification, West Yorkshire signalling upgrades, Trans Pennine Route Upgrade, the Ordsall Chord, Liverpool City Region upgrades, Manchester Victoria Station improvements, and the Calder Valley upgrade. The project also includes station improvements at Manchester Oxford Road and Salford Central, as well as platform capacity enhancements for through services at Manchester Piccadilly.

TfN also welcomes the work being undertaken to explore the digitalisation of signalling between Manchester and York as a component of the Trans Pennine Route Upgrade, as well as supporting a future Northern Powerhouse Rail network.

Work has commenced on bringing the Halton Curve back into use. This small, yet significant, section of infrastructure will support economic growth by opening up opportunities and improving connections between Liverpool, Liverpool John Lennon Airport, Cheshire West and Chester, and North Wales. In addition to unlocking key employment sites and generating additional tourism and economic benefits, it will also support modal shift to help to alleviate congested roads by providing people with the opportunity to use the railway

to make a journey they could not otherwise make. The 2016 Autumn Statement also provided development funding for the Manchester Airport Terminal 2 Metrolink extension.

The Great North Rail Project will result in more frequent and faster trains between Liverpool and Manchester, Preston and Manchester, and Manchester and Sheffield. The Great North Rail programme also includes the Trans Pennine Route Upgrade programme, for which TfN is a strategic partner, and for which Northern Partners are seeking a firm commitment in early 2018. This investment will help to reduce journey times further and increase capacity between Manchester, Manchester Airport, Huddersfield, Leeds, York and Selby, and beyond to Liverpool, Hull, Scarborough, Middlesbrough and Newcastle.

Delivering the Trans Pennine Route Upgrade programme will improve links between the cities of the North and provide additional short term capacity to meet growth and address overcrowding. This will enable better journeys for passengers from 2022. Rail users expect high quality rail services and TfN is committed to electrification where it delivers benefits, but will also take advantage of new technology to improve journeys. Although an important scheme, the Trans Pennine Route Upgrade cannot deliver the transformation in journey times and capacity that TfN is seeking for the longer term, therefore this programme is an essential strong baseline for future investment.

Electrification in the North West and the Oxenholme to Windermere enhancements will also complement Northern Powerhouse Rail and support enhanced commuter services.

For HS2, Phase One has now received Royal Assent, providing the necessary permission to construct this phase of the line. HS2 Ltd's work to develop Phase One and Phase Two continues to demonstrate that the project will bring a range of benefits for the UK, improving connectivity, capacity, and driving growth in the North. Connectivity will be improved to towns and cities in the North of England, with new services and new infrastructure. There will be new HS2 stations at Leeds, Manchester Airport and Manchester Piccadilly, with classic-compatible services using the upgraded existing infrastructure to serve other destinations including Sheffield, York, Darlington, Durham, Newcastle, Crewe, Liverpool, Warrington, Wigan, Preston, Lancaster, Oxenholme, Penrith and Carlisle. These latter stations need to be ready to accommodate HS2 services from the day of opening.

Following the completion of Phase One in 2026, journey times to the North West of England and North Wales will be reduced. Following the completion of Phase 2a to Crewe in 2027, journey times to North West of England, North Wales and Scotland will improve again. With completion of the full Phase Two route in 2033, journey times between London and the North East and North West of England will

be significantly improved, with better connections from the North to the Midlands and to Scotland. The committed enhancements to power supply and infrastructure to facilitate journey time improvements on the East Coast Main Line will be a first step in preparing the line for the arrival of HS2.

HS2 is a central part of the rail proposition for the North. Working with HS2 Ltd, TfN wants to ensure that the design of Phase Two could be refined to create a more integrated rail network through Northern Powerhouse Rail, which will maximise its economic and strategic value both to the city regions it serves across the North and to the UK as a whole. This has already resulted in bringing forward the completion of a station at Crewe to 2027 as part of Phase 2a. The Strategic Transport Plan will play a key role in supporting the case for HS2 to serve the North. This includes the use of HS2 infrastructure by Northern Powerhouse Rail to support crucial Northern rail passenger movements, and the wider connectivity to HS2 stations that the Strategic Transport Plan is looking to develop. TfN welcomes the £300 million confirmation in the Autumn Budget 2017 towards ensuring that Northern Powerhouse Rail services can be accommodated on the HS2 Phase 2B infrastructure.

TfN is also working with Cheshire East, Cheshire West and Chester councils, Network Rail and HS2 Ltd on the proposals for an integrated hub at Crewe. The Hub would not just connect the areas around the station, it would also improve connections to other parts of Cheshire, including HS2 northbound, and strengthen cross-border movements to and from North Wales.

TfN will be working to enhance the interchanges at other key stations across the North. These will then strengthen the case for investment in supporting local transport infrastructure. This includes supporting growth strategies that are in development to understand the regeneration and wider connectivity at Manchester Piccadilly, Manchester Airport, Sheffield and Leeds.

When HS2 reaches the North, it will be important to maximise the benefits and opportunities, with complementary measures to ensure good connectivity to and from new HS2 stations. The spare capacity released on the classic rail network must be used to improve both freight and passenger services. Investment in the established network may need to be targeted where additional volumes are expected with the opening of HS2, and options for early adoption and acceleration of at least key elements of HS2 will also be worthy of consideration. Not all of the North will benefit equally from HS2, so continued investment in the classic main lines linking the North to the rest of the UK is also important.

Current road commitments in the North

Recent investment in the Strategic Road Network has been considerable and the schemes under construction in the North will support economic growth and alleviate some of the worst congestion on the network. The first Roads Investment Strategy (RIS1) includes £2.9 billion of commitments by 2020 in total, with 33 schemes in the North, including upgrading the A1 to continuous motorway standard from the M1 to Newcastle, and converting sections of the M1 and M62 to smart motorways to provide a four-lane standard for the majority of these routes within the North.

RIS1 will also provide major improvements to port and airport access, with five major Northern ports benefitting from committed schemes such as the A5036 Princess Way in Liverpool and A63 Castle Street in Hull. Manchester, Doncaster Sheffield, and Newcastle airports will also benefit from improvements to the strategic or local network. These are key schemes that will contribute to pan-Northern growth.

Local Enterprise Partnerships across the North have secured over £2 billion in Local Growth Fund allocations for local transport projects through City Deals, Growth Deals and Devolution Deals. This has been supplemented by locally funded investment programmes in a number of areas. This is alongside support for targeted investment such as the A18 in Yorkshire and Humber, the A1290 in the North East and the A536 in the North West.

£90 million of funding for the North has also been made available to help cut congestion and journey times for motorists and to improve safety. These schemes will be completed by Spring 2020, and include improvements to the A595 and A66 junctions in Cumbria, junctions on the A69 at Hexham and Corbridge, and A63 Garrison Road in Hull.

RIS1 also includes commitments to bring forward schemes for RIS2 between 2020 and 2025. This includes the reconstruction of some of the most congested motorway junctions in the North, such as the Lofthouse Interchange between the M1 and M62, Junctions 26 and 27 on the M62 and the M60 / M62 / M66 interchange at Simister Island, as well as the A19 Moor Farm and Seaton Burn junctions. RIS2 should also see the upgrading to motorway standard of the A1 between Redhouse and Darrington, allied to improvements to the A1(M) Doncaster Bypass.

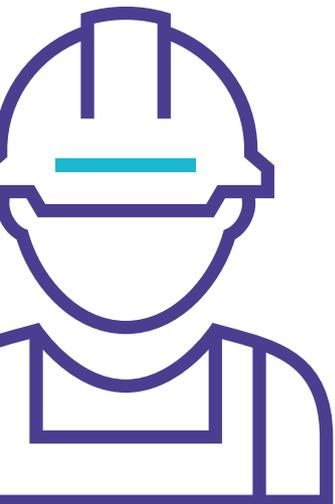
The 2016 Autumn Statement also provided support for developing a number of Large Local Major Transport Schemes across the North, including:

- Warrington Waterfront Western Link.
- A500 dualling west of the M6.
- A1079 and A164 Jocks Lodge Junction.
- Sheffield's Innovation Corridor (links between Sheffield and Rotherham around the M1).
- New Tees Crossing.
- Tees Valley East-West Connections (A1(M) and the A66 to the North West of Darlington).

Funding for the Middlewich Eastern Bypass was confirmed through this funding stream in October 2017.

In March 2017, the A556 Improvement Scheme was completed, providing a faster and more reliable link between Junction 19 of the M6 and Junction 7 of the M56. 50,000 vehicles, including 7,000 lorries, rely on this motorway-to-motorway connection every day, and the improvement will also reduce the environmental impact of this traffic on local communities. The construction and design of the new road has also been innovative, setting an exemplar for future projects, and has received multiple environmental and considerate constructor awards.

The Mersey Gateway bridge project is a new, six-lane, 9.2 km road over the River Mersey. The project provides enhanced capacity and connectivity between Runcorn, Widnes and the M56, relieving the existing congestion on the Silver Jubilee Bridge. The project is expected to bring huge benefits for people and businesses in Halton, the Liverpool City Region, Cheshire and across the North West, including 4,640 permanent new jobs as a result of the operation of the Mersey Gateway, regeneration activity and inward investment, and £62 million GVA per annum by 2030. Access to the Mersey Gateway should be improved further with a commitment by Highways England to provide a new junction on the M56 (Junction 11A), work on which should commence before March 2020.





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Building the long term Investment Programme

The process for building TfN’s long term Investment Programme is set out in the diagram below. The Investment Programme has a horizon year of 2050 to align with the Northern Powerhouse Independent Economic Review, and will allow TfN to develop a pipeline of investment. This will enable TfN and Partners to work together with Government and Delivery Partners to secure funding and delivery of the right schemes at the right time. The Investment Programme when finalised will provide certainty for local transport authorities to deliver complementary investment. The pipeline of investment will give confidence to businesses so they can invest and grow, give the supply chain, including SMEs, confidence to plan interventions, build up their skills base, and collaborate across industries.

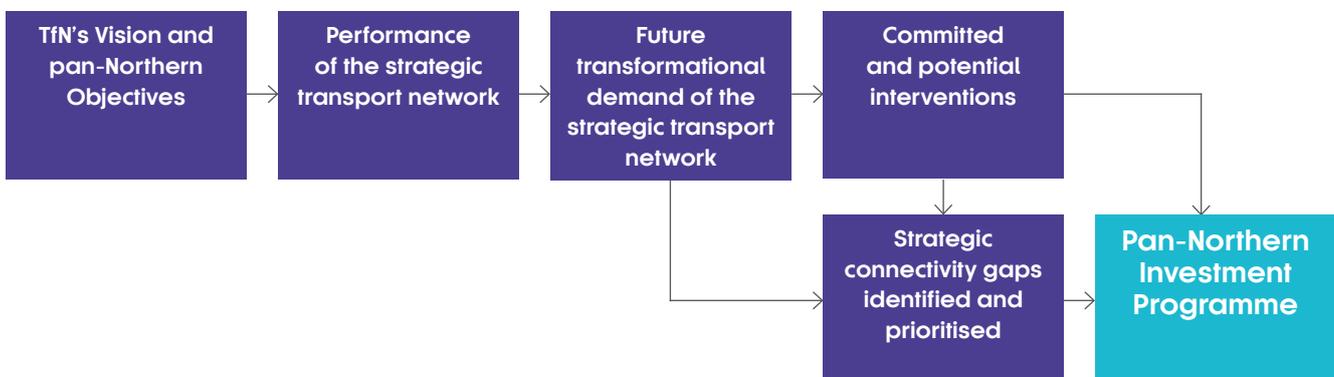
The long term Investment Programme will build on the rail and road commitments listed in this Plan, and informs TfN’s work programmes, as illustrated overleaf. This reflects the current position with Northern Powerhouse Rail, the Long Term Rail Strategy, the work done to date on three Strategic Roads Studies, the Major Road Network for the North, the Integrated and Smart Travel programme, and a series of Strategic Development Corridors that have been identified from the most recent evidence. TfN’s programmes of work are building on and incorporating the analysis set out in the Independent International Connectivity Commission’s Report and the Enhanced Freight and Logistics Analysis.

The following pages provide more detail on each of these work programmes.

Activity will continue on each of these work programmes as the Strategic Transport Plan evolves over time, this will ensure any interventions brought forward contribute to achieving the desired outcomes of the Strategic Transport Plan. For most work programmes, the next stage is to develop a Strategic Outline Programme and define the early delivery opportunities that will provide the levels of growth envisaged by the Northern Powerhouse Independent Economic Review up to 2050. This follows the HM Treasury Green Book approach to developing business cases for programmes.

Each work programme will need to develop its own specific strategic programme level business cases, context and objectives, which support the pan-Northern transport objectives, as well as an initial Value for Money assessment for the preferred package of interventions. An understanding of the particular environmental and social context of any physical interventions will also be needed. This process will also involve public engagement and consultation at the appropriate time.

Developing the long term Investment Programme in this way will enable TfN’s Partners to use the Strategic Outline Programmes to support the case for their strategic local connectivity priorities. These will complement the major, strategic transport interventions that comprise the long term Investment Programme.



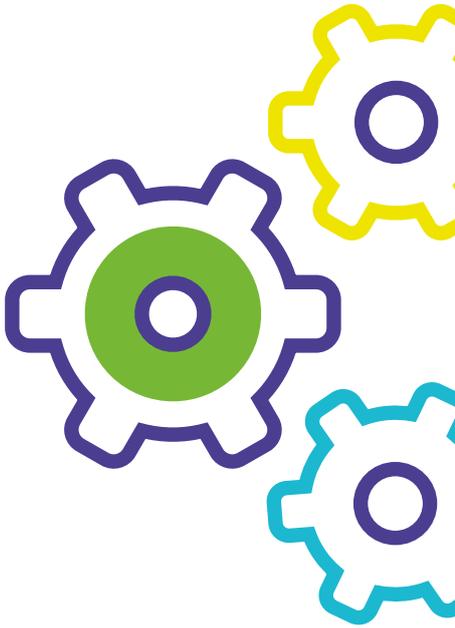
Process for developing the long term Investment Programme

TfN's work programmes

Strategic Transport Plan and Investment Programme
 Inputs into Rail Upgrade Plans, Route Business Plans, Road Investment Strategies, Franchise Agreements, other Investment Processes, and current and future national policy.

Strategic Development Corridors
 Multi-modal programme level corridor work, to support other TfN programmes such as the case for rail franchise, line and station investment, Northern Powerhouse Rail, and the Major Road Network, and complementary to Partners' investment plans along the Strategic Development Corridors. Building on the Independent International Connectivity Commissions Report and the Enhanced Freight and Logistics Analysis.

Rail		Roads	Smart
<p>Northern Powerhouse Rail</p> <p>Significantly improving capacity, frequency, speed and services between the North's main economic centres</p>	<p>Long Term Rail Strategy</p> <p>Improving train services, stations and lines on the wider rail network</p>	<p>Major Road Network for the North and Strategic Road Studies</p> <p>Improving the reliability, efficiency, quality and resilience of the North's road network</p>	<p>Integrated and Smart Travel</p> <p>Improving the experience for people using public transport across the North</p>



Northern Powerhouse Rail

Significantly improving capacity, frequency, speed and services between the North's main economic centres

Rail



A step change in the level of rail connectivity between some of the North's largest cities is required to support opportunities and choices to the next generation of workers and businesses. Northern Powerhouse Rail can help deliver the integrated Northern labour markets that is central to achieving economic transformation, unlocking investment potential and creating opportunity and new economic choices for millions of people across the North.

Northern Powerhouse Rail is being developed as part of the Long Term Rail Strategy, and is complementary to investment plans for the wider rail network. This will ensure that the wider network can also incorporate and realise the associated benefits of Northern Powerhouse Rail.

Northern Powerhouse Rail would support economic transformation in the North by delivering faster and more frequent rail journeys linking the North's six main cities with each other and Manchester Airport. It also has potential to provide much improved connectivity for other significant economic centres, and the potential to release capacity on the existing rail network for freight and other local services.

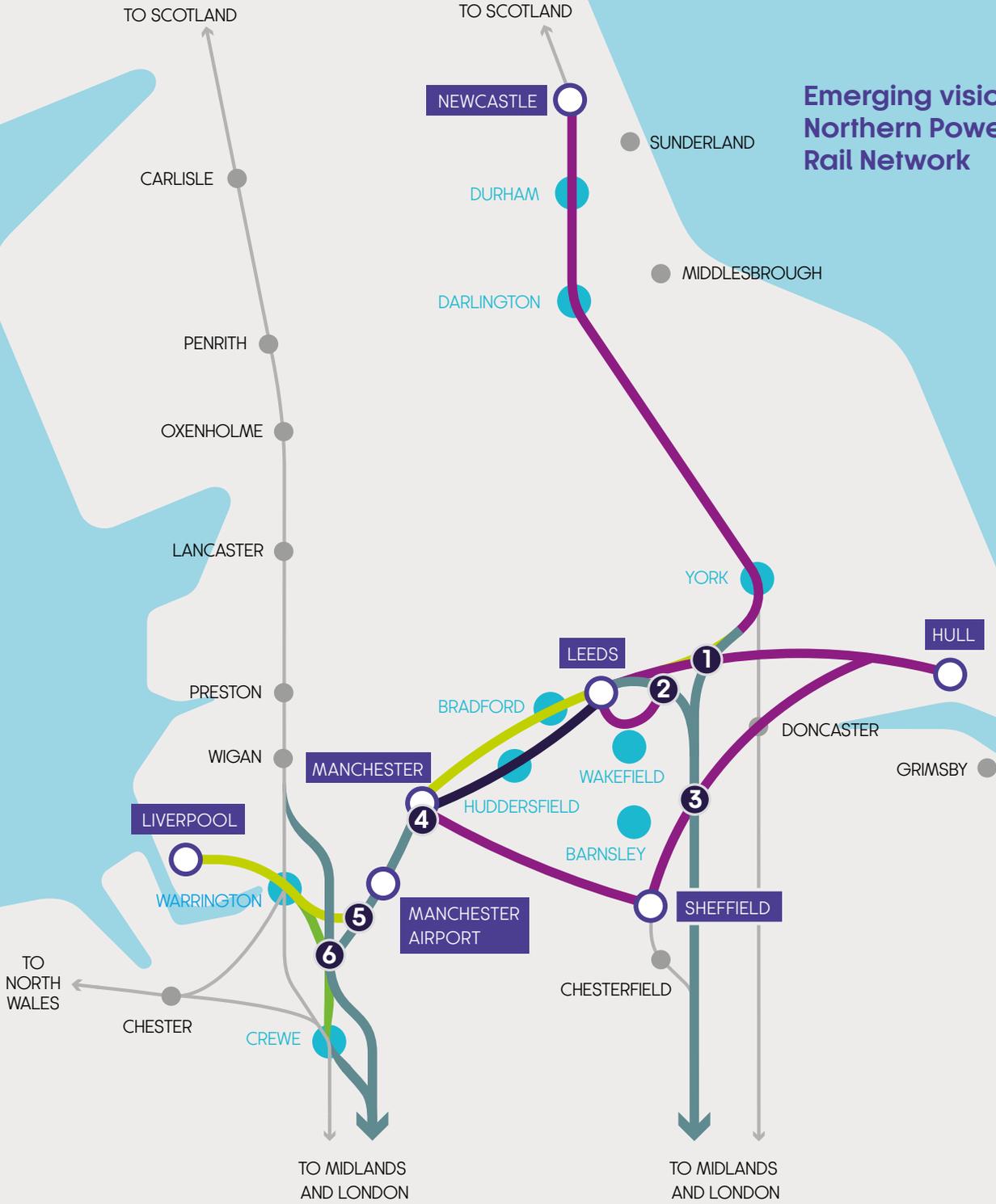
Working collaboratively with Northern Partners, TfN and the Department for Transport have been developing the Northern Powerhouse Rail network, making progress in improving the economic case for the Northern Powerhouse Rail network, whilst retaining the scale of ambition required to transform the North.

Analysis shows that Northern Powerhouse Rail could:

- Increase the population within one hour of four of the largest cities from less than 10,000 today to 1.3 million helping support a modal shift from road to rail
- Change the way labour markets work, where people live and work, and how businesses collaborate, and enable the North to attract and retain the people and skills it needs. Once the network is delivered, 40% of businesses identified in the *Northern Powerhouse Independent Economic Review* as prime capabilities would be within 90 minutes rail travel of four or more of the North's largest cities, compared to only 12% today
- Be integrated with HS2 to maximise connectivity and demand on the planned new fast north-south connections, and make greater use of HS2 infrastructure. Northern Powerhouse Rail and HS2 will together deliver the North's vision of city to city links, both east-west and north-south
- Improve access to Manchester Airport from across the North to enable it to act as a global gateway for the whole of the North. Journey times will be significantly reduced and services will be more frequent than now.

This work has refined the service options and developed a programme of sequenced infrastructure concepts that for a number of corridors come close to achieving, or in some cases, exceeding the Conditional Outputs as set out in the One North Report and Northern Transport Strategy. This process has also enabled TfN to understand the potential future economic benefits, and explore how costs could be reduced by making better use of existing and future planned infrastructure.

Emerging vision for the Northern Powerhouse Rail Network



Northern Powerhouse Rail junctions with HS2:

- 1 Junction on HS2 mainline for Leeds – North East services
- 2 Junction on HS2 Leeds spur to facilitate through services via existing Leeds station
- 3 Junction on HS2 mainline for Sheffield – Leeds services
- 4 Junction at Manchester Piccadilly to support Northern Powerhouse Rail platforms
- 5 Junction on HS2 Manchester spur for Manchester – Liverpool services
- 6 South facing junction on HS2 mainline for London – Liverpool services

- Northern Powerhouse Rail - upgrade line
- Northern Powerhouse Rail - new line
- Linking Liverpool to HS2
- HS2 line
- TransPennine Route Upgrade
- Existing line
- Northern Powerhouse Rail hub station
- Other significant economic centre

Alternative concepts will continue to be assessed between Liverpool – Manchester, Manchester – Sheffield and Manchester – Leeds as part of Developing a Strategic Outline Business Case for the programme. Map shows only railway lines which interact with Northern Powerhouse Rail. The Department for Transport and HS2 Ltd are also assessing concepts for a HS2 parkway serving South Yorkshire.

The emerging vision for the Northern Powerhouse Rail network includes:

- A new line between Liverpool and the HS2 Manchester Spur via Warrington
- Capacity at Piccadilly for around eight through services per hour
- A new Trans Pennine rail line that connects Manchester and Leeds via Bradford
- Significant upgrades along the corridor of the existing Hope Valley line between Sheffield and Manchester via Stockport
- Leeds to Sheffield delivered through HS2 Phase 2B and upgrading the route from Sheffield
- Leeds to Newcastle via HS2 junction and upgrades to the East Coast Mainline
- Significant upgrades to existing line from Leeds to Hull (via Selby) and Sheffield to Hull (via Doncaster)

Alternative concepts will continue to be assessed between Liverpool – Manchester, Manchester – Sheffield, and Manchester – Leeds as part of developing a Strategic Outline Business Case for the programme. TfN are also exploring plans for shorter term improvements along the Hope Valley corridor between Sheffield and Manchester as a joint priority for both TfN and the Sheffield City Region, and whether transformational journey times could be realised along the existing rail corridor. If the evidence demonstrates that significant upgrades to the Hope Valley corridor do not look promising in terms of moving towards the transformational outputs, TfN will consider the case for and further assessment of a new line between Manchester and Sheffield.

The business case for the elements of this vision require the evidence base to be worked up and completed, and therefore decisions as to the right proposals to implement will depend on further work to establish costs and benefits of these options.

TfN wants to ensure that Northern Powerhouse Rail is fully integrated into the planning of HS2 Phase 2B, to ensure both maximum value for money and that Northern Powerhouse Rail can be developed without delay.

To enable the possibility for Northern Powerhouse Rail services to make use of HS2 infrastructure, it is necessary to incorporate passive provision in the HS2 Phase 2B Hybrid Bill, with funding announced by the Chancellor in October 2017 intended to future proof HS2 for delivery of Northern Powerhouse Rail connectivity. A series of touchpoints between Northern Powerhouse Rail and HS2 Phase 2B have been identified across the Eastern (Sheffield to Leeds) and Western (Liverpool to Manchester) corridors, as well as at Manchester Piccadilly.

Integration with HS2 provides the opportunity for parts of the Northern Powerhouse Rail network to be delivered in an efficient way, using parts of an already committed scheme with an agreed programme. Together with the existing mainline route network, HS2 and Northern Powerhouse Rail can create a flexible set of services to maximise the economic outcomes for the UK.

The government has been working closely with TfN in the development work for junctions. These are:

- Junctions in the Leeds area, enabling trains from Manchester, Sheffield and the Midlands to travel via Leeds and on to York and the North East. This could also release capacity for more local and commuter services east of Leeds
- Junctions in Cheshire to serve Liverpool via a new line, enabling services between Liverpool and Manchester via the HS2 Manchester spur, and offering the potential for faster Liverpool - London HS2 services on to the HS2 mainline
- Junctions at Manchester Piccadilly, which combined with a range of other interventions, would enable services from Manchester Airport and Liverpool to use either an underground Northern Powerhouse Rail through station or a surface turn-back station to continue east towards Leeds and the North East.
- A junction north of Sheffield at Clayton, enabling trains to run through Sheffield and re-join the HS2 mainline to Leeds (This is already being considered in the design by HS2 Ltd as part of the Phase 2B Hybrid Bill work).

TfN and Partners have been developing a refined set of possible journey times and frequency for the Northern Powerhouse Rail network, including integration with plans for HS2, and other proposed improvements to the rail network in the North. By using the HS2 infrastructure, and importantly the inclusion of junctions between Northern Powerhouse Rail and HS2 in the Phase 2B Hybrid Bill, this could allow the journey time aspirations to be achieved between some of the North's largest economic centres.

Emerging analysis shows that a service from Liverpool to Manchester Piccadilly, via Warrington and Manchester Airport, could take around 28 minutes, compared to the current fastest service of 50 minutes between Manchester Piccadilly and Liverpool.

A service could also take people from Manchester Airport to Manchester Piccadilly in 10 minutes or less using the HS2 tunnel to the south of Manchester, with services running from Manchester Airport to Liverpool in around 15 minutes via Warrington.

Using new junctions on to the HS2 mainline in Yorkshire, Sheffield to Leeds journey times could be around 26 minutes, compared with 41 minutes currently. Using new infrastructure between Manchester and Leeds, journey times could be no more than 30 minutes, compared with the current 49 minute journey time, via a stop serving Bradford.

To date, TfN's focus has been on developing journey times on routes that make use of HS2 infrastructure. Further work on potential journey time improvements on the rest of the network will be undertaken over the coming months. As part of developing any programme of this scale, and recognising the early stage of the programme, work will also explore the train service specification across the whole of the network. Following submission of the Northern Powerhouse Rail Strategic Outline Business Case at the end of 2018, and assuming a positive outcome, the more detailed design work on each corridor will then commence. This will include how local services will connect the Northern Powerhouse Rail hub stations, as well as other significant economic centres, and the potential to continue Northern Powerhouse Rail services beyond the core network to other locations, such as Sunderland, Doncaster, Preston and Carlisle.

The next phase of work will be to develop propositions for the Liverpool – Manchester, Sheffield – Leeds, Leeds – Manchester, and Sheffield – Manchester corridors, as well as for the wider Northern Powerhouse Rail network to Newcastle and Hull. As a key element of the TfN Investment Programme, the next phase of work will look to ensure that any propositions are integrated with other plans for the rail network in the North to ensure an efficient approach to network development and investment.

The Northern Powerhouse Rail network could be delivered in phases, building upon committed and planned investment, matching outputs to the ambition of a network which can support the transformation of the Northern economy. This approach could take the form of a series of short, medium and longer term phases for the development of Trans Pennine Route Upgrade and Northern Powerhouse Rail programme.

Key milestones for the delivery of Northern Powerhouse Rail are:

- 2020 – completion of Network Rail's Control Period 5
- 2022 – completion of the roll out of new rolling stock and services for the current TransPennine Express and Northern franchises
- 2023 – completion of the current Trans Pennine Express franchise
- 2024 – completion of Network Rail's Control Period 6
- 2025 – completion of the current Northern Franchise
- 2026 – opening of HS2 Phase 1, with HS2 services running to the North West
- 2027 – opening of HS2 Phase 2A to Crewe with HS2 services running to the North West
- 2020's and beyond – the medium to longer term horizon for new Northern Powerhouse Rail infrastructure and associated schemes.
- 2033 – opening of HS2 Phase 2B to Manchester and Eastern legs to Sheffield, Leeds and beyond

Northern Powerhouse Rail is subject to further scheme development. TfN and the Department for Transport will complete a Strategic Outline Business Case for Northern Powerhouse Rail by the end of 2018.



The North's passenger railway network and stations



	Rail Network
	High Speed 2
	Other Rail Stations
	Major Rail Stations
	HS2 Rail Stations

This wider geography includes the full extent of the Northern and TransPennine franchises within England and those authorities who are served by the services. Alongside TfN's constituent authorities, these authorities are co-opted members of TfN for rail franchising.

Long Term Rail Strategy

Improving train services, stations and lines on the wider rail network

Rail



An efficient and resilient rail network across the North is required to support and facilitate the transformation of the North's economic performance, as well as improving opportunities and quality of life, while playing a critical role in reducing greenhouse gas emissions and moving towards a sustainable transport system. This includes providing fast, frequent, reliable and high quality passenger services, along with the capacity and capability to adapt to modern freight requirements.

Over the last two decades, the North's railway has experienced substantial growth in passenger numbers despite a legacy of underinvestment. Much of that growth has been accommodated within pre-existing capacity. This is no longer possible on many routes. The North's rail network lacks sufficient capacity for growth and is severely constrained by on-train congestion, low journey speeds and poor punctuality.

In recent years the North's railway has been able to secure investment, and through greater influence in the franchising process the North has secured a commitment to deliver significant passenger service improvements for Northern and TransPennine Express. Central to securing this investment is the way in which local authorities across the North have worked together to influence change. Success in making the case for the Northern Hub, and linked schemes on adjoining routes to enhance rail connectivity across the North was followed by the formation of Rail North Ltd, and the adoption of the Long Term Rail Strategy. This led to the joint management of the TransPennine Express and Northern franchises with the Department for Transport.

Whilst this recent investment is welcome, TfN wants to ensure that committed schemes are delivered in full, and build upon this investment, to ensure it delivers its full potential and TfN need to plan for further improvements that will be necessary to drive economic growth. Responding to this challenge, TfN have updated the Long Term Rail Strategy, identifying opportunities to transform rail across the North for both urban and rural communities, supporting the pan-Northern transport objectives. The Long Term Rail Strategy sets out to deliver high quality rail services right across the North, with more frequent and better integrated services, faster journeys and improved reliability, on modern trains with high quality facilities, alongside an efficient and attractive rail freight offer.

The Long Term Rail Strategy sets out an ambitious vision for the transformation of the North's rail network with new railways (such as HS2 and Northern Powerhouse Rail) and services complemented by major upgrades of the existing network and the harnessing of new technology to create a world class railway for the North.

The planned HS2 and Northern Powerhouse Rail investments will lead to a step change in rail's offering, benefitting many areas of the North. HS2 will enhance the North's connectivity with the rest of the UK, whilst Northern Powerhouse Rail will transform connectivity between major Northern cities, helping to redefine the economic relationships within and beyond the North, whilst securing modal shift from road transport for major interurban flows. The Long Term Rail Strategy will ensure that these become part of a single integrated rail network complemented by the raising of standards across all of the North's network, to ensure good connectivity which meets the needs of passenger and freight customers.

Planning for future improvements is already taking place and continued investment in the rail network is essential if the current gaps that will still exist once these committed schemes have been delivered are to be addressed. For freight, these gaps include limitations in network capacity, train lengths, loading gauges and axle weights, which makes some journeys uncompetitive. For passengers, these gaps include slow journey times, infrequent and poorly integrated services, overcrowding, poor quality passenger facilities, and outdated rolling stock.

The Long Term Rail Strategy defines a series of key themes based on evidence of economic and social impact of rail, supported by a set of desirable minimum standards. Each key theme addresses one or more of the gaps that prevent the current rail network from delivering the pan-Northern transport objectives. Each demonstrates a clear and strong alignment to the pan-Northern transport objectives to deliver a single, cohesive, integrated rail network.

Connectivity

A step change in connectivity including frequency and journey time improvements for both passenger services and freight, combined with better integration of services. This will bring the North's economic centres and neighbouring regions closer together and better align service provision to the seven day economy, supporting sustainable transformation of the North's economic performance above and beyond that permitted by HS2 and Northern Powerhouse Rail.

Capacity

Providing longer trains and additional services to meet existing and future passenger demand, with improvements to the infrastructure and signalling capability to accommodate these additional services. It will also enable the railway to be maintained and renewed in such a way that passengers and the freight users are not unnecessarily disrupted by engineering possessions. This will ultimately improve access for all to opportunities across the North, and facilitate the large-scale modal shift of passenger and freight flows which will be required.

Customer

A passenger network that is easy to navigate, accessible and predictable, with consistent information available before and throughout journeys. For passengers, there will be a less complex and more rationalised fares structure and better coordination of services with one another and with other modes of public and active transport. Stations and rolling stock will be of high quality with secure and comfortable passenger environments and facilities tailored to the needs of the journeys being made. For freight, there will be improved reliability and punctuality and the flexibility to meet the changing needs of the industries of the present and the future. Collectively this will improve the performance and integration of the North's strategic transport network by delivering high quality services across the North.

Community

A railway which supports the social fabric of the communities it serves, providing journey opportunities which enable access to education, training and leisure opportunities as well as employment, and plays a full part in addressing transport poverty, isolation, and deprivation across the North. Equally important is enhancing rail's wider role in society and reflecting our global responsibilities, including the reduction of greenhouse-gas emissions, the transition to sustainable energy sources and reducing the pollution caused by transport activities. Rail will contribute to these both by supporting modal shift for both passenger and freight and by increasing environmental standards of rail's own operations.

Cost Effectiveness

Growing revenue and minimising the unit cost of operating and maintaining the North's railway without compromising the quality of the services offered, will help maximise network efficiency and enhance the case for additional faster and direct services.

TfN through the Long Term Rail Strategy will work with Government and the rail industry to:

- Transform connectivity to, from and within the North seeking, subject to business cases and local requirements, to deliver a minimum two trains per hour on each route where there is appropriate demand and average journey speeds of at least 40 mph for local services, 60 mph for inter-urban services, and 80 mph for long distance services.
- Fully realise the benefit of on-going rolling stock investment, with infrastructure enabling trains to operate to their full capability.
- Provide capacity, both on-train and within the infrastructure, that keeps pace with growth and prevents overcrowding at any time of day.
- Deliver the capacity and capability to serve the changing needs of the North's freight sector, including flows that currently use less sustainable modes.
- Develop a consistent set of high service standards, recognising the different characteristics of:
 - Community railways.
 - Rural railways.
 - Urban commuter services.
 - Inter-urban services.
 - High speed and long distance services.
- Work alongside operators to deliver timetables, stations and operational practices designed to provide good connections between rail services and with other transport modes.
- Review the fares structure, products and pricing, with a view to removing unnecessary complexity and price anomalies and promoting the efficient use of transport infrastructure - delivering a structure which is perceived as fair, and is commercially sustainable and supports economic and social objectives.
- Deliver a consistent and resilient network, which can be relied upon by all its users.
- Develop and implement an information standard, to ensure that consistent, accurate and up-to-the-minute journey advice is available to all.
- Set standards for the North's stations, recognising their role as gateways to the North's towns, cities and communities, and their potential greater role in the economic and social fabric of the areas they serve. Seek to optimise their operational performance and interchange to, from and across the rail network.
- Secure investment to create a pleasant and safe travelling and waiting environment that is inclusive and accessible for all.
- Encourage opportunities for social enterprises.

- Reduce the rail network's contribution to greenhouse gas emissions and local air quality issues, and via modal shift contribute to a step-change in the sustainability of transport activities.

To achieve these aims TfN will work with local transport authority partners, local communities, train operators, Network Rail, the Department for Transport, and prospective funding and delivery partners to deliver a continuous programme of interventions on rail across the North.

Securing the benefits of continual investment

In the short term, TfN needs to secure the benefits from the current infrastructure enhancements, including the full delivery of the Northern and TransPennine Express franchise commitments. In the medium and longer term, there remains a need for Network Rail to:

- Complete delivery of the committed enhancement programme.
- Deliver the Great North Rail Project, including the TransPennine Route Upgrade.
- Prepare the classic network for the completion of HS2
- Identify and develop the interventions that will be needed in the future.

The benefits of on-going rolling stock investment must be fully realised, and further improvements prioritised. Where new trains are introduced to the rail network, the rail network must be able to ensure that the best performance can be achieved from the rolling stock. Without infrastructure improvements, many journey times between key centres will remain uncompetitive compared to road based trips. For longer distance services, new trains will be capable of 100 mph or in some cases 125 mph, and therefore opportunities to exploit that capability to improve journey times must be seized.

Without sustained investment, constraints that remain on the network will force potential trade-offs between connectivity, capacity and punctuality. These bottlenecks must not erode benefits and prevent growth and modal shift by compromising performance, or preclude the introduction of new or optimised passenger and freight services.

In addition to ensuring the completion of committed enhancements, TfN is developing an initial long term Investment Programme, which will be further developed into a pipeline of schemes through to 2050, in order to deliver the outputs of the Strategy and the Strategic Transport Plan. TfN will then seek to secure the necessary funding and commitments to deliver this.

Planning for future growth

The capacity improvements being delivered over the next seven to eight years will help address some of the most immediate on-train overcrowding issues, particularly at peak times. However, additional capacity investment must keep pace with the North's economic growth and the rail demand this will generate. Lengthening trains and increasing service frequencies will help to cater for some demand growth, but there will be locations that will require major infrastructure enhancements to support further growth.

The needs of the North's logistics sector will continue to be dynamic, with changing demand for freight flows. A rail network able to respond quickly to such dynamics is the key to ensuring the continuation and growth of freight on rail, including capturing commodities currently carried by less sustainable modes such as road or air freight. This will require the provision of spare network capacity, as well as a flexible solution for network maintenance and renewals to permit maximum network access.

There are also significant gains to be made from making the railway work more efficiently, and from using the on-going maintenance and renewal programme to deliver benefits. More radical solutions will be required to resolve long-standing network weaknesses which limit the choice of rolling stock, constrain capacity, preclude service integration and prevent freight train operators introducing new services. TfN will work with the wider manufacturing and logistics industry to identify where these challenges are likely to arise and ensure plans are in place to accommodate additional demand. TfN will also identify where the infrastructure needs enhancing to give improved reliability and resilience.

In parallel, TfN must ensure that benefits of economic growth are enjoyed across the North. Currently there are notable connectivity gaps within the North, both urban and rural; between the North, and other parts of the UK and global gateways. TfN will actively promote interventions aimed at increasing economic participation in the North, creating vibrant communities founded on strong and inclusive economies which deliver benefits which are equitably distributed and do not compromise the ability of future generations to sustain standards of living and quality of life.

Ensuring the North's readiness for HS2 and Northern Powerhouse Rail

Where HS2 and Northern Powerhouse Rail services utilise the existing infrastructure, TfN will work with the rail industry to identify timetable and infrastructure solutions which can accommodate both high speed, long distance services, as well as vital local and freight services which run on the network, thereby meeting the conditional outputs for classic rail passenger and freight services. TfN will also seek to ensure the design of these schemes will assist in delivering the conditional outputs where this can be achieved.

TfN's Investment Programme will include interventions of a strategic, pan-Northern significance, including station upgrades, line speed improvements and network capacity increases. This will prepare the network in the North to take full advantage of the investment and ensure that communities across the North are able to access and benefit from the HS2 hubs and gateways, building on the connectivity work already being undertaken for stations such as Manchester Piccadilly, Leeds, Sheffield, and Crewe.

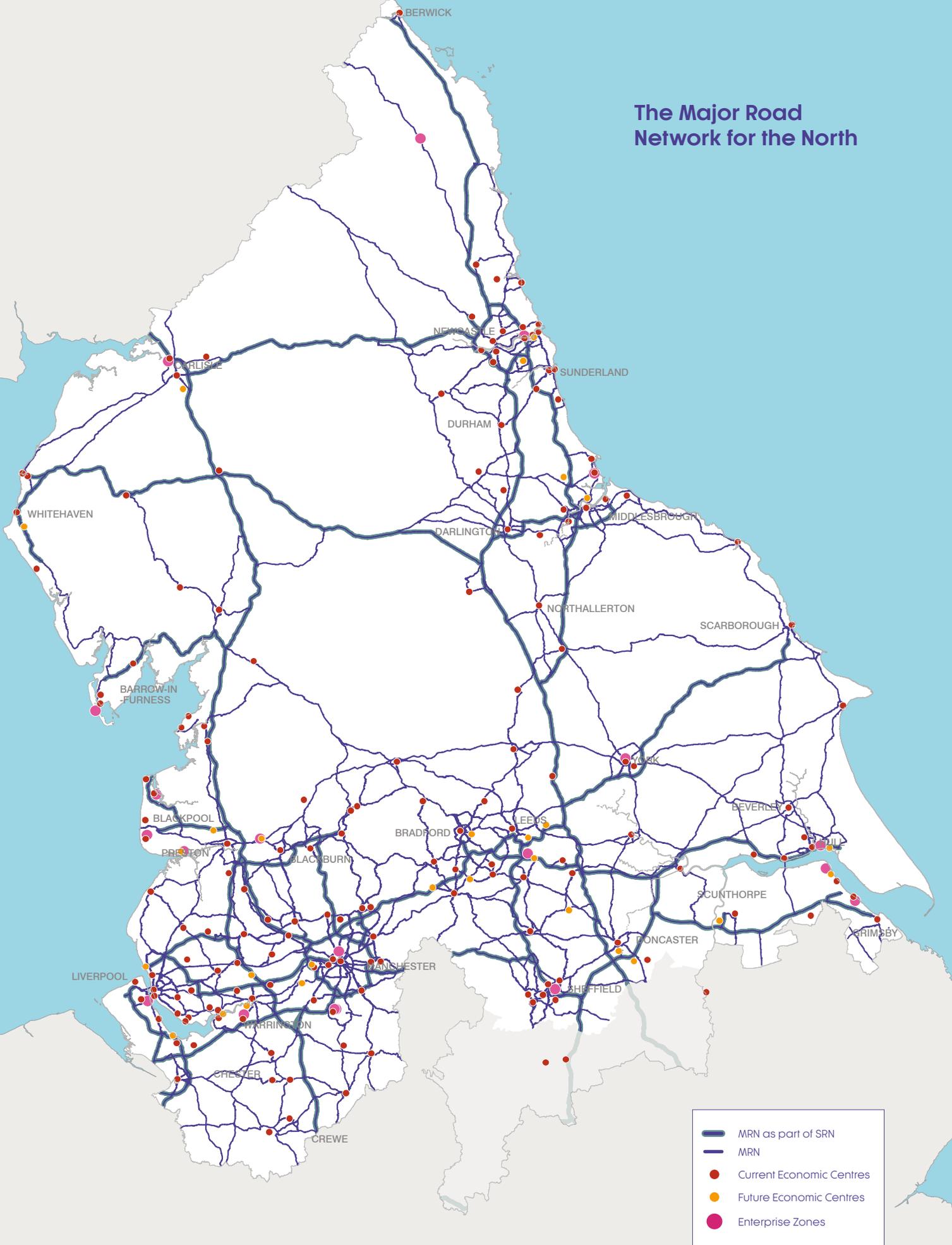
TfN and Partners will also examine the case for a Northern Chord between HS2 and Northern Powerhouse Rail in Cheshire. This has the potential to support transformational economic development through enhanced connectivity between Lancashire, Cumbria, Manchester Airport, Manchester, and beyond to Leeds, Sheffield, and the North East.

TfN will examine how connectivity improvements across the North East, Tees Valley, Yorkshire, and Hull and the Humber could serve to support and stimulate economic development in the years prior to HS2 Phase 2b.

All this requires a rolling programme of enhancement. The timescales for some rail investment projects mean that now is the time to start the development of interventions that will be implemented in the late 2020s.



The Major Road Network for the North



Major Road Network for the North and Strategic Road Studies

Roads



Improving the reliability, efficiency, quality and resilience of the North's road network

Major Road Network

Highways England, through their Roads to Growth work, identifies that sectors heavily dependent on the Strategic Road Network employ 7.4 million people and contribute £314 billion in GVA to England's economy. These sectors are likely to grow by 35% by 2030, yet the Strategic Road Network cannot cater for all this growth on its own. The Strategic Road Network accounts for 2% of the road network in the North, but accounts for a significantly higher proportion of traffic flow and economic value.

For many of the Northern economic clusters it is the rest of the road network, or the last mile, that can make all the difference as to whether goods or people arrive in time, or as efficiently as possible. A focus on the existing Strategic Road Network alone will not allow the North to achieve the connectivity and economic growth identified in the *Northern Powerhouse Independent Economic Review*.

To resolve this gap between the Strategic Road Network and the local road network TfN and its Partners have defined a Major Road Network for the North, which includes key local transport authority roads vital both to complete door to door, gate to gate journeys alongside the strategic road network and to support the major economic assets, including towns, cities, key economic assets, ports and airports.

The Major Road Network for the North represents 7% of the North's roads providing the integrated network of national and pan-Northern strategic roads needed to improve productivity and support growth.

The principles behind the development of a Major Road Network for the North are to link:

- **Current economic centres** - generally have a population of more than 50,000 people (or perform a strong sub-regional function), represent a regionally important international gateway for people or goods, or employment cluster, or university located external to a major settlement
- **Future economic growth locations** - key growth centres in local Strategic Economic Plans and Local City Region Strategies, especially linked to the *Northern Powerhouse Independent Economic Review* sectors that are set to deliver a sufficient number of jobs/dwellings to have a significant impact on the economy when considered at the level of the North.



2,444 km

Strategic Road Network (SRN)



5,454 km

Major Road Network (MRN) (excluding SRN)

7,899 km

Major Road Network (MRN) (including SRN)



TfN has defined a Major Road Network for the North. Working with Partners, including Highways England, TfN will work to promote policies and interventions that deliver improved:

- Journey reliability.
- Network efficiency.
- Network resilience.
- Journey quality (including information provision and asset condition).
- Safety.
- Place (in terms of the urban and natural environment).

TfN want to work with Partners to reduce the impact of road based travel impacts on the environment, air quality, and carbon emissions. Through influencing travel behaviour, supporting higher quality design, and adapting to new technologies, such as electric vehicles, the Major Road Network can be improved, managed, and adapted for the future to support a sustainable Northern economy. This work includes exploring how Highways England's Air Quality Strategy could be expanded to cover the Major Roads Network through future investment on the network.

The current funding mechanism for road investment means that the bulk of the Road Investment Strategy funding is allocated to the Strategic Road Network. In the future, TfN want to see greater opportunities for Road Investment Strategy and other mechanisms and will make the case for additional funding on the Major Road Network, so that both the Strategic Road Network and Major Road Network can provide a coherent network serving the North's important economic centres and assets. The delivery, operation and maintenance of the road network across the North will remain the responsibility of local transport authorities and Highways England.

The Government's Transport Investment Strategy set out proposals to create a Major Road Network across England. Part of the proposals include the allocation of a proportion of the National Roads Fund to be invested in the Major Road Network. TfN has led the way in developing the case for investment in the Major Road Network for the North, with this work showing the added value of making the case for investment in the transport network.

TfN has already identified its priorities for the RIS2 investment period for the Major Road Network for the North. In doing so, TfN wants to ensure that transport can enable and harness private sector investment across the North. This has driven the identification of the short term interventions, for example, where TfN and Partners are aware of significant investment taking place in an area, including private sector investment in the nuclear and chemicals sectors in Cumbria, North East and Tees Valley, the Cheshire Science Corridor and Atlantic Gateway.

TfN and Partners are also conscious that delivery needs to be a key factor in the sequencing process, hence any short term interventions identified would be expected to have had significant development work already done to date. That is one of the reasons why TfN re-affirms its support for the road schemes being promoted by its Partners through the Large Local Major Transport Schemes Fund listed previously.

Beyond these schemes, short term priorities for the Strategic Road Network and Major Road Network for the North include interventions such as M6 Junction 33, A590 and A595 improvements (including Whitehaven Relief Road and Carlisle Southern Link Road), M53 Junctions 5 to 11, M58 Junction 1 and M6 / M58 Interchange, M57 Junctions 4 and 5, South East Manchester Multi-Modal Study Package, Crewe HS2 Hub Access Package, M65 Junctions 2 to 6, A64 Hopgrove Junction to Barton Hill improvements, A1 – A19 Link Road, Hollingworth – Tintwistle Bypass, M67 / M60 corridor improvements, Port Salford Western Gateway Infrastructure Scheme, A690 corridor improvements and A696 Newcastle Airport access. All of these interventions still require confirmation of value for money and deliverability but represent an important step in TfN and Partners providing clear advice to Highways England and Government on its priorities.

Strategic Road Studies

TfN has been working closely with the Department for Transport and Highways England on three Strategic Road Studies:

- **Northern Trans Pennine Routes**
- **Manchester North West Quadrant**
- **Trans Pennine Tunnel**

The **Northern Trans Pennine Routes Study** assessed the strategic and economic case for dualling the full length of the A66 between the A1 at Scotch Corner and the M6 at Penrith. This included making targeted interventions to improve safety, environmental, and connectivity issues on the A69 between Newcastle and Carlisle. This programme of work will shortly move to the option identification phase of development.

The **Manchester North West Quadrant Strategic Study**, covering sections of the M60, M62, M602, M61 and M66, has demonstrated there is a strong strategic case for the substantial upgrade to improve journey times, east-west connectivity, safety, and user experience. This programme of work will shortly move into the next phase of development to identify options which deliver best value for money, whilst improving and mitigating any adverse sustainability impacts.

The **Trans Pennine Tunnel Strategic Study** examined options for providing significantly improved road connectivity between Greater Manchester and Sheffield City Region, and the wider southern Pennines corridor. This programme of work has shown that although a long tunnel under the Peak District National Park would be technically feasible, the cost would be prohibitive and offer poor value for money.

TfN is now leading on developing alternative options, working closely with Highways England and the Department for Transport, that will provide a more cost-effective solution, while addressing sustainability requirements. This includes ensuring that the road connectivity improvements would be an exemplar scheme involving environmental enhancements to benefit the Peak District National Park.

To date, this work has found that the most promising alternative option is a partially tunnelled route on the line of the existing A628, with a supporting package of wider road connectivity enhancements, including on the M60, M67 and M1, which would have road user and economic benefits for the Sheffield City Region, Greater Manchester, and the wider Northern economy. This alternative option would also have the benefit of possibly being sequenced in its delivery. This work will also build on Highways England's existing Trans Pennine Upgrade programme, including improvements to the A57 at Mottram.



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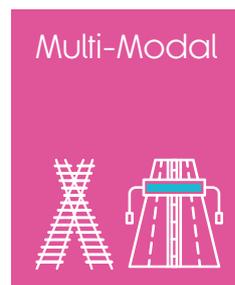


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Integrated and Smart Travel

Improving the experience for people using public transport across the North



A fully inclusive public transport system has the opportunity to enable users of the transport network to explore opportunities across the whole of the North.

TfN is working in partnership with operators, transport authorities and the Department for Transport to deliver a scheme that will make it easier for passengers to travel seamlessly using their preferred payment method, confident that they have paid the best possible on the day fare for their journey.

Customers can already use a smartcard, contactless bank card or their smartphone to pay for travel by public transport in parts of the North of England. The Integrated and Smart Travel programme will build on existing systems to develop smart ticketing, payment and information technologies to transform travel across the whole region. A world class transport system should be supported by a payment and information system that makes it simple and easy to travel around and between city regions for both work and leisure. Passengers will be able to plan journeys, view fare information and know the different options as well as benefiting from a 'fair price promise' when travelling across all operators and modes of travel

in the North. To achieve this, the Integrated and Smart Travel programme is working to deliver a programme that will make travel by rail, bus and light rail travel simple, attractive and convenient.

The Integrated and Smart Travel programme will work towards its vision by delivering four key programme objectives:

- Enabling economic growth in the North – increasing public transport use, freeing capacity on road networks and providing customers with access to a wider jobs market.
- Improving customer experience allowing seamless multi-modal cross border travel, reducing queuing times, improving journey and pricing information and ensuring value for money.
- Increasing efficiency across the transport network – improving accuracy and timeliness of travel information, reducing operational costs, reducing fraud and easing congestion on roads.
- Providing a consistent and familiar travel experience throughout the North – TfN can work with transport operators and local transport authorities to simplify fare structures and ticket types across the North.

Delivering the programme

The programme will be delivered in three concurrent phases over the next four years as set out below:

The Integrated and Smart Travel programme is significantly underway, with Strategic Outline, Outline and Full Business Cases having been completed for various phases over the previous year. The programme includes a number of 'quick wins' as well as a series of 'pilot projects' to provide valuable insight for longer term plans.

Phase 1	Phase 2	Phase 3
<p>The delivery of early benefits focussed on rail including the introduction of smart and integrated travel to customers by working with train companies and the Department for Transport to issue smartcard products, complementing the availability of barcode ticketing for other journeys. This first phase will also form part of a national programme to roll out smart ticketing on all rail travel.</p>	<p>The continued delivery of smart and integrated travel benefits, including enhanced real time customer information such as disruption messaging, open data sources and sharing knowledge with operators and transport authorities to identify new opportunities for collaboration.</p>	<p>The implementation of a 'back office' which will enable customer to use contactless bank cards to travel on multiple modes of transport across the north. It will collate and read customer data to facilitate the capping of multi-modal, multi-operator journeys. This will ensure that customers pay the best possible price for their travel on public transport.</p>



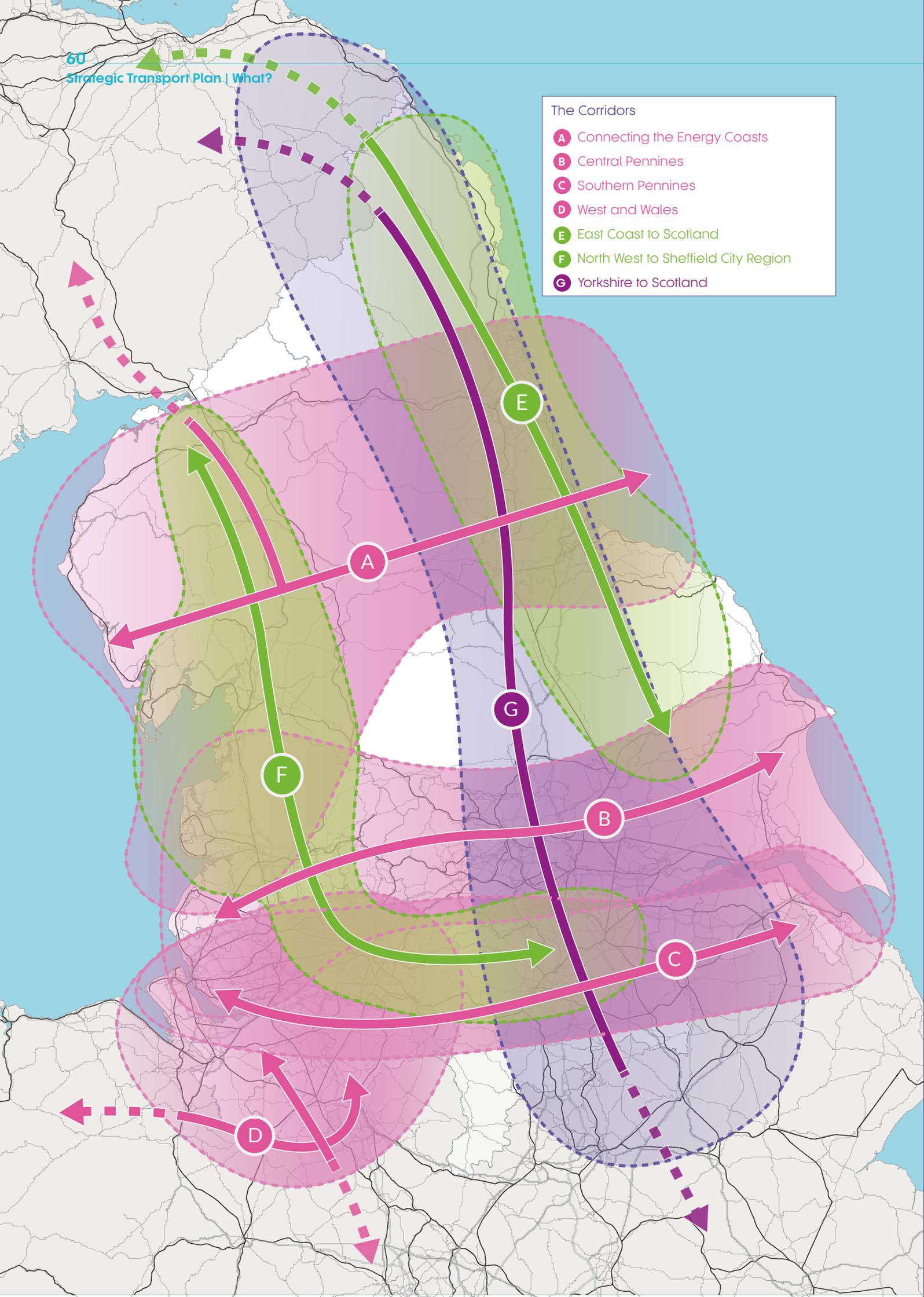
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- The Corridors
- A Connecting the Energy Coasts
 - B Central Pennines
 - C Southern Pennines
 - D West and Wales
 - E East Coast to Scotland
 - F North West to Sheffield City Region
 - G Yorkshire to Scotland



Strategic Development Corridors

Developing the major strategic transport interventions along economic growth corridors

As part of developing the evidence base for the Strategic Transport Plan, the Integrated Rail and Major Roads Reports identified a series of connectivity priorities to support economic growth in the North.

These reports:

- Set out the current performance of the rail and major road networks in the North, including the service provision and infrastructure for passengers and freight on the rail network.
- Identified where there is increased economic growth and thus associated travel demand, building on the conclusions of economic and demand forecasting under the transformational economic growth scenario set out in the *Northern Powerhouse Independent Economic Review*, and how this will affect future passenger and freight demand in the North.
- Bring together options currently under development for infrastructure improvements across the North.
- Consider where evidence suggests a need to improve connectivity that will enable transformational economic growth (drawing from the *Northern Powerhouse Independent Economic Review*, the Long Term Rail Strategy, the Independent International Connectivity Commission Report, Highways England's 'Roads to Growth' and TfN's Partners' current programmes).

These seven corridors represent an economic area where the evidence to date suggests most progress towards the transformational growth scenario would be made by bringing forward major, strategic rail and road investment over the lifetime of the Strategic Transport Plan especially on some of the crucial east-west corridors.

As the following pages will set out, each corridor will have a different scale of contribution towards achieving the outcomes of transformational growth, with investment in all corridors critical in achieving TfN's and Partners collective ambitions.

Four of the Strategic Development Corridors are multi-modal in nature, but three are currently focussed around a single mode, as drawn from the Initial Integrated Rail Report and Major Roads Report, in particular where Network Rail or Highways England is undertaking development work to address future issues, albeit in the short to medium term.

They are by no means where all future investment should be concentrated, but represent where the largest gaps between demand and performance currently exist, and also where there is likely to be the greatest economic potential for agglomeration between the prime and enabling capabilities and the North's important economic centres. Investment in these Strategic Development Corridors will benefit the whole of the North as movements to, from, and within the corridors will benefit from interventions brought forward within it.

Consideration for interventions within the Strategic Development Corridors will factor in airports and ports, which are key to global connectivity and supporting economic growth, as well as being economic centres which provide clusters of business and service activities. This will consider those catchments which are cross-corridor in nature. The Strategic Development Corridors will also be future proofed through consideration and collaboration towards advances in innovation and technology.

Sustainable communities need to be supported by the right infrastructure, to ensure connectivity from homes to jobs and services. Enhanced transport connectivity within these growth corridors, with similar work being undertaken by the National Infrastructure Commission in other parts of the UK, will have economic benefits for the North and the UK as a whole, as well as improving the development opportunities, investment, and quality of life for those living and working in the corridors.

TfN and Partners have the opportunity to maximise the benefits of any significant new strategic infrastructure investment, ensuring that TfN's pipeline of new investments aligns with national policy, such as the Industrial Strategy, and local stakeholders plans, including spatial plans and housing growth.

Prime Capabilities

- Digital
- Energy
- Health Innovation
- Advanced Manufacturing

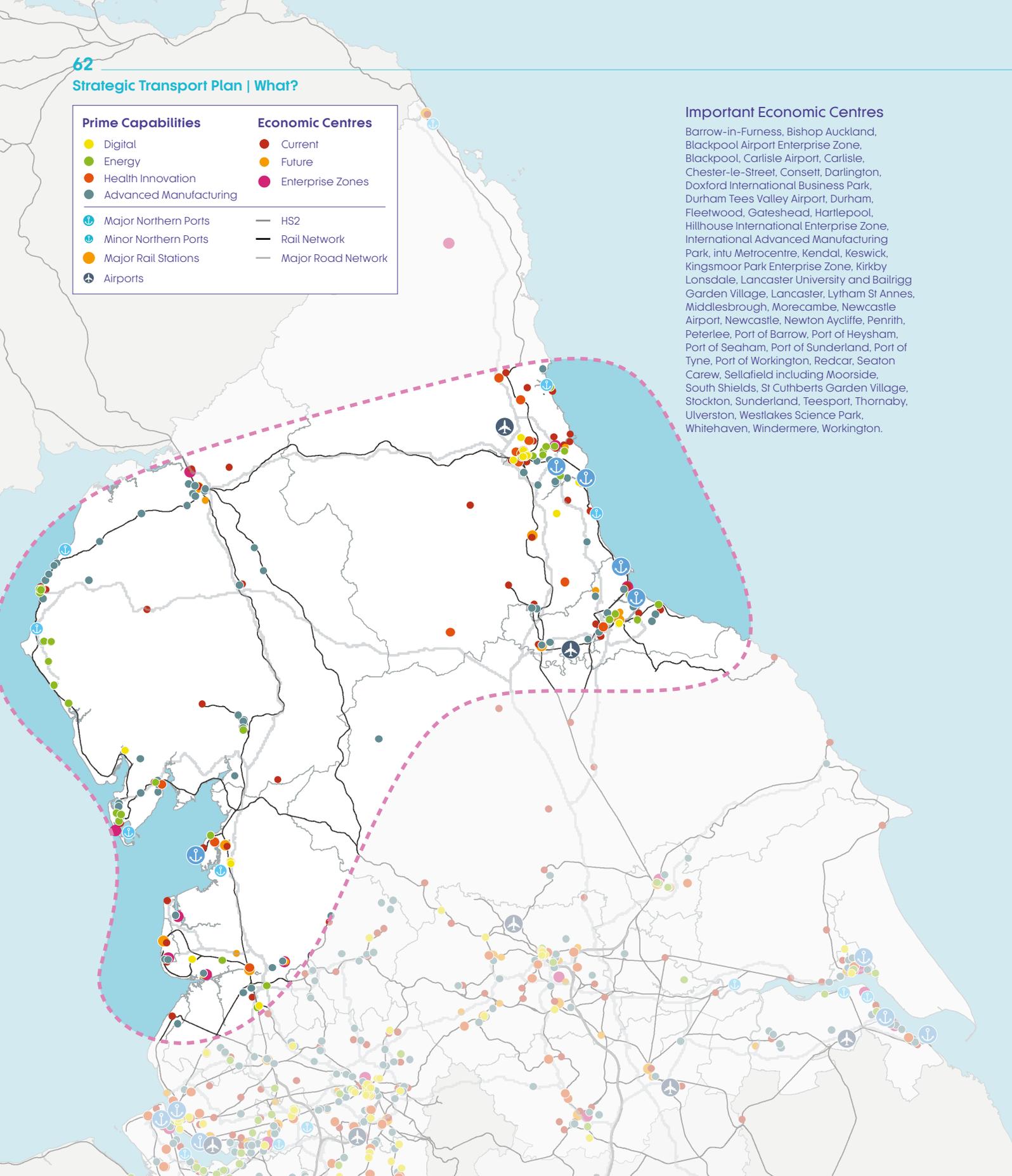
Economic Centres

- Current
- Future
- Enterprise Zones

- ⓘ Major Northern Ports
- ⓘ Minor Northern Ports
- ⓘ Major Rail Stations
- ✈ Airports
- HS2
- Rail Network
- Major Road Network

Important Economic Centres

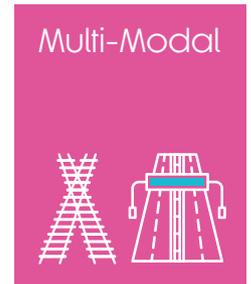
Barrow-in-Furness, Bishop Auckland, Blackpool Airport Enterprise Zone, Blackpool, Carlisle Airport, Carlisle, Chester-le-Street, Consett, Darlington, Doxford International Business Park, Durham Tees Valley Airport, Durham, Fleetwood, Gateshead, Hartlepool, Hillhouse International Enterprise Zone, International Advanced Manufacturing Park, intu Metrocentre, Kendal, Keswick, Kingsmoor Park Enterprise Zone, Kirkby Lonsdale, Lancaster University and Bailrigg Garden Village, Lancaster, Lytham St Annes, Middlesbrough, Morecambe, Newcastle Airport, Newcastle, Newton Aycliffe, Penrith, Peterlee, Port of Barrow, Port of Heysham, Port of Seaham, Port of Sunderland, Port of Tyne, Port of Workington, Redcar, Seaton Carew, Sellafield including Moorside, South Shields, St Cuthberts Garden Village, Stockton, Sunderland, Teesport, Thornaby, Ulverston, Westlakes Science Park, Whitehaven, Windermere, Workington.



● Business as usual scenario 2050 ● Transformational scenario Added Value 2050

Connecting the Energy Coasts

Improving connectivity for people and goods between the nationally significant non-carbon energy and research assets located in Cumbria, Lancashire, North Yorkshire, the North East, and Tees Valley.



Strategic and economic context

This corridor seeks to enhance the strategic connectivity, for people and goods, between the advanced manufacturing and energy generation research centres and assets. This is crucial to support the transformational growth potential within this economic area. There is a strong presence of the North's prime capabilities within this corridor.

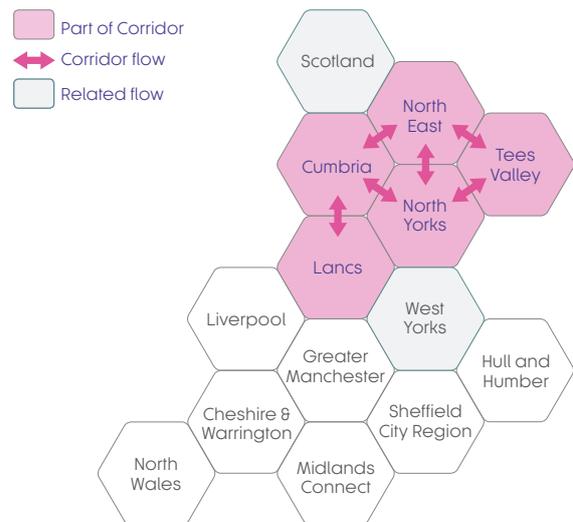
These economic centres and assets need to be better connected within the corridor, as well as to the north-south transport corridors. Strategic, transport investment in this corridor will support nationally significant infrastructure investment, unlock opportunities for employment, support the supply chain, and housing construction, such as the proposed garden villages. Enhanced connectivity will also support tourism and leisure connectivity to some of the North's natural assets, such as the National Parks.

To the west of the corridor, strategic connectivity improvements can support the delivery and operation of a range of major projects including a new nuclear power station at Moorside and investment at Sellafield; this will also support wider growth in the centre of international excellence for the nuclear sector found in Cumbria. There are also growth aspirations for the Port of Workington and strengths in advanced manufacturing and renewable energy schemes in the south of Cumbria, such as BAE Systems. To the east of the corridor, there is significant growth potential in the energy generation industries in the North East and Tees Valley, as well as in logistics at Teesport, Port of Tyne and Port of Blyth. Specialisation in manufacturing and production is a key asset in this corridor.

Transport context

East-West movements are constraining opportunities for investment, and connectivity to ports and airports. Improvements have supported the existing rail network and Strategic Road Network for movements north-south. However, the corridor is significantly affected by efficiency and resilience issues and poor East-West connectivity, that not just hinders movements on this corridor, but movements across the North as a whole. This includes rail lines such as the Tyne Valley Line, Durham Coast Line and the Cumbrian Coast Line and Furness Line.

The majority of committed transport investment is located on the east coast to enhance connectivity across the North East linked to the A1 and A19, and A69 junction improvements at Corbridge and Hexham. To the west, investment has been made on the Heysham to M6 Link Road. Aside from the planned investment on the A66 corridor between the A1(M) and Teesport, this investment has focussed on north-south movements with clear gaps in the east-west connections and their resilience.



Location Growth	Road	Rail
Cumbria to Lancashire	108%	71%
Lancashire to Cumbria	111%	67%
Cumbria to North East	59%	105%
North East to Cumbria	56%	105%
Cumbria to North Yorkshire	53%	107%
North Yorkshire to Cumbria	53%	110%
North East to North Yorkshire	297%	87%
North Yorkshire to North East	301%	89%
North East to Tees Valley	314%	131%
Tees Valley to North East	314%	127%
Tees Valley to North Yorkshire	110%	53%
North Yorkshire to Tees Valley	112%	54%

These growth figures show the potential maximum growth road and rail based travel by 2050 from a range of different scenarios

Prime Capabilities

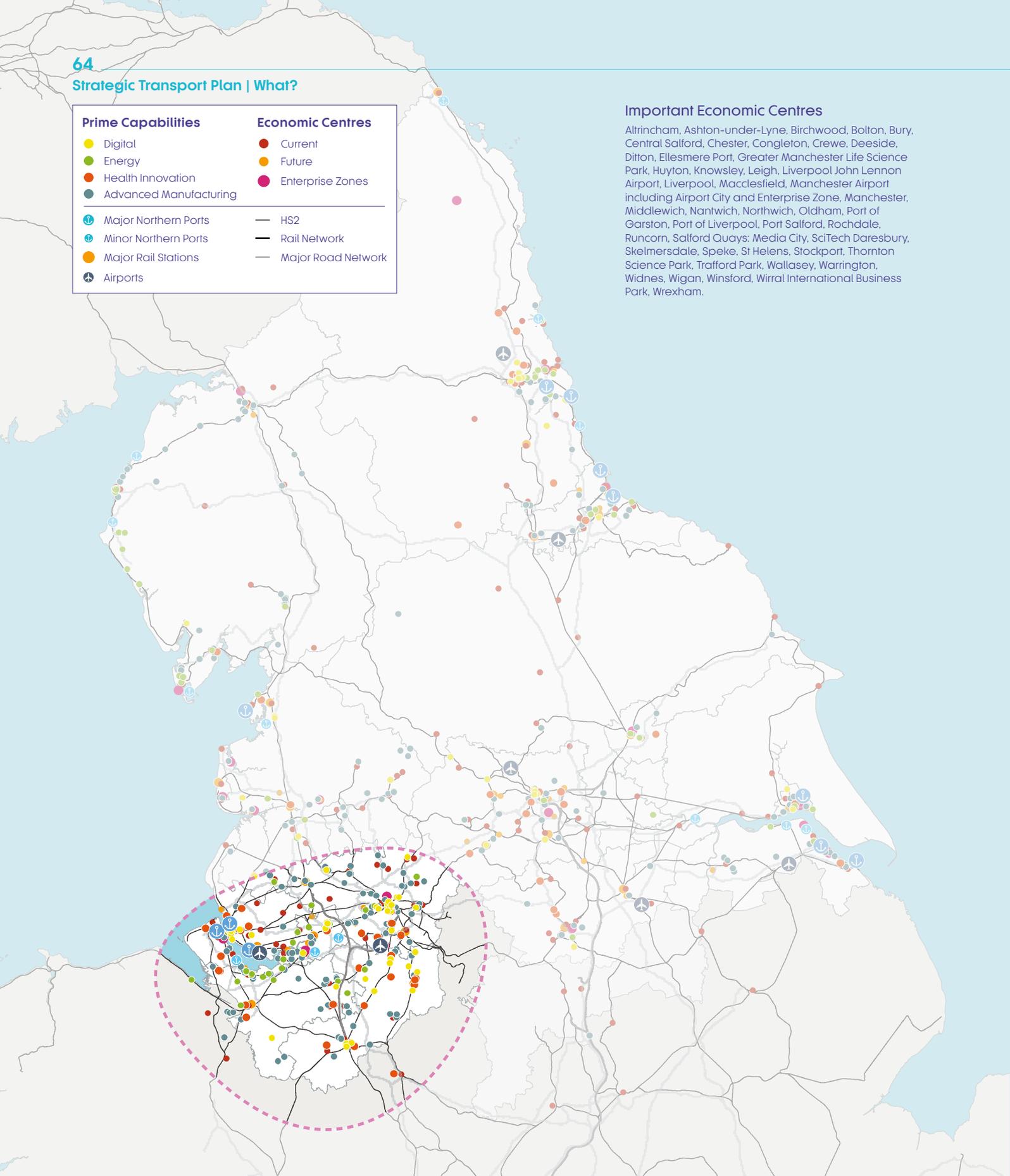
- Digital
- Energy
- Health Innovation
- Advanced Manufacturing
- ⓘ Major Northern Ports
- ⓘ Minor Northern Ports
- Major Rail Stations
- ✈ Airports

Economic Centres

- Current
- Future
- Enterprise Zones
- HS2
- Rail Network
- Major Road Network

Important Economic Centres

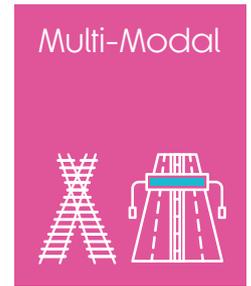
Altrincham, Ashton-under-Lyne, Birchwood, Bolton, Bury, Central Salford, Chester, Congleton, Crewe, Deeside, Ditton, Ellesmere Port, Greater Manchester Life Science Park, Huyton, Knowsley, Leigh, Liverpool John Lennon Airport, Liverpool, Macclesfield, Manchester Airport including Airport City and Enterprise Zone, Manchester, Middlewich, Nantwich, Northwich, Oldham, Port of Garston, Port of Liverpool, Port Salford, Rochdale, Runcorn, Salford Quays: Media City, SciTech Daresbury, Skelmersdale, Speke, St Helens, Stockport, Thornton Science Park, Trafford Park, Wallasey, Warrington, Widnes, Wigan, Winsford, Wirral International Business Park, Wrexham.



● Business as usual scenario 2050 ● Transformational scenario Added Value 2050

West and Wales

Improving connectivity, for people and goods, to, from and through the important economic centres and assets of Cheshire, Liverpool City Region and Greater Manchester, with strategic connectivity in to North Wales and the Midlands.



Strategic and economic context

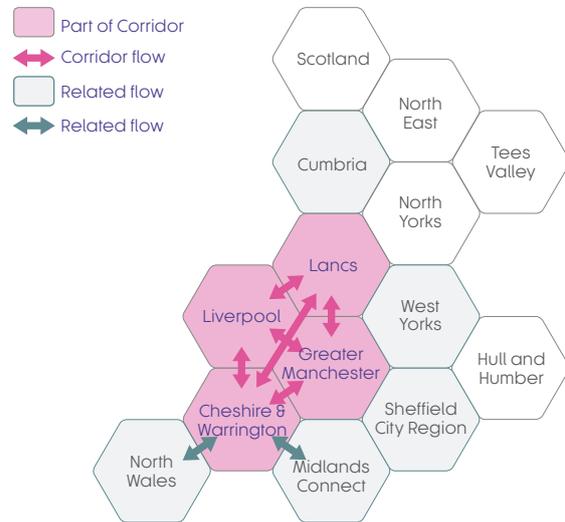
This corridor can strengthen the connectivity between important and densely populated economic centres and assets, including some of the North's largest cities, such as Liverpool and Manchester. This corridor will also strengthen strategic cross-border connectivity in to North Wales and the Midlands.

There is significant economic and population growth forecast within this corridor, with associated transport demand. Economically, there is a strong representation of all the prime and enabling capabilities, along with nationally important economic assets that will support economic growth across the North as a whole. Strategic connectivity improvements can support growth at Manchester Airport, Liverpool John Lennon Airport, the Cheshire Science Corridor Enterprise Zones, the Atlantic Gateway, the North Wales Arc, the Port of Liverpool, and the Crewe HS2 Hub. Work by Growth Track 360, including connectivity with the Constellation Partnership, has highlighted how connectivity improvements would transform the North Wales and Cheshire regional economies.

Transport context

This corridor has a complex, dense transport network but future interventions need to be focussed on the key economic assets and adjacent markets for goods and labour. For example, there is currently poor southern and western access to Manchester Airport, the largest airport in the North. Current investment plans provide capacity in the short term. The Halton Curve re-instatement will unlock direct journey opportunities beyond Chester to North Wales in the medium term. Significant congestion, efficiency, capacity, and reliability impacts on the road and rail networks are constraining economic growth, such as on parts of the West Coast Main Line and M6 Motorway. The freight and logistics industry require enhanced connectivity on both the road and rail networks, as well as exploring opportunities for greater use of waterborne and intermodal freight.

Major strategic interventions can allow the important economic centres within the corridor to capitalise on inward investment and ensure that centres and assets continue to stimulate investment. Significant investment in rail, benefitting both passengers and freight, including the enhancement of Liverpool Lime Street Station and the redevelopment of Liverpool Central, will further enhance its capabilities. Improvements on the Major Roads Network are planned, under construction, and/or complete, including the M56 J6-8, M53 J5-11, and M6 J16-J19 Smart Motorway Schemes, M6 Junction 16 and 22, and M56 Junction 11a, and the Mersey Gateway Bridge. There are also a number of significant, local major schemes, such as the A6-Manchester Airport Relief Road.



Location Growth	Road	Rail
Lancashire to Liverpool City Region	110%	80%
Liverpool City Region to Lancashire	144%	77%
Lancashire to Greater Manchester	159%	82%
Greater Manchester to Lancashire	77%	161%
Lancashire to Cheshire and Warrington	162%	97%
Cheshire and Warrington to Lancashire	180%	92%
Liverpool City Region to Greater Manchester	277%	100%
Greater Manchester to Liverpool City Region	271%	93%
Liverpool City Region to Cheshire and Warrington	204%	64%
Cheshire and Warrington to Liverpool City Region	204%	65%
Cheshire and Warrington to Greater Manchester	211%	66%
Greater Manchester to Cheshire and Warrington	210%	62%

These growth figures show the potential maximum growth road and rail based travel by 2050 from a range of different scenarios

Prime Capabilities

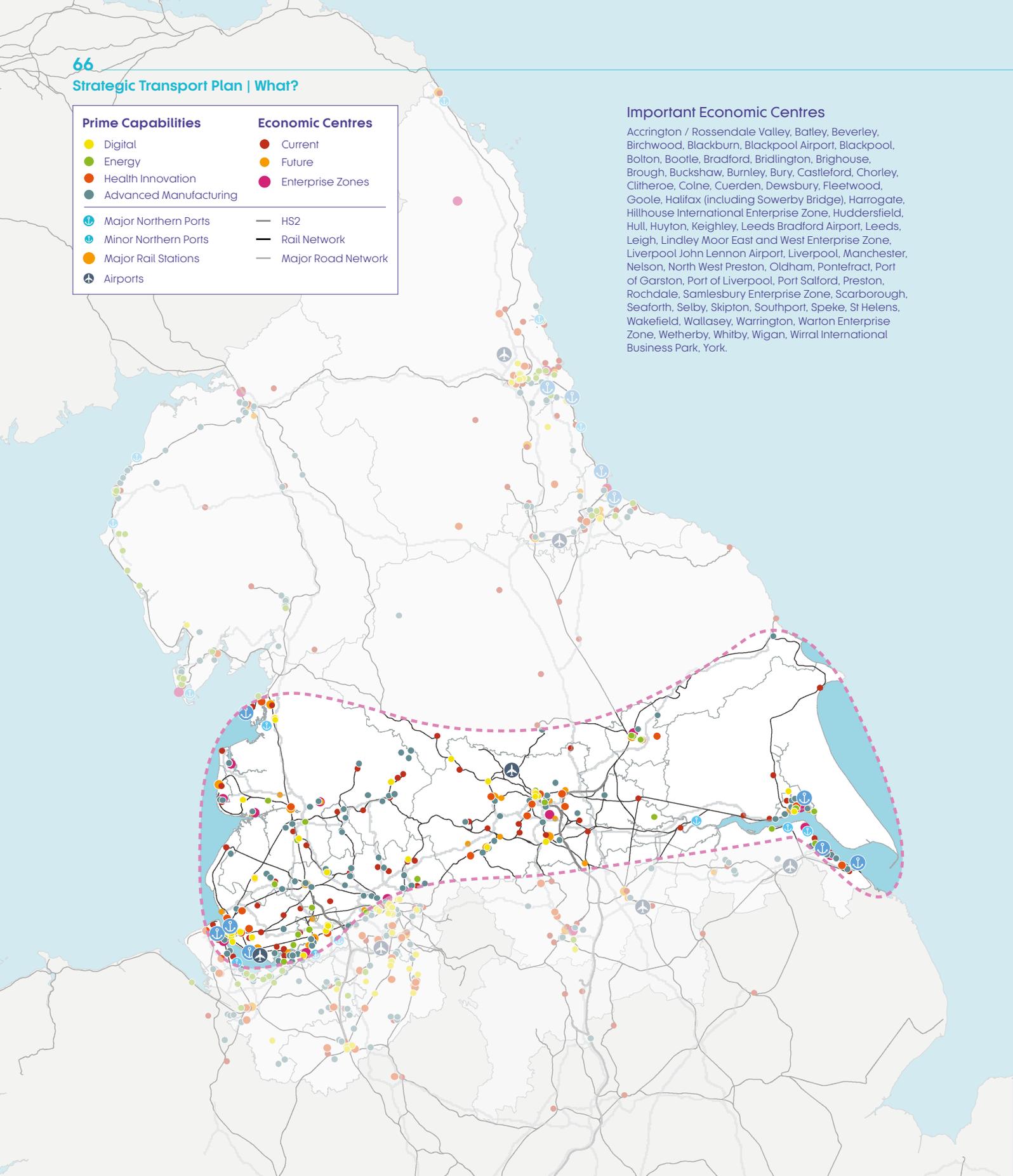
- Digital
- Energy
- Health Innovation
- Advanced Manufacturing
- ⓘ Major Northern Ports
- ⓘ Minor Northern Ports
- Major Rail Stations
- ✈ Airports

Economic Centres

- Current
- Future
- Enterprise Zones
- HS2
- Rail Network
- Major Road Network

Important Economic Centres

Accrington / Rossendale Valley, Batley, Beverley, Birchwood, Blackburn, Blackpool Airport, Blackpool, Bolton, Bootle, Bradford, Bridlington, Brighouse, Brough, Buckshaw, Burnley, Bury, Castleford, Chorley, Clitheroe, Colne, Cuerden, Dewsbury, Fleetwood, Goole, Halifax (including Sowerby Bridge), Harrogate, Hillhouse International Enterprise Zone, Huddersfield, Hull, Huyton, Keighley, Leeds Bradford Airport, Leeds, Leigh, Lindley Moor East and West Enterprise Zone, Liverpool John Lennon Airport, Liverpool, Manchester, Nelson, North West Preston, Oldham, Pontefract, Port of Garston, Port of Liverpool, Port Salford, Preston, Rochdale, Samesbury Enterprise Zone, Scarborough, Seaforth, Selby, Skipton, Southport, Speke, St Helens, Wakefield, Wallasey, Warrington, Warton Enterprise Zone, Wetherby, Whitby, Wigan, Wirral International Business Park, York.



+ £38.6bn



+ 750k



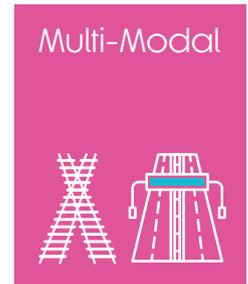
+ 470k

● Business as usual scenario 2050

● Transformational scenario Added Value 2050

Central Pennines

Improving strategic east-west connectivity for some of the North's important economic centres and assets in North Yorkshire, West Yorkshire, East Riding and Hull and Humber through to Greater Manchester, Lancashire and Liverpool City Region.



Strategic and economic context

This corridor has some of the North's key economic and population centres, with a diverse mix of strategic movements. With enhanced strategic connectivity, there is the potential to uncage the significant economic growth potential. Addressing East-West connectivity is a priority for TfN, and a failure to address current connectivity constraints would critically restrict the transformational growth potential of this corridor and the wider Northern economy.

This corridor is a major economic area of the North, and is home to globally significant businesses, supply chains and economic assets across all the North's prime and enabling capabilities. The corridor has the largest aerospace cluster in the UK, including BAE Systems and Rolls Royce, with major sector representation and internationally competitive advantages in sectors such as automotive and other advanced manufacturing.

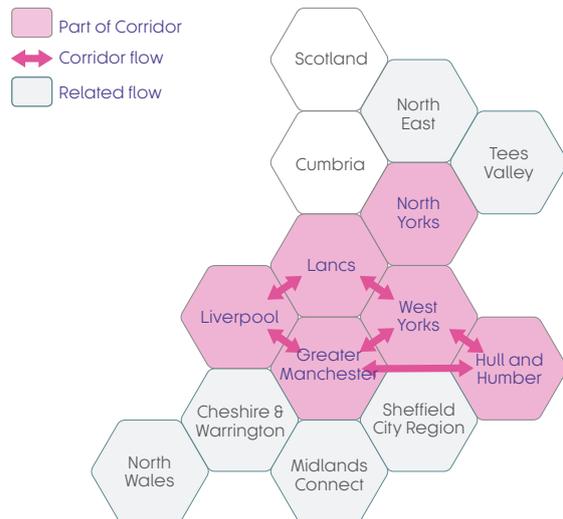
Enhanced connectivity can support complementary high-growth, high-value economic sectors and clusters and could attract new high-value business activity and inward investment to the corridor and the North. Freight and logistics is a key element of this corridor, connecting the Port of Liverpool with the Ports on the Humber. Leeds Bradford and Liverpool John Lennon Airport are situated within this corridor, providing important air connectivity which is enhanced by the catchment areas of other airports such as Manchester Airport. The visitor economy is also a key element of this corridor. Blackpool remains the UK's largest seaside resort, with economic renewal a key priority locally.

Transport context

There is a need to provide enhanced, additional road and rail capacity across the Pennines to provide alternatives to existing routes and to open up new opportunities. Across the corridor there is a diverse mix of strategic movements to cater for. Freight and logistics support the ports, airports and inland ports as well as servicing the businesses located across the corridor. Improving connectivity would accelerate increased employment, new housing developments, and increase the scale of the overall growth opportunity.

There is currently strong road and rail demand between Liverpool, Manchester and Leeds, with demand exceeding the current capacity on the rail network and the M62, with alternative connections along this corridor not providing a strong alternative movement option.

Existing rail commitments on this corridor include the Great North Rail Project. Highways England is upgrading M62 junctions 20-25 to a Smart Motorway. Other strategically important road schemes include the A5036 Port of Liverpool Access, M58 Improvements, Preston Western Distributor and new M55 junction 2, A1(M) / A59 Junction 47 Improvement, A63 Castle Street, M62/M606 Chain Bar, M6 Junction 26/M58, M6 Junctions 21A-26 Smart Motorway, M60/M62 (Simister Island), A585 Windy Harbour to Skippool Improvement, A1079 corridor improvements, and A1237 and M65 Hyndburn – Burnley-Pendle Growth Corridor junction improvements.



Location Growth	Road	Rail
Lancashire to Liverpool	110%	80%
Liverpool to Lancashire	144%	77%
Liverpool to Greater Manchester	277%	100%
Greater Manchester to Liverpool	271%	93%
Greater Manchester to Hull and Humber	54%	74%
Hull and Humber to Greater Manchester	64%	70%
Lancashire to West Yorkshire	92%	88%
West Yorkshire to Lancashire	93%	87%
West Yorkshire to Hull and Humber	381%	55%
Hull and Humber to West Yorkshire	382%	63%
Greater Manchester to West Yorkshire	463%	98%
West Yorkshire to Greater Manchester	465%	104%

These growth figures show the potential maximum growth road and rail based travel by 2050 from a range of different scenarios

Prime Capabilities

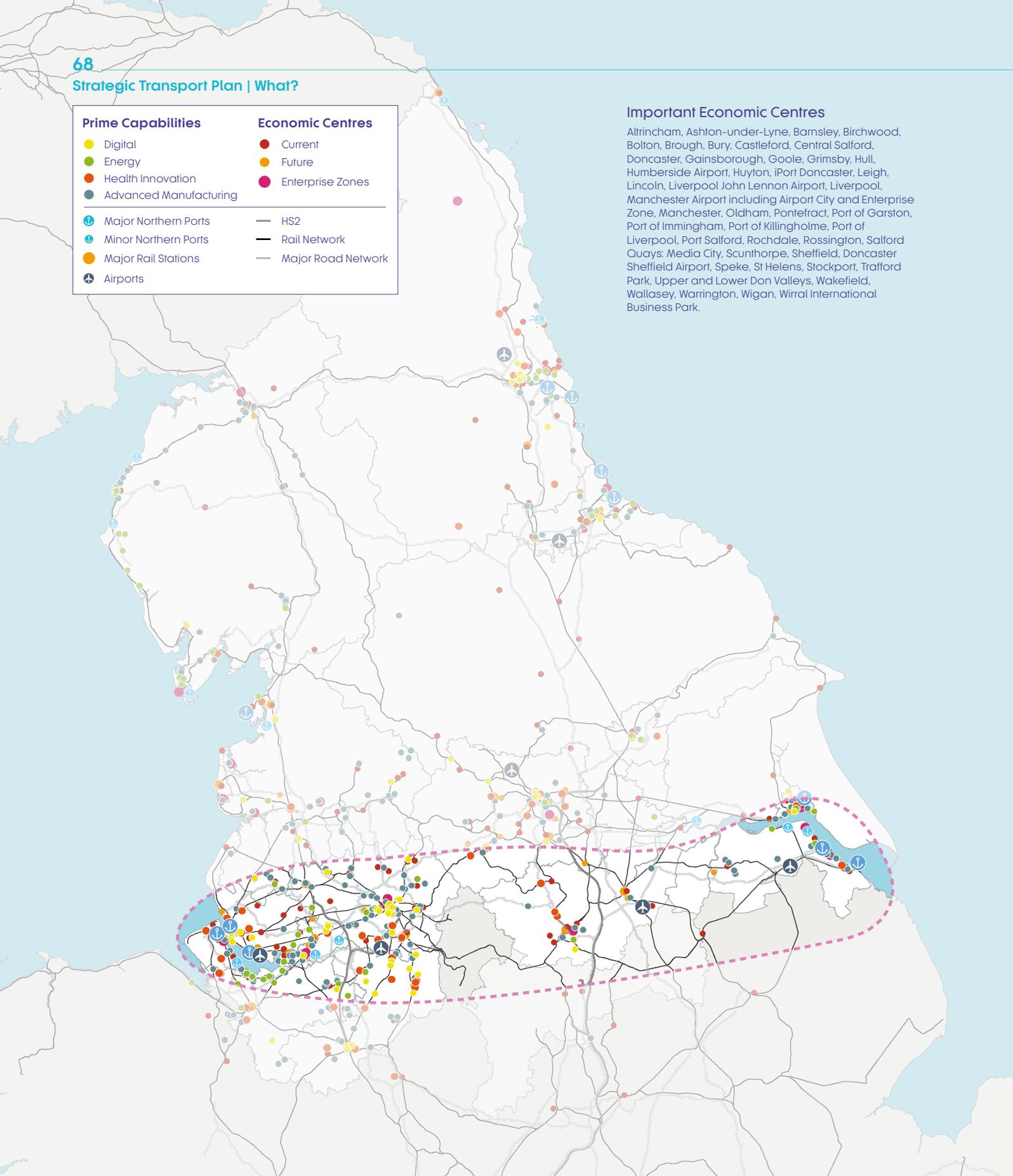
- Digital
- Energy
- Health Innovation
- Advanced Manufacturing
- ⓘ Major Northern Ports
- ⓘ Minor Northern Ports
- Major Rail Stations
- ✈ Airports

Economic Centres

- Current
- Future
- Enterprise Zones
- HS2
- Rail Network
- Major Road Network

Important Economic Centres

Altrincham, Ashton-under-Lyne, Barnsley, Birchwood, Bolton, Brough, Bury, Castleford, Central Salford, Doncaster, Gainsborough, Goole, Grimsby, Hull, Humberside Airport, Huyton, iPort Doncaster, Leigh, Lincoln, Liverpool John Lennon Airport, Liverpool, Manchester Airport including Airport City and Enterprise Zone, Manchester, Oldham, Pontefract, Port of Garston, Port of Immingham, Port of Killingholme, Port of Liverpool, Port Salford, Rochdale, Rossington, Salford Quays: Media City, Scunthorpe, Sheffield, Doncaster Sheffield Airport, Speke, St Helens, Stockport, Trafford Park, Upper and Lower Don Valleys, Wakefield, Wallasey, Warrington, Wigan, Wirral International Business Park.



+ £47bn



+ 640k

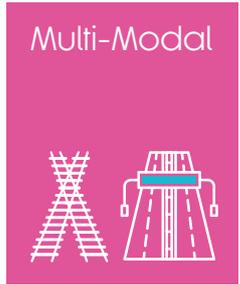


+ 390k

● Business as usual scenario 2050

● Transformational scenario Added Value 2050

Southern Pennines



Improving the strategic East-West, multi-modal connectivity between the important economic centres, assets and ports within Liverpool City Region, Greater Manchester, Cheshire, Sheffield City Region, East Riding and Hull and Humber, as well as cross-border movements to the Midlands.

Strategic and economic context

This corridor provides connectivity between some of the major economic and population centres of the North, including Liverpool, Manchester, Sheffield and Hull, along with four major ports, and three international airports. East-West connectivity will need to be transformed in order to support the forecasted economic and population growth.

The North's prime and enabling capabilities are highly represented in this economic area. The corridor is home to globally significant businesses, supply chains and economic assets with major sector representation and international competitive advantages in advanced manufacturing, low-carbon/energy and logistics, including the Energy Estuary in Hull and the Humber. Advanced manufacturing is a particular strength with a strong cluster in the Sheffield City Region, which is home to the Advanced Manufacturing Research Centre managed by the University of Sheffield and the top Enterprise Zone for Modern Manufacturing and Technology in the UK. Greater Manchester also offers significant opportunities for growth in the advanced materials sector and advanced manufacturing is one of four specific areas of 'smart specialisation' identified by the Liverpool City Region.

This corridor has the opportunity for freight and logistics to continue to strengthen the operations and investment at the corridor's ports, airports and inland ports. Enhancing strategic connectivity to the growth plans of Doncaster Sheffield Airport, Manchester Airport, and the Ports of Liverpool and the Humber, can have associated economic growth benefits along the corridor and the wider Northern economy. Grimsby and Immingham ports are the busiest in the UK by combined freight tonnage.

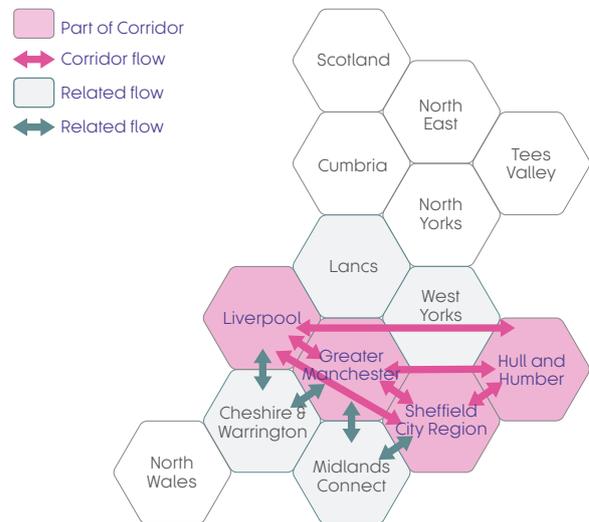
Investment in the corridor will also need to be sensitive to sustainability considerations, particularly the Peak District National Park, as well as identifying the visitor economy benefits from the enhanced strategic connectivity.

Transport context

Providing transport routes to complement the M62 corridor and linking the Sheffield City Region west and east more effectively, thereby improving overall Trans Pennine connectivity are key aims, with an additional need to improve connections to the growing Humber ports. The

important economic centres can be supported to grow and invest through significant agglomeration benefits gained through improved, efficient, resilient strategic road and rail connectivity. Improved multi-modal connectivity would address the economic challenges and ambitions of the corridor. Improving resilience will enhance conditions for freight movements particularly, and therefore continuity of supply for businesses.

There are a number of schemes already identified to meet short term challenges on the network including Mottram Moor A57-A57(T) link, M56 J6-8, M60 J24-27 and J1-4, the Mersey Gateway Bridge, A628 Climbing Lanes, M62 J20-25 Smart Motorway; and the Great North Rail Project. Work continues to develop large local major schemes and work on the Trans Pennine Tunnel and wider connectivity work.



Location Growth	Road	Rail
Liverpool City Region to Hull and Humber	125%	69%
Hull and Humber to Liverpool City Region	134%	103%
Liverpool City Region to Greater Manchester	277%	100%
Greater Manchester to Liverpool City Region	271%	93%
Greater Manchester to Hull and Humber	54%	74%
Hull and Humber to Greater Manchester	64%	70%
Liverpool City Region to Sheffield City Region	20%	67%
Sheffield City Region to Liverpool City Region	134%	103%
Greater Manchester to Sheffield City Region	622%	44%
Sheffield City Region to Greater Manchester	624%	49%
Sheffield City Region to Hull and Humber	622%	59%
Hull and Humber to Sheffield City Region	626%	65%

These growth figures show the potential maximum growth road and rail based travel by 2050 from a range of different scenarios

Prime Capabilities

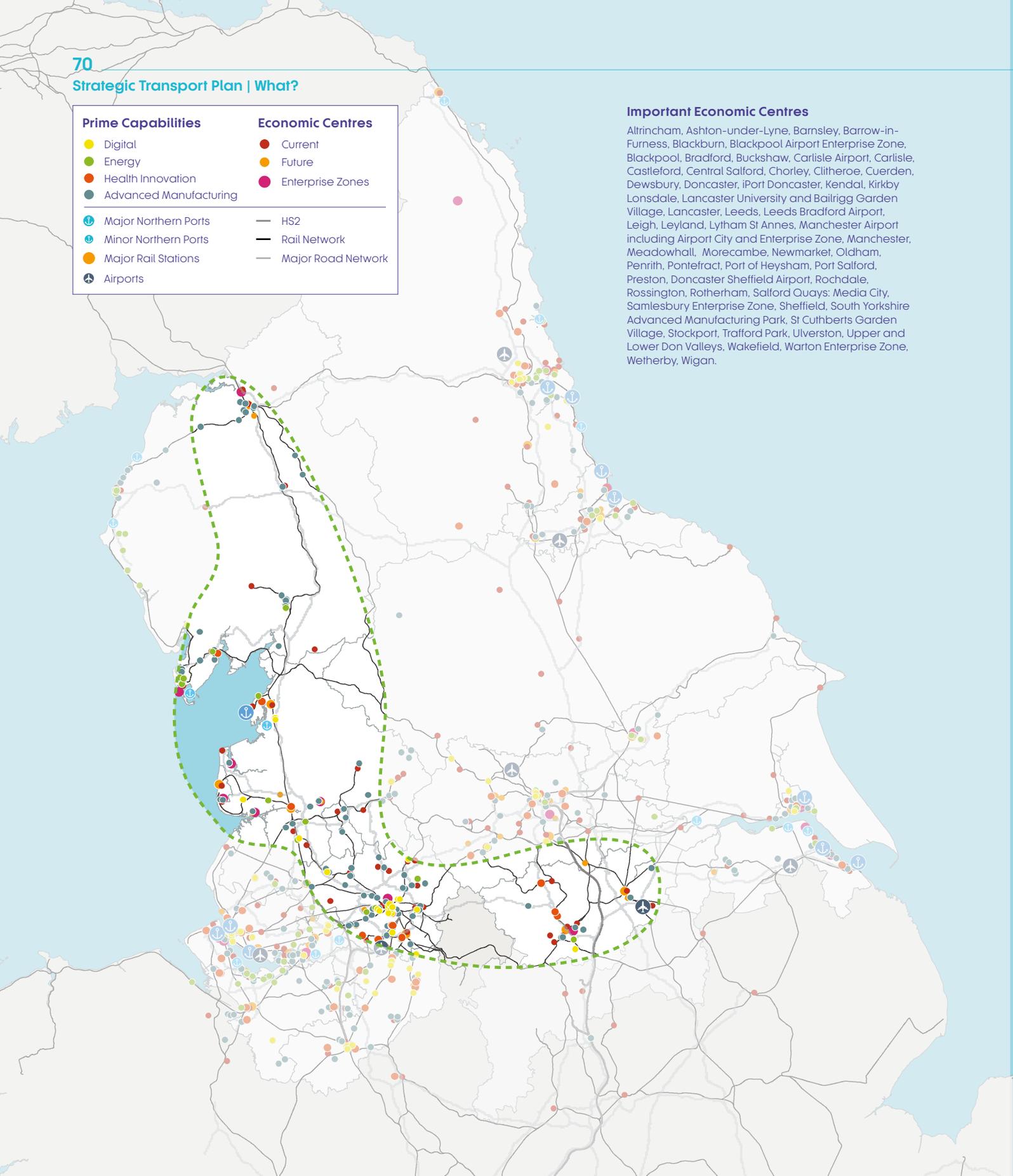
- Digital
- Energy
- Health Innovation
- Advanced Manufacturing
- ⓘ Major Northern Ports
- ⓘ Minor Northern Ports
- Major Rail Stations
- ✈ Airports

Economic Centres

- Current
- Future
- Enterprise Zones
- HS2
- Rail Network
- Major Road Network

Important Economic Centres

Altrincham, Ashton-under-Lyne, Barnsley, Barrow-in-Furness, Blackburn, Blackpool Airport Enterprise Zone, Blackpool, Bradford, Buckshaw, Carlisle Airport, Carlisle, Castleford, Central Salford, Chorley, Clitheroe, Cuerden, Dewsbury, Doncaster, iPort Doncaster, Kendal, Kirkby Lonsdale, Lancaster University and Bailrigg Garden Village, Lancaster, Leeds, Leeds Bradford Airport, Leigh, Leyland, Lytham St Annes, Manchester Airport including Airport City and Enterprise Zone, Manchester, Meadowhall, Morecambe, Newmarket, Oldham, Penrith, Pontefract, Port of Heysham, Port Salford, Preston, Doncaster Sheffield Airport, Rochdale, Rossington, Rotherham, Salford Quays: Media City, Samlesbury Enterprise Zone, Sheffield, South Yorkshire Advanced Manufacturing Park, St Cuthberts Garden Village, Stockport, Trafford Park, Ulverston, Upper and Lower Don Valleys, Wakefield, Warton Enterprise Zone, Wetherby, Wigan.



+ £33.1bn



+ 562k



+ 334k

● Business as usual scenario 2050 ● Transformational scenario Added Value 2050

North West to Sheffield City Region

Strengthening rail connectivity between the advanced manufacturing clusters and assets in Cumbria, Lancashire, Greater Manchester and Sheffield City Region, with improved connectivity from the North in to Scotland.



Strategic and economic context

This rail corridor looks to strengthen the strong and growing connectivity and collaboration between the advanced manufacturing, health technology, digital businesses, and research centres in the Sheffield City Region and those in Lancashire and Cumbria.

The corridor is home to globally significant businesses, supply chains and economic assets. Important centres including Samlesbury Enterprise Zone, Blackpool Airport Enterprise Zone, which is home to the National Energy College, the University of Manchester’s Dalton Nuclear Institute in Cumbria, Manchester Airport, and the Sheffield City Region Advanced Manufacturing Park, which is home to the Nuclear Catapult Research Centre, and in Barrow-in-Furness and its major role in subsea technologies and marine engineering. The Fylde Coast is an established base for polymer science, nuclear and renewable energy.

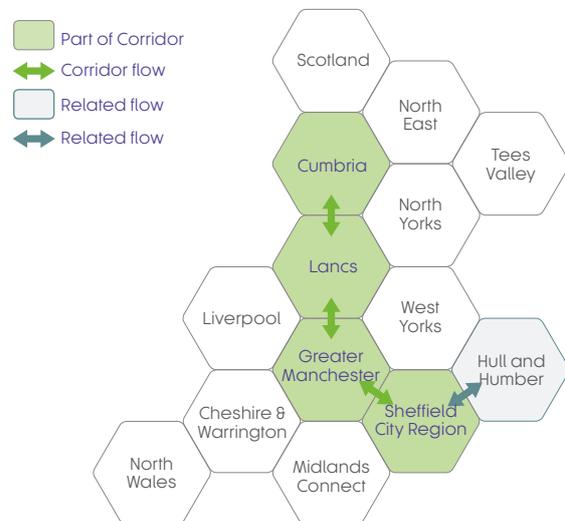
Greater Manchester sits between these two clusters and, in addition to forming part of the expertise in these sectors, it provides access to professional and financial services which support the prime capabilities. Bringing all these centres of research closer together by improving connectivity will increase productivity and support collaboration and innovation.

The logistics industry is also important for servicing the businesses located across the corridor, and within the corridor. There is also a strong visitor and tourism offer from two of the UK’s national parks, which enhanced strategic connectivity and access to international gateways across the North can support.

Transport context

The potential economic links between the two areas are not served well by the existing rail network, and so this corridor needs to complement other investments being pursued in road improvements in the North West and across the Pennines. There is also strong demand for growth on this corridor through to Scotland, for passengers and freight. On the line between Blackpool North, Preston and Manchester, journey times and frequencies are being improved.

Locations north-west of Manchester are poorly connected to Sheffield City Region and the West Coast Main Line has capacity constraints north of Preston. Frequency of through services across Manchester are insufficient, and journey times are also poor. This issue extends in to Cumbria with speed and capacity constraints. There are also significant freight flows, such as on the Hope Valley Line, where freight flows are driven by the cement and aggregates industries. Current challenges on the Hope Valley line is the current mix of fast and stopping passenger services and freight services. Journey time and frequency improvements are also an issue on the South Fylde line.



Location Growth	Road	Rail
Lancashire to Greater Manchester	159%	82%
Greater Manchester to Lancashire	77%	161%
Cumbria to Lancashire	108%	71%
Lancashire to Cumbria	111%	67%
Greater Manchester to Sheffield City Region	622%	44%
Sheffield City Region to Greater Manchester	624%	49%

These growth figures show the potential maximum growth road and rail based travel by 2050 from a range of different scenarios

Prime Capabilities

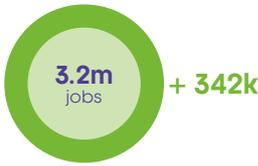
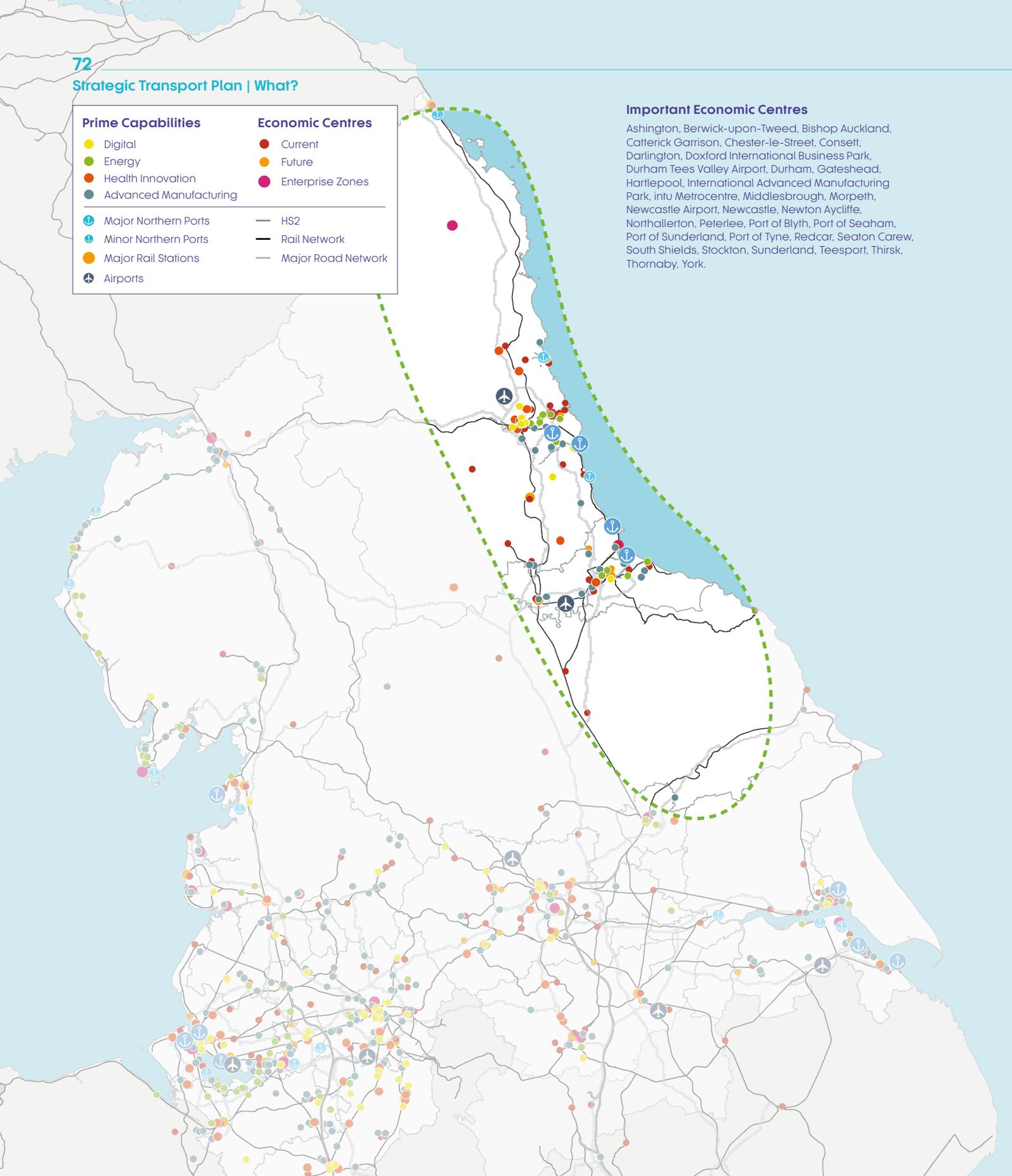
- Digital
- Energy
- Health Innovation
- Advanced Manufacturing
- ⓘ Major Northern Ports
- ⓘ Minor Northern Ports
- Major Rail Stations
- ✈ Airports

Economic Centres

- Current
- Future
- Enterprise Zones
- HS2
- Rail Network
- Major Road Network

Important Economic Centres

Ashington, Berwick-upon-Tweed, Bishop Auckland, Catterick Garrison, Chester-le-Street, Consett, Darlington, Doxford International Business Park, Durham Tees Valley Airport, Durham, Gateshead, Hartlepool, International Advanced Manufacturing Park, intu Metrocentre, Middlesbrough, Morpeth, Newcastle Airport, Newcastle, Newton Aycliffe, Northallerton, Peterlee, Port of Blyth, Port of Seaham, Port of Sunderland, Port of Tyne, Redcar, Seaton Carew, South Shields, Stockton, Sunderland, Teesport, Thirsk, Thornaby, York.



● Business as usual scenario 2050 ● Transformational scenario Added Value 2050

East Coast to Scotland

Strengthening rail connectivity and capacity along the East Coast Main Line and other key parallel rail lines, such as the Durham Coast Line, to provide enhanced strategic and local connectivity in the North East, Tees Valley, East Riding and North Yorkshire.



Strategic and economic context

This rail corridor looks to strengthen the significant economic development in this corridor. These developments include the major ports, airports including Newcastle and Leeds Bradford, major rail hubs, strategic rail freight interchanges and intermodal terminals.

The corridor also contains several nationally significant assets, such as the International Advanced Manufacturing Park (IAMP), in Sunderland and South Tyneside, Tees CCPP NSIP, York Potash Harbour Facilities and Walney Extension offshore wind farm. There is potential for future longer term investment at Hartlepool nuclear power station and major renewable energy assets at Dogger Bank and Blyth, with links to those within Hull and the Humber. Advanced manufacturing is a particular strength with a strong automotive sector in the North East and the Tees Valley and advanced manufacturing in the Sheffield City Region. There is also a growing renewable energy sector along the east coast, requiring collaboration and connectivity across the corridor. The North East also has particular strengths in the health sector, which are complemented by emerging growth areas within the Tees Valley, and Sheffield City Region, and a strong and growing health and life science sector in the Leeds City Region. These prime capabilities are supported by strengths in the enabling capabilities including professional services (particularly in the North East and Leeds City Region) and logistics associated with the corridor's ports, airports and freight hubs.

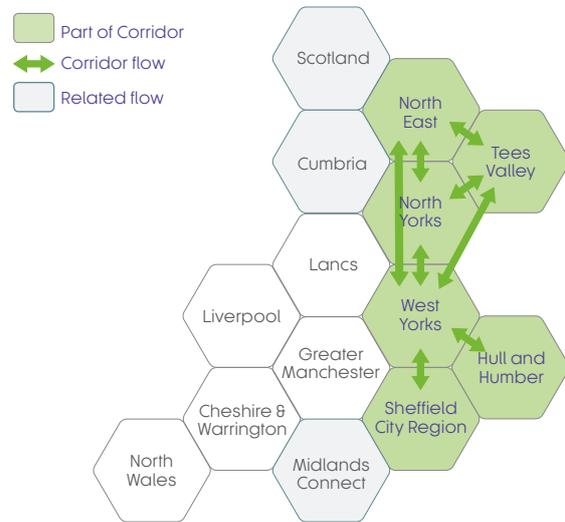
There are significant freight and logistics centres along the corridor with key national links within the North East, as well as to the Midlands and Scotland. Both air and freight hubs provide a focus for growth in the movements of goods, supported by a growing inland port and distribution capability. There is also a strong visitor and tourism offer, including Hadrian's Wall World Heritage Site, Northumberland Dark Skies Park, Northumberland and North Yorkshire Moors National Parks.

Transport context

Although the East Coast Main Line provides a key spine for North-South freight and passenger movements, this rail corridor is wider than just that route, encompassing parallel rail lines, including the Durham Coast Line

where journey time and peak capacity are key issues that constrain opportunities. The wider connectivity requirements along the Eastern Corridor link several key economic centres and also include links to the Northern Powerhouse Rail and HS2 programmes.

Investment is required at rail stations including Darlington, Middlesbrough, Newcastle, York, Hartlepool, Morpeth and Sunderland to increase capacity, promote economic growth, and make the most of the opportunities provided by HS2. There are existing capacity, operability, timetabling, and reliability constraints along the corridor, which is limiting economic growth and the movement of people.



Location Growth	Road	Rail
North East to North Yorkshire	297%	87%
North Yorkshire to North East	301%	89%
North East to Tees Valley	314%	131%
Tees Valley to North East	314%	127%
Tees Valley to North Yorkshire	110%	53%
North Yorkshire to Tees Valley	112%	54%
North Yorkshire to West Yorkshire	195%	60%
West Yorkshire to North Yorkshire	194%	57%
North East to West Yorkshire	898%	159%
West Yorkshire to North East	894%	158%
Tees Valley to West Yorkshire	161%	97%
West Yorkshire to Tees Valley	157%	97%
West Yorkshire to Hull and Humber	381%	55%
Hull and Humber to West Yorkshire	382%	63%
West Yorkshire to Sheffield City Region	1314%	76%
Sheffield City Region to West Yorkshire	1315%	75%

These growth figures show the potential maximum growth road and rail based travel by 2050 from a range of different scenarios

Prime Capabilities

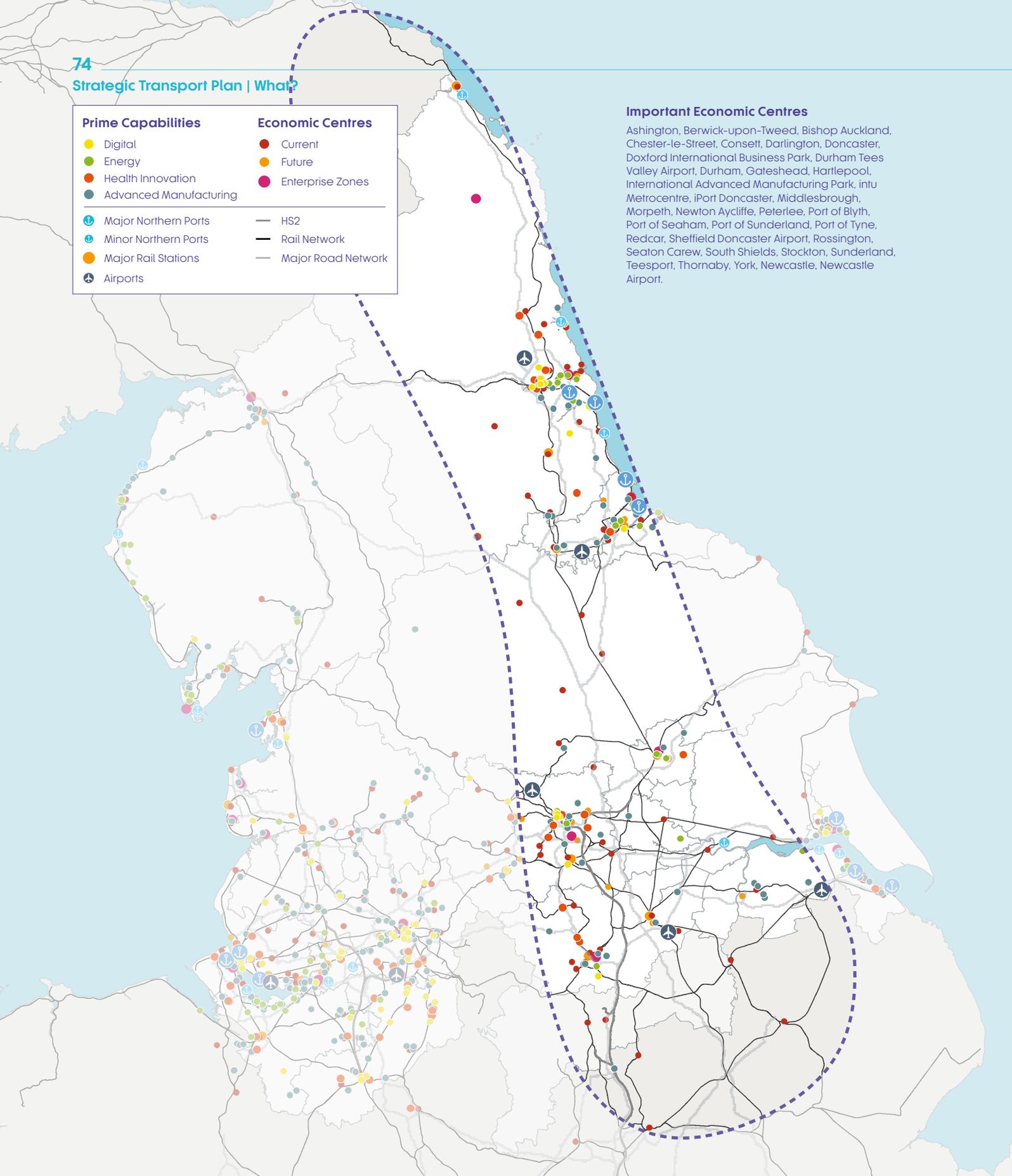
- Digital
- Energy
- Health Innovation
- Advanced Manufacturing
- ⓘ Major Northern Ports
- ⓘ Minor Northern Ports
- Major Rail Stations
- ✈ Airports

Economic Centres

- Current
- Future
- Enterprise Zones
- HS2
- Rail Network
- Major Road Network

Important Economic Centres

Ashington, Berwick-upon-Tweed, Bishop Auckland, Chester-le-Street, Consett, Darlington, Doncaster, Doxford International Business Park, Durham Tees Valley Airport, Durham, Gateshead, Hartlepool, International Advanced Manufacturing Park, intu Metrocentre, iPort Doncaster, Middlesbrough, Morpeth, Newton Aycliffe, Peterlee, Port of Blyth, Port of Seaham, Port of Sunderland, Port of Tyne, Redcar, Sheffield Doncaster Airport, Rossington, Seaton Carew, South Shields, Stockton, Sunderland, Teesport, Thornaby, York, Newcastle, Newcastle Airport.



+ £45.9bn



+ 564k



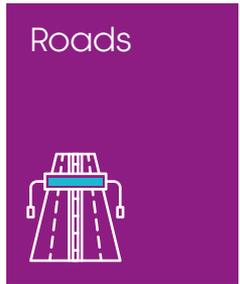
+ 342k

● Business as usual scenario 2050

● Transformational scenario Added Value 2050

Yorkshire to Scotland

Strengthening road connectivity between the Midlands, South Yorkshire, West Yorkshire, North Yorkshire, East Riding, Tees Valley, the North East, and Scotland, building on the existing road investment commitments.



Strategic and economic context

This road corridor looks to strengthen and complement the East Coast Corridor to Scotland road corridor and will examine the transformational requirements to better connect the economic centres in this corridor beyond the current Road Investment Strategy commitments.

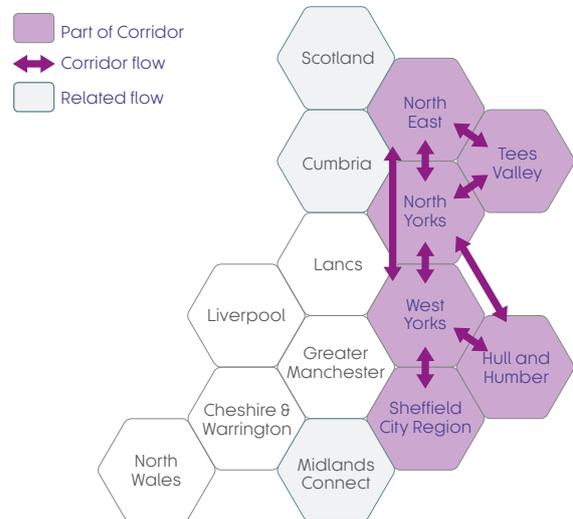
The significant economic developments in this corridor include ports (Tyne, Tees, Sunderland), airports (Newcastle, Durham Tees Valley and Doncaster Sheffield), major rail hubs (Newcastle and Doncaster), and intermodal freight terminals.

The corridor also contains several nationally significant assets, such as the International Advanced Manufacturing Park (IAMP), in Sunderland and South Tyneside, Tees CCPP NSIP and York Potash Harbour Facilities. There is potential for future longer term investment at Hartlepool nuclear power station and major renewable energy assets at Dogger Bank and Blyth, with links to those within Hull and the Humber. Advanced manufacturing is a particular strength with a strong automotive sector in the North East and the Tees Valley and advanced manufacturing in the Sheffield City Region. There is also a growing renewable energy sector along the east coast, requiring collaboration and connectivity across the corridor. The North East also has particular strengths in the health sector, which are complemented by emerging growth areas within the Tees Valley, and Sheffield City Region, and a strong and growing health and life science sector in the Leeds City Region. These prime capabilities are supported by strengths in the enabling capabilities including professional services (particularly in the North East and Leeds City Region) and logistics associated with the corridor's ports, airports and freight hubs.

There are significant freight and logistics centres along the corridor with key national links within the North East, as well as to the Midlands and Scotland. Both air and freight hubs provide a focus for growth in the movements of goods, supported by a growing inland port and distribution capability. There is also a strong visitor and tourism offer, including Hadrian's Wall World Heritage Site, Northumberland Dark Skies Park, Northumberland and North Yorkshire Moors National Parks.

Transport context

The major North-South routes of the A1 and A19 must provide a consistent level of service and resilience to meet the needs of the important economic centres they link and the strategic journeys they facilitate. Improved transport connectivity between the cities and surrounding economic centres, such as along the A19, will increase productivity and support the growth of complementary industrial capabilities. This corridor can transform the movement of people and goods within this corridor, as well as strategic movements between Scotland and the Midlands. This will complement Midlands Connect and Transport Scotland's aspirations for additional north-south connectivity and resilience.

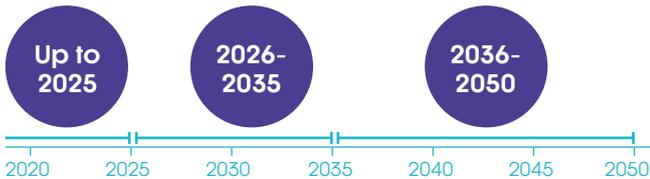


Location Growth	Road	Rail
North East to North Yorkshire	297%	87%
North Yorkshire to North East	301%	89%
North East to Tees Valley	314%	131%
Tees Valley to North East	314%	127%
Tees Valley to North Yorkshire	110%	53%
North Yorkshire to Tees Valley	112%	54%
North Yorkshire to West Yorkshire	195%	60%
West Yorkshire to North Yorkshire	194%	57%
North East to West Yorkshire	898%	159%
West Yorkshire to North East	894%	158%
North Yorkshire to Hull and Humber	660%	58%
Hull and Humber to North Yorkshire	661%	59%
West Yorkshire to Hull and Humber	381%	55%
Hull and Humber to West Yorkshire	382%	63%
West Yorkshire to Sheffield City Region	1314%	76%
Sheffield City Region to West Yorkshire	1315%	75%

These growth figures show the potential maximum growth road and rail based travel by 2050 from a range of different scenarios

The emerging long term Investment Programme

TfN's emerging long term Investment Programme will be split into three periods according to when the intervention is required to be operational. This is to align with the five year investment periods for the Roads Investment Strategy, and to be relevant to Network Rail control periods:



Recognising that further work is being undertaken on each of the TfN work programmes, the current estimate of the total value of the emerging Investment Programme from 2020 through to 2050 is £60-70 billion. This figure is based on today's prices and, at this point, comprises different cost base assumptions used in the rail and road industries.

The emerging long term Investment Programme will include:

- The emerging network for Northern Powerhouse Rail
- Short and medium term priorities for the Major Road Network for the North
- Other significant rail interventions to the whole of the rail network across the North that support HS2 and Northern Powerhouse Rail, and support the delivery of the pan-Northern transport objectives and the Long Term Rail Strategy.

TfN and Partners consider this to be an ambitious, but realistic, scale of programme. It is split broadly equally between rail and road interventions, based on the scale of interventions identified to date. It also assumes the delivery of the three tranches of the Integrated and Smart Travel package at a broad cost of £150 million, all of which will be complete in the early years of the Investment Programme.

The ambition lies in the commitment to a 30-year programme of predominantly capital investment that will deliver the North's strategic transport needs, and support the transformation in economic productivity and output envisaged by the *Northern Powerhouse Independent Economic Review*. The emerging Investment Programme also sets out the cost envelope for the strategic transport interventions needed for the North to reach its economic potential.

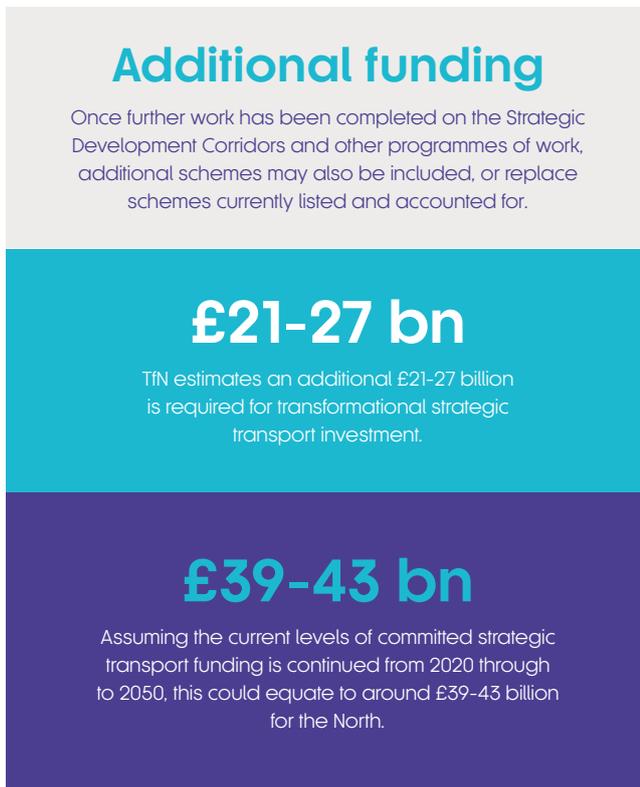
The realism lies in the scale of the investment, which is based on the fiscal remit for the National Infrastructure Commission (NIC) set by HM Treasury, which is itself benchmarked against other countries' commitment to strategic infrastructure. HM Treasury has asked the National Infrastructure Commission to plan for between 1 and 1.2% of GDP to be spent on strategic economic infrastructure improvements each year. The current estimate of the value of TfN's emerging Investment Programme represents around 0.7% of the North's GDP each year for strategic transport projects alone, with additional proportions of GDP spending required for other critical infrastructure investments in the North, such as energy and digital technology.

TfN seeks an increase in strategic transport investment over and above the level currently being delivered by Highways England and Network Rail in the period 2015-2020.

At this point in the development of the long term Investment Programme, TfN's current estimate of the level of additional capital expenditure required to support transformational economic growth, over and above the existing level of investment, is some £21-27 billion over 30 years. This represents an average level of additional strategic transport investment in the North of between £700 million and £900 million per year.

This additional investment would cover the wholly new sections of railway within the Northern Powerhouse Rail network, improvements to the Major Road Network in the North and other transformational rail projects.

The chart below shows the increase above current rates of investment represented by the emerging long term Investment Programme:



Strategic transport funding in the North (2020-2050)

Longer term projects are at varying stages of development, whereas the shorter term projects that the North wants to see delivered in the five year funding period from 2020 are clearer and more developed, with TfN acting as the Strategic Partner to Network Rail and Highways England in the planning and delivery of these schemes. TfN will work closely with both Highways England and Network Rail to ensure respective spending programmes are aligned.

As the Government has set out in the Industrial Strategy, it is important to consider future investments and decisions strategically, ensuring that infrastructure not only provides the basics for the economy, but also actively supports the long term national interests. The Strategic Transport Plan, Strategic Development Corridors, and the interventions in the long term Investment Programme will do just that, by ensuring that the North's long term interests and growth opportunities are better connected. This will then allow TfN and Partners to develop and deliver the interventions that are critical to transforming the North's economy.

The important programmes of work described in the Strategic Transport Plan will continue to develop and identify further transport interventions. In particular the updated Long Term Rail Strategy sets out a comprehensive strategy to transform the entire rail network across the North. Additional and/or modified interventions, beyond those envisaged at this time, will be identified to improve frequency of services, journey times, reliability, and the quality of trains and stations, in order to meet desirable minimum standards for all parts of the North's existing rail network. TfN will use its role to co-ordinate franchise oversight and the selection of future infrastructure enhancements, closely co-ordinating services and the infrastructure on which they will run, so as to get the best advantage from the investment in both. TfN has already started to work with the rail industry to identify more cost-effective ways of undertaking enhancements to both the infrastructure and rail services.

TfN's Partners will also continue to make the case for local transport investment to support the *Northern Powerhouse Independent Economic Review* vision, for example extensions to the Tyne and Wear Metro and other urban rail and rapid transit networks. These interventions are vital to ensure a "whole journey" approach is taken, that new areas of housing are linked effectively to jobs, and to ensure that all of the North's people have access to the future economic opportunities.

Working with Delivery Partners, TfN will also aim to deliver the Investment Programme in a sustainable way, and encourage advances in technology to be embraced positively.

As TfN does not have the direct responsibility for the delivery, operation and management of the North's transport network, TfN will continue to work closely and collaboratively with Government and Delivery Partners to ensure the long term Investment Programme becomes a reality, and delivers on the pan-Northern transport objectives set out at the beginning of the Plan. TfN does however directly co-manage the Northern and TransPennine franchises, ensuring that the franchise operations and delivery is undertaken to deliver the North's current and future priorities.

How?

Delivering TfN's Investment Programme

Governance and accountability

TfN will be established as a statutory Sub-National Transport Body in 2018 comprising 19 Constituent Authorities. As part of its statutory governance arrangements TfN is required to establish a Partnership Board that will be made up of representatives of the 19 constituent authorities, as well as business leaders from all 11 Northern Local Enterprise Partnerships, and representatives from Highways England, Network Rail, High Speed Two (HS2) Ltd, and the Department for Transport.

One of TfN's priorities is the development of this Strategic Transport Plan. Other functions TfN will be responsible for will be the coordination of regional transport activities, such as Integrated and Smart Travel, and the co-management of the Trans Pennine Express and Northern rail franchises. The latter function involves the incorporation of Rail North as part of TfN, enhancing the North's ability to speak with a single voice.

TfN will also be a Statutory Partner in the Government's investment decision making processes, utilising bespoke mechanisms such as the Highways North Board to engage with the Department for Transport to ensure that the North's priorities are understood and recognised in national decision making. Through this process, TfN can also enhance and strengthen the way in which constituent authorities engage with the Department for Transport, identifying connectivity to pan-northern, strategic priorities and providing additional information on how local schemes could provide wider economic and transformational growth benefits for the North.





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TfN's role and powers

- Established under Section 102 E of the Local Transport Act 2008 and pursuant to the Order made of the Sub-National Transport Body for the TfN area.
- TfN will act as a Statutory Partner to the Secretary of State in both road and rail investment processes and will be responsible for setting the objectives and priorities for strategic road and rail investment in the TfN area.

General functions

- Prepare a transport strategy for the North, in the form of the Strategic Transport Plan, in accordance with Section 102I of the Local Transport Act 2008.
- Provide advice to the Secretary of State for Transport about the exercise of the transport functions in relation to the North.
- Co-ordinate the carrying out of transport functions in relation to its area that are exercisable by different constituent authorities, with a view to improving the effectiveness and efficiency in the carrying out of those functions.
- If TfN considers that a transport function in relation to its area would more effectively and efficiently be carried out by TfN, to make proposals to the Secretary of State for the transfer of that function to TfN.
- Make other proposals to the Secretary of State about the role and functions of TfN.

Capital grants

- To pay Capital Grants under Section 56(2) of the Transport Act 1968 to support the funding and delivery of joint projects.

Ticketing schemes

- Make an advanced ticketing scheme under Section 134C (1), and to make other kinds of ticketing schemes under Section 135(1) of the Transport Act 2000.

Rail franchising

- TfN will take over the role and functions of Rail North Limited and, through a Rail Partnership Agreement, with the Secretary of State for Transport, will exercise management functions in relation to the Trans Pennine Express and Northern Franchise Agreements.
- The right under Section 13 of the Railways Act 2005 to be consulted over the grant of a rail franchise agreement for passenger services within, to and from the TfN area, and the right to enter into arrangements with the Secretary of State relating to the management of rail franchise agreements.

Highway Functions exercisable jointly with the Secretary of State

- Enter into agreements with local authorities under Section 6(5) of the Highways Act 1980 for the construction or improvement of a trunk road.

Highway functions exercisable concurrently with Local Highway Authorities

- Enter into agreements under Section 8(1) of the Highways Act 1980 with highway authorities and third parties for the construction, improvement or maintenance of a highway other than a trunk road.
- To construct new highways under Section 24(2) of the Highways Act 1980.
- Under the provisions of Regulation 14 of the Order, TfN may not exercise the function in Section 24(2) of the Highways Act 1980 unless the manner in which it proposes to exercise the function has been approved by each Council through whose area the road is to pass, the authority which is to be the highway authority for the road, the highway authority for any highway with which the new road will communicate, and the Secretary of State.
- Under the provisions of Regulation 15 of the Order, TfN may not exercise any of the other concurrent highway functions unless the manner in which it proposes to exercise the function has been approved by the local highway authority for the area affected.

Stronger partnerships

As discussed at the beginning of the Strategic Transport Plan, collaboration at a local level, with both public and private sector organisations, is crucial to maximise the case for sustained investment in the North. The TfN Partnership Board represents all of the North's local transport authorities and Local Enterprise Partnerships, covering every part of the North. Creating this partnership has been a historic step forward for the North. For the first time, the Northern public and business leaders have been brought together to identify the scale of the economic opportunity, the challenges that need to be overcome, and how best to invest in transport across the North.

TfN is grateful for the efforts and contributions of all its Partners to help make this Strategic Transport Plan a reality. TfN has built upon the research and experience of these Partners and engaged with them throughout the process to ensure there is agreement on the way forward. In doing so, TfN is acutely aware of the need to add value and to help unlock and accelerate transport investment.

TfN also wants to continue to work closely and collaboratively with other successful, existing partnerships and networks. These include N8, TechNorth, the Institute for Transport Studies, Campaign for Better Transport, the Northern Powerhouse Partnership, IPPR North and others to ensure TfN's vision and objectives are delivered.

By producing an integrated, aligned pan-Northern Strategic Transport Plan, TfN has the opportunity to support local aspirations for more sustainable, innovative, efficient local transport networks. These could include targeting short trips that could be undertaken by active modes. This in turn could reduce localised congestion, and support an improved transport system at a local and pan-Northern level. Consequently, this will support economic growth, as well as improved social inclusion, by reducing severance and connecting local communities with employment and other services in local areas and across the North.

Relationship with local transport systems

Whilst the long term Investment Programme will look to make the major road and rail networks more efficient and reliable, many journeys will require their journey to go beyond these networks. This will often involve other modes such as bus, cycling, light rail and walking. There are many key regional flows across the North that are not met by rail services, whereby existing bus services and light rail may be the best solution to improve such connectivity.

As TfN and Partners develop major, strategic interventions for improving the road and rail network, consideration of innovative and targeted local urban and rural transport priority measures is required. This is also a key component, as the increase in road-based travel of around 50% by 2050 included increased travel by buses and cycling. Additionally, in many cases other modes are key to allow

people to access work, health, leisure and education opportunities. This also supports the objective to improve opportunities to people across the North, working towards a healthier, more inclusive North.

TfN's work to develop Integrated and Smart Ticketing can make inter-modal travel more attractive. The benefits of this initiative will be constrained if measures to improve the offer of the bus service and light rail network are not explored, particularly for serving employment, including those identified in the *Northern Powerhouse Independent Economic Review*, commercial sites and tourist locations.

The transfer of car trips to bus and light rail, where practical, can also have a positive impact on air quality. Whilst this is a local issue, collectively, it will contribute towards air quality improvements across the North, and support the UK Air Quality Plan for tackling nitrogen dioxide.

TfN and Partners will look to assess the options, including through the powers of the Bus Services Act to improve inter-modal travel, and modal shift, by simplifying access to travel information to make journey planning easier.

Relationship with spatial planning

The North is varied in its physical characteristics. TfN wants to support local authority spatial and economic planning functions in developing an integrated approach to transport and land use planning that aligns with the TfN evidence base and long term Investment Programme. TfN is working towards delivering a transformative economic scenario and local Partners can use the Strategic Transport Plan to support the case for local investment and see what the Strategic Transport Plan means for their respective spatial plans.

It is envisaged that the Strategic Transport Plan and the long term Investment Programme will become more aligned with spatial land use plans, such as those around transport hubs, maximising the opportunities for economic growth and for users to access the transport network with good land use planning also contributing towards changing peoples use of the transport network, including shorter trips. Major, strategic investment can also support local growth plans, such as is the case around HS2 stations in the North.

The Strategic Transport Plan and long term Investment Programme can also help to align planned future development sites. Planned strategic transport investment can help support schemes seeking funding through mechanisms, such as the Housing Infrastructure Fund, which will provide infrastructure to unlock new private house building in the areas where housing need is greatest.

Cross-border relationships

TfN recognises that the effects of the Strategic Transport Plan are not constrained by borders. TfN has also sought to create and maintain strong relationships with its neighbours to ensure cross-border interfaces and movements are properly considered, including in matters relating to sustainability. Where possible, TfN has defined the key relationships and investments that support shared ambitions. TfN is also looking forward to working with neighbours to secure the investment that is critical to nurturing a stronger economy for the UK. Memoranda of Understanding have been developed to allow joint working with a number of organisations as shown below.



Innovation

The significant uncertainty facing the future of transport has intensified due to changing demographics, economic instability, climate change, technological innovation and changing consumer preferences. There are a number of factors that could affect future transport demand and supply across the North, disrupting the transport sector and posing both risks and opportunities.

TfN wants to harness innovative measures and encourage smart technology to support the delivery of the pan-Northern transport objectives. Innovation has the potential to increase the capacity and capabilities of our existing transport infrastructure. Finding ways to embrace new solutions and harness efficiency from our networks will allow the North to live within its environmental, demographic and financial limits, while supporting economic growth in the North. By embracing innovative solutions now, TfN can also influence future infrastructure captured by long term planning. Both of these uses can result in better transport user outcomes and experiences, more efficient choice of transportation options, and the use of technology to influence demand.

Analysis shows that regions which support innovation and create new technological solutions grow faster than those that do not. Furthermore, investing in research and development can provide a reliable pipeline of skills in the North, which could attract and retain employers. With the North's digital and innovative capabilities growing, there is an opportunity to harness this research and innovation, and use the North as early adopters or a test bed to strengthen the UK's competitive advantage globally.

Traditional models of car ownership are changing and declining, especially among younger people and in urban areas. The trend towards a shared economy of service provision rather than product ownership means that consumers are increasingly likely to purchase access to a car, such as through car clubs, rather than purchasing their own vehicle. Automotive companies are rethinking their positioning – reframing themselves as providers of mobility, not just manufacturers of vehicles. In the future, people may well view the transport system as a whole – meaning a greater focus on multi-modal solutions, with seamless transfer between different modes. This is why TfN is developing multi-modal Strategic Development Corridors to ensure the right priorities and investment is delivered.

Connected and Autonomous Vehicles could improve the throughput of the road network and make driving easier, enabling people to be more productive and offering greater mobility to a wider range of people, whilst robotics and automation will also play an increasing role in operating and delivering transport services. The Automated and Electric Vehicles Bill aims to put the UK at the forefront of the driverless car market. There is a balance to be struck as Connected and Autonomous Vehicles could also bring drawbacks to the North's future transport system by, for example, undermining public transport, as people could use these vehicle services instead of public transport. Understanding the changes in technology will also be crucial when addressing interventions to support TfN's road based travel projections and the efficiency and resilience of the Major Road Network for the North.

The Industrial Strategy also sets out further support for electric vehicles through a £400 million charging infrastructure investment, and an extra £100 million to extend the plug-in car grant. TfN and Partners will work to ensure that as much of this current, and future, funding is invested in the North to help support the success of the pan-Northern transport objectives and ensuring an adaptable, sustainable road network for the future.

The North will also need to take due account of more stringent environmental regulations, including the likely implementation of Clean Air Zones in major towns and cities. There will need to be an understanding of the take-up of electric and alternative fuels in vehicle technology in the North. New fuel technologies are likely to accelerate the transition away from fossil fuels, potentially driving changes in travel behaviour and requiring changes to infrastructure. This will contribute towards reducing greenhouse gas emissions from transport, and tackling the air pollution produced by the increased number of diesel cars on the road. Increased electrification of vehicles for both road and rail would help to reduce noise pollution.

Today there are about



1.84

connected devices per person on the planet



By 2020, this will rise to around

6.6

devices per person

Currently

99%



of physical objects that may one day be part of this network are still unconnected



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Innovation and technology will also have an impact on rail travel. The increased use of digital and data tools will allow for stronger traffic management, including the use of digital railway infrastructure. Integrated and Smart ticketing and information will provide customers with a seamless and personalised transport service.

Existing and new networks can be used more efficiently by enabling innovative multi-modal interactions, including with rapid transit systems, freight consolidation and loading gauge planning. The link between transport infrastructure and energy generation and storage innovations will also be key, with developments in new cleaner power expected during the lifetime of the Strategic Transport Plan.

Mobile devices are increasingly at the centre of digital lifestyles and access to data will increasingly influence passengers' relationship to transportation and their decision-making processes. This is already seen in Mobility as a Service which provides personalised transportation options. The development of 5G networks will also have an impact.

Big data, smart infrastructure and the Internet of Things are examples of innovation which will allow transport modes and users to communicate with each other and with the surrounding environment. A strong mobile infrastructure will pave the way for truly integrated and inter-modal transport that maximises efficiency gains, including providing transport users with real time information..

The Government is also investing in superfast fibre broadband infrastructure. This will support people and businesses to have improved technological connectivity, and could in turn have an impact in the patterns of movements on the transport network, through promotion of agile and flexible working.

Reviewing and understanding future trends is key to ensuring the transport system in the North is future-proof. These factors will be considered during the review process of the Strategic Transport Plan as well as in the development of interventions. TfN is committed to strengthening analysis and understanding of these trends so they can be better reflected in the evidence base and influence how the long term Investment Programme develops.

TfN will be looking to work with Government on current and future policy development, including the Government Office for Science's new Foresight Future of Mobility project which will help policy makers, at a national, pan-Northern and local level, think about the future of transport when planning for transport infrastructure that shapes the way people and goods move in the future.

Consideration of future technologies and innovation will be integral to the development of TfN's long term Investment Programme and TfN will be undertaking further research as the Strategic Transport Plan evolves over time.



Northern transport skills

Improving education and skills to support economic prosperity is a priority at a national and local level. The Government's Industrial Strategy and the Transport Infrastructure Skills Strategy set out that more needs to be done to address sector-specific skills gaps, including urgent skills shortages in transport infrastructure.

Analysis shows that demand has increased through the creation of specialist colleges and training facilities within transport, such as the National College of High Speed Rail in Doncaster, the Newcastle College Rail Academy, and Modal Training who specialise in maritime, ports, wind energy, offshore, road and logistics sectors. Across transport there are many skills required that are in high demand across competing sectors, driving up demand for scarce skills and in turn the pay and benefits that can be commanded across both public and private sectors.

Delivery of the long term Investment Programme will require a skilled workforce to support both the operational roles and the infrastructure development to support the successful delivery of the Strategic Transport Plan. Working collaboratively across education, skills and transport will be the only way to achieve this, including determining the flexibility of funding across the skills system, understanding the impact of Brexit, and having a clear line of sight to an evolving project pipeline that will inform the skills need.

The UK Commission for Employment and Skills (UKCES) Working Futures Data and the *Northern Powerhouse Independent Economic Review* together demonstrate a trend in employment in the North up to 2050. Much of this increase will come from key sectors related to transport. The data shows that from 2014-2022 across the North there is a projected increase in employment of 3.6% from 7.1 million to 7.4 million.

Looking at job categories most closely aligned to transport, the average growth rate from 2014-2022 is expected to be 6.6%, more than double the Northern average. This growth shows that there is already a skills deficit and this is set to rise. There will be high demand across some key skills sets and high competition across sectors. Currently the skills provision is fragmented and not targeted, there is little emphasis on transport as a sector outside of rail.

Longer term there are wider changes that compound the education and skills issues. Specific skills gaps have been identified in relation to project leadership, engineering and technical, logistics (particularly Large Goods Vehicles drivers), and IT and digital. These skill gaps become far more significant in the medium to long term, with action to meet the skills challenge needed in the short term.

The transport sector also has an issue with image and attracting young people to opportunities. Feedback from recent research commissioned by TfN suggests a prevailing negative perception of transport's role is exacerbated by a disconnect between employment opportunities in transport and education providers, parents and business. This is further compounded with an ageing workforce and difficulties in attracting women and ethnic minorities to the sector.

National policy on skills as set out in the Government's Industrial Strategy presents opportunities for transport, and progress is underway, particularly in rail. Further opportunities will be available through the introduction of technical institutions. Going forward, the North faces a complex set of challenges in addressing its transport skills gap.

Funding and financing

By its nature, pan-regional strategic transport infrastructure is both expensive due to long distances covered and topographical challenges, and has an irregular profile of spend required over extended timeframes. Meeting the ambitions for transformational economic growth will therefore require material increases in transport investment compared to historic norms – right across the North, and over an extended period. Current fiscal arrangements in the UK mean that around 94% of revenue raised by the public sector accrues to Central Government. TfN is committed to exploring alternative funding sources within the North. However, it remains the case that the significant part of the resources required to deliver TfN's investment programme will need to come from Central Government.

A sustainable funding proposition for the long term Investment Programme must be delivered against the backdrop of significant short, medium and longer term fiscal pressures, not least the scale of committed spend on transport infrastructure across the UK. The fact that TfN is constituted to serve the interests of a wide body of stakeholders across the North, and yet does not have the ability to directly borrow capital or raise revenue, makes the challenge significantly more complicated than for local schemes.

Although innovative alternative funding and financing models have been successfully trialled in London and the South East, these are not necessarily applicable in the North. Not only are the economic benefits of inter-urban interventions more diffuse, reflecting the larger and more diverse geography, but the reality that base levels of productivity, wages and land values are significantly lower than other parts of the country, as well as there being significant differences within the North itself.

Accordingly, new ways of paying for the investment required to support transformational economic growth will need to be devised, considered and implemented.

There is currently a significant amount of activity underway in the market that aims to understand how to leverage private finance into transport projects. TfN is fully engaged with these efforts, notably with the work currently being undertaken by the CBI on the funding and financing of infrastructure. This seeks to explore how transport projects might benefit from the large sums of private capital that are available in the market for infrastructure investment, and the potential obstacles that may exist. This work has identified that there are significant opportunities for TfN to take advantage of private finance where a clear source of funding is available, and these opportunities will be explored as the work on funding progresses.

Given the importance of addressing the funding challenge, TfN is working with its Partners to establish a fit for purpose and deliverable outline funding and financing framework for the long term Investment Programme.

This work is based on some key principles:

- **Funding is a shared challenge requiring a shared solution** - the overall funding package for the long term Investment Programme will be made up of a mix of existing national sources and an element of 'new' funding. These sources could range from the redirection of existing pots of national or local revenue to bespoke funding arrangements reflecting Government policy objectives around national rebalancing.
- **TfN and its Partners will argue for demonstrable fairness between places and regions** – any future funding framework needs to deliver the necessary contribution to headline growth while also balancing the many diverse needs of TfN's Partners and stakeholders. Ensuring fairness and consistency between stakeholders - and with other parts of the UK - will be critical to developing sustainable propositions, as well as an understanding of how risks and rewards are allocated and managed.
- **New sources of revenue need to proportionately tap into the financial benefits generated by the investment** - investment in strategic infrastructure generates a material benefit for users, whereas the improved accessibility it creates benefits residents, workers and businesses and attracts others to relocate to the area. Opportunities will exist to raise revenue on the back of the financial benefits generated by the investment (that are not captured by the existing tax system), but this must be done in a way that avoids pricing off the productivity and rebalancing benefits of the investment itself. This means a subtle approach is required, based on understanding what value will be created and when, and then capturing only what would otherwise be 'windfall' gains.
- **The differences between places, and in any one place over time, point to the need for a 'whole programme' approach** - different individual initiatives and places will demonstrate different levels of potential to generate value and funding at different times. One of the implications of this is that funding needs to be seen in the round on a whole programme basis, as with the approach taken to identifying interventions. At the same time, it is likely that in particular locations, value will be created by a combination of national, regional and local investment, and so the future funding framework must seek to work in parallel with, and complement, local plans and avoid 'crowding out' local investment.

Potential funding sources

TfN's status as a pan-regional organisation, with a range of stakeholders but limited fiscal powers, means that a bespoke but credible funding and financing framework will be required. A substantial element of funding will come from central Government budgets. In this context, the infrastructure funding needs of the North, although very substantial in their own right, are part of a bigger challenge, one that may only be solved through a fundamentally different approach to infrastructure funding at a national level.

At the same time, it is recognised that mechanisms through which the local businesses, communities and individuals who benefit most from the programme can make an appropriate contribution will also form part of the solution. These too will require new approaches. As with the TfN work programmes, activity will continue to develop options for the funding and financing framework as the Strategic Transport Plan is finalised, and a number of options will be investigated in detail. These will include:



1. Future grant funding framework for Capital Programmes

It has been recognised from the outset that the nature of the capital programmes TfN is sponsoring, and the centralised transport funding regime within which those programmes are being developed, means the large majority of funding for TfN's programmes would be from central sources. Currently this means funding from the Department for Transport's Department Expenditure Limits and/or Annually Managed Expenditure budgets allocated to strategic programmes delivered via Network Rail and Highways England.

TfN has been established with the principle of bringing forward a shared set of solutions across the North and this is central to the Strategic Transport Plan and the long term Investment Programme. However, the North does not exist as a democratic or revenue raising entity. Therefore to deliver the transformational change TfN is charged with supporting, will require a funding framework which provides the basis for substantial future investment.

A future funding framework should be developed, which is well-understood, provides increased certainty, can work at a pan-Northern level and incentivises cost effective delivery of the TfN programmes which best promote growth. This should be developed to align incentives across partners, promote joined up investment in TfN and local programmes, provide a baseline to encourage additional funding to be raised locally and support changes driven at a national level by technological and behavioural change.

2. Vehicle excise duty

The National Roads Fund was created in 2014, whereby Vehicle Excise Duty from 2020 onwards would be used to pay for future improvements on the Strategic Road Network. At current prices, the National Roads Fund would be worth around £5.8 billion each year across the UK.

The recent Transport Investment Strategy confirmed this commitment, but also indicated that the Government would be seeking to use a proportion of the National Roads Fund to pay for improvements to the Major Road Network, as well as the Strategic Road Network. The precise value of the allocation to the Major Road Network for the North is unknown at this time, but indications suggest this could be around £1 billion per year across the UK.

There is still detail to follow on the definition of what a newly-designated Major Roads Network would comprise, and how the funding would be allocated, but what is clear is that the use of the National Roads Fund for future improvements to the Major Road Network is a new and potentially significant source of funding for the road elements of the long term Investment Programme.



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3. Land value capture

The benefits generated by new or improved strategic transport infrastructure are converted in a large part into higher commercial and residential land / property prices in benefitting areas. Where planning allows (or as part of a planning response) new or improved infrastructure can also act as a catalyst for new higher density development, and create new land parcels and property rights from which in turn development opportunities can be leveraged.

It is possible that Land Value Capture mechanisms that tap into this future uplift, as are being considered in other parts of the UK, can have a role to play in the funding framework for part or all of the long term Investment Programme.

The characteristics of the programme and the area that it will serve mean that the opportunity may not be as significant as elsewhere. The location, distribution and timing of the value created by the pipeline of interventions, and how much could be captured without unintended consequences, is key to understanding the quantum of new funding potential created on the back of the different types of investment, and this will only become clear during the detailed development of the long term Investment Programme.

Land Value Capture would be broad-based, taking a modest proportion of the gain to different beneficiaries, thereby minimising the risk that the value capture threatens to the outcomes targeted by the investment. Much of the benefits from the investments are likely to be realised within TfN's Partner areas or city regions that have their own objectives for local funding and value capture. Any funding and financing framework will therefore need to work in parallel with local strategies for Land Value Capture.

4. Rail franchises in the North

The Northern and Trans Pennine rail franchises are expected to generate a surplus by the end of the current franchise period, which taken together, would be of the order of £100 – 150 million per annum. Were these premia to be directed wholly or partially towards future investment in transport in the North in the next franchise period, this could deliver material funding potential, whilst at the same time incentivising the efficient management of the franchises in the North.

The potential could be even greater if TfN's and its Partners' ambitions for generating additional rail travel and deploying effective demand management result in patronage growth, enhanced capacity and improved utilisation and yields into the next franchise period. This will be an important part of the negotiations around the next franchises.

More broadly, there may also be an opportunity to reform fares structures to address historical imbalances, and to reflect changes in behaviour and technology, in order to provide for a fair contribution from the users who benefit from additional investment, while supporting the ongoing investment programme needed to transform the North's economy.

Appraisal and analysis

TfN requires strong evidence and analysis to make the case for further investment in the North's strategic transport network. Working with TfN's Partners and the Department for Transport, a set of analytical requirements have been gathered to meet a wide range of inter-linked interventions. These requirements will enable TfN to deliver the evidence base and representative picture of the North, in a coherent analytical framework for the North.

The objectives of this framework are to:

- Develop a consistent approach to the analysis of strategic transport proposals across all TfN activities in the North and provide tools that Partners can use for evaluation.
- Develop collaborations and governance to build and maintain confidence of Partners, including national agencies, that the analysis is robust and credible.
- Provide input to Investment Programme and Strategic Development Corridors objectives that identify the need for future strategic investment, including the evidence of the impacts of economic growth and wider policies.
- Improve the external visibility and accessibility of analytical outputs to Partners and wider stakeholders.
- Develop an approach consistent with that of other sub-national organisations and derive substantial efficiencies and quality improvements in creating the analytical framework.

The Strategic Transport Plan is looking to promote and accelerate growth and seize the opportunity that better connectivity can bring. Quantifying these benefits can be complex, with current approaches favouring schemes in places where there is already growth, not unlocking growth. TfN will work with DfT on the appraisal framework to test out new approaches to quantifying benefits.

The framework will concentrate on supporting TfN work programmes for assessing strategic transport interventions and for the production of investment business cases. Specifically, it aims to:

- Strengthen core analysis by improving the robustness of assessments and business cases, and improving confidence and costs.
- Expand the range of analysis including how TfN can enhance current practices to incorporate the full range of economic impacts in business cases.
- Enable assessment of innovative future developments that take into account technology take-up, such as autonomous vehicles, policy changes, and collaboration, such as Mobility as a Service.

The analytical framework will enhance both current project capabilities and the longer term analytical programme and capability for TfN as a statutory body. In establishing its own analytical framework, TfN will continue to be guided by the HM Treasury Green Book and DfT WebTAG for programme and scheme development, to ensure consistency of approach with DfT and other Partners. This includes ensuring the analysis is consistent with the national approach in the National Infrastructure Commissions National Infrastructure Assessment (NIA). TfN will apply the following principles to make sure that the appraisal properly reflects the key factors impacting on economic growth in the North, and continue to influence Government and others to work in the same way:

- Taking a programme level approach. The use of Strategic Outline Programmes means TfN and Partners can make an overall case for packages of multi-modal interventions to deliver a coherent set of outcomes. This will also enable decisions to be taken on projects knowing what further improvements will be needed in the future so to avoid incremental changes being low value for money in the longer term.
- TfN has established a coherent strategic economic narrative from the *Northern Powerhouse Independent Economic Review*, which flows through to the economic objectives in the STP and the Strategic Development Corridors. TfN will continue this approach through to intervention level, ensuring a strong link to the strategic and economic cases through all five business cases in scheme development. TfN will build in evaluation from the outset, ensuring TfN measure success against the original objectives.
- Considering a wide range of potential futures and economic forecasts. Building on the *Northern Powerhouse Independent Economic Review* and the work on future travel demand for the Strategic Transport Plan, TfN will use the business as usual and transformational scenarios against a range of potential futures outcomes.
- Measuring the widest possible range of impacts to fully capture all of the impacts of transport investment.
- Measuring national as well as pan-Northern impacts. In appraising the impact of programmes, TfN will aim to demonstrate the net national benefits to the UK economy, the North as a whole and the distributional impacts across the North wherever possible.

These principles represent best practice in appraisal and evaluation of public policy, and are fully consistent with HM Treasury Green Book. They reflect how TfN has been working to ensure that it balances the need to make a transformational case for investment while delivering conventional transport planning analysis to a high level of technical assurance.

TfN is supportive of the proposed changes to the WebTAG guidance to better capture the wider economic impacts of transport interventions, and of the wider changes outlined in the Transport Investment Strategy. This new guidance represents a major step forward in the consideration of appraisal and it will facilitate a more rounded and realistic assessment of schemes that better reflects their true economic impacts. The revised guidance will support TfN in developing the Investment Programme needed to drive transformational economic growth in the North. TfN will continue to work closely with the Department for Transport to improve the evidence base and appraisal guidance, whilst continuing to press for further and more rapid changes to the system.

TfN will also ensure the development of a Rebalancing Toolkit, as set out in the Industrial Strategy, is dynamic and considers interventions more strategically. This will be critical if TfN's long term Investment Programme is going to be delivered. The Strategic Transport Plan, Strategic Development Corridors, and further analysis and appraisal tools will support the Toolkit and the 'rebalancing' evidence in strategic business cases.

Alongside all the technical and financial considerations to be taken in relation to any proposed interventions in the long term Investment Programme, it will be a key aim to minimise the impact of transport on the built and natural environment and the health and wellbeing of residents, workers and visitors in the North. It is important to recognise that in the development of any intervention, the environmental, health and social aspects will be assessed at an appropriate level for that stage of the design or planning.

Environmental considerations will continue through to the construction and operation of the individual schemes, through the implementation of effective Environmental Management Plans. As such, the mitigation and recommendations made in the Strategic Transport Plan are only a first step in protecting and where possible enhancing the environment, health and wellbeing of the North.

The development of the Integrated Sustainability Appraisal has ensured that these elements have been factored in throughout the development of the Strategic Transport Plan.

The Integrated Sustainability Appraisal is an iterative assessment process informing the Strategic Transport Plan as it develops, intended to highlight that potential significant effects arising from the Plan are identified, assessed, and mitigated. It also ensures that the Strategic Transport Plan incorporates the regulatory and guidance requirements for Strategic Environmental Assessment, Equality Impact Assessment, Health Impact Assessment, Community Safety Assessment, and Habitats Regulation Assessment.



Ensuring a sustainable Investment Programme

TfN and its Delivery Partners will ensure that strategic transport infrastructure is designed and constructed in a sustainable way. The principles set out below, build on the pan-Northern transport objectives, and will be developed over time to ensure the long term Investment Programme becomes an exemplar in how it:

- Defines a broad set of infrastructure requirements that will seek to deliver high quality travel with associated high quality environmental mitigation, to create an attractive, inclusive, and accessible environment to live, work and invest, for a healthier, safer, more inclusive strategic transport network across the North.
- Acts as a catalyst for future transport technologies that will enable environmentally and efficient travel, contributing to the Government's target to reduce carbon emissions.
- Promotes confidence in businesses to invest in a skilled labour market to deliver the transport infrastructure required, as well as supporting wider opportunities.
- Explores opportunities for 'green' and 'blue' infrastructure to enhance landscapes and habitats, and support a net gain in biodiversity where possible.

TfN's principles for pan-Northern transport investment

In time as the Strategic Transport Plan and long term Investment Programme develops, TfN will work towards delivering infrastructure that supports these agreed principles for the sustainable delivery of transport in the North. This can be achieved in part through joint infrastructure planning with Delivery Partners, other statutory bodies, and wider stakeholders.

TfN endorses the work being undertaken by Highways England and High Speed Two (HS2) Ltd through its Design Panels, as well as similar approaches by other Delivery Partners, to work towards delivering the best sustainable design through infrastructure development. TfN wants to work with its Delivery Partners to ensure projects in the North are designed to the objectives and principles set out in this Plan.

New approaches could include encouraging new and/or upgraded infrastructure to undertake sustainable procurement and be resource efficient, including promoting the circular economy, through exploring opportunities that can reduce the consumption of natural resources, such as soil, materials, energy, and water in construction, operation, and maintenance. Additionally, transport infrastructure should seek to minimise the contamination of land during construction, operation, and maintenance. TfN wants to encourage design, construction, repair and maintenance of transport infrastructure that respects and enhances the North's landscape character and townscapes. TfN will seek to ensure that these design principles are implemented in the development process for interventions on the Major Road Network for the North and across the North's rail network.

The North collectively, both public and private sector, needs to work towards a transport network that significantly reduces carbon emissions and harmful air pollutants, particularly CO₂, NO₂, particulates and noise. This will also improve air quality and support the North's contribution towards compliance with the UK's legal limits as soon as possible. This includes supporting and harnessing the uptake of ultra-low and zero emission technologies, as highlighted in the innovation section of the Strategic Transport Plan. This will also be a national priority with the Government's stated intention to ban new diesel and petrol vehicles from 2040.



The Government's *Clean Growth Strategy – Leading the Way to a Low Carbon Future* sets out a series of key policies and proposals aimed at driving down carbon emissions over the next decade. The Strategy identifies transport, which accounts for 24% of UK emissions as a key area for action, setting out a series of policy measures focussed on accelerating the shift to low carbon transport. These include actions on introducing new vehicle technologies, on encouraging the shift of freight from road to rail and on working with the private sector to support research and development of connected and autonomous vehicles.

TfN will need to work with Partners to ensure that the right infrastructure is in place for new low emission vehicles to be successful in the North, for example there needs to be a sufficient and appropriate charging and refuelling network in place. This also requires working with stakeholders in one of the North's prime capabilities in energy generation and supply to support this innovative change.

Working with other statutory bodies, such as the Environment Agency, TfN wants to ensure the strategic transport network is future proofed, adaptive, and resilient. For example TfN wants to ensure that Sustainable Drainage Systems (SuDS) such as green roofs, rain gardens or swales are incorporated in to the TfN's pipeline of investment to reduce flood risk. Additionally working with Partners and other statutory bodies, TfN wants to deliver transport investments that protect sites designated for important nature conservation, ensure that due regard is given to the need to undertake archaeological investigations, and protect and enhance the quality and distinctiveness of historic assets.

The North of England contains a number of statutory and non-statutory designated sites that are protected for their importance for nature conservation. Prime among these sites are Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), which form the Natura 2000 European network of core breeding and resting sites for rare and threatened species, along with some rare natural habitat types. It is the aim of this network to ensure the long term survival of Europe's most valuable and threatened species and habitats, listed under the European Commission's Habitats and Birds Directives. In addition to the Natura 2000 sites, there are also internationally important wetlands designated as Ramsar sites.

At a UK level there are a large number of nationally important Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), and many important Local Nature Reserves (LNRs) and green spaces that support wildlife and enhance the wellbeing of the local population.

The Strategic Transport Plan and Investment Programme recognises the importance of all these sites and TfN are committed to work with Partners to avoid and/or minimise any adverse impacts on important nature conservation sites as far as possible. Any potential direct or indirect impacts on these sites that may arise from new and/or upgraded transport interventions will be appropriately assessed, mitigated, and/or compensated for, in-line with existing best practice and relevant legislation across the life span of the Plan. This would include European designated sites (including Ramsar sites), when necessary, Habitats Regulation Assessment.

The North's strategic transport network also needs to be designed and developed to be accessible and ensure users have an increased opportunity and choice of services. This can ensure that communities across the North have opportunities to access work and leisure. These greater choices can also support work being undertaken by other organisations, such as Public Health England, to explore how investment in transport can have positive impacts on people's health.

TfN also wants to work with Delivery Partners, the industry, professional institutions, and the Government to ensure that equality barriers are being overcome, and the right talent and skills are available to deliver TfN's long term Investment Programme. A transformation of the economy requires a transformation in the productivity of the workforce. This will also support the recommendations set out in the Government's Transport Infrastructure Skills Strategy.

TfN wants to support diversity in transport, through encouraging and promoting the study of Science, Technology, Engineering and Maths (STEM) subjects by students, so they can become the next generation of transport engineers, planners, and professionals. Additionally, more needs to be done to support and encourage more women, BAME, those with disabilities, and LGBT professionals in to the transport sector.

Strategic Transport Plan review process

Following public consultation on the Strategic Transport Plan, this version of the Plan will be updated in light of responses received.

It is proposed that the Strategic Transport Plan, once adopted in 2018, is reviewed within two years and then in five yearly cycles after that. The long term Investment Programme is intended to be a rolling programme and so it will be subject to more frequent reviews, as interventions are delivered.

The reviews will be timed to fit within industry planning processes including the Road Investment Strategies, Rail Upgrade Plans, Route Business Plans and other Investment Processes, rail franchise renewals and changes in Government. This will ensure that TfN is positioned to influence policy and investment decisions with a robust, evidence based and up-to-date plan that makes the case for continued investment. This process will continue to ensure that TfN is delivering the pan-Northern transport objectives, and complements planning, local transport plans, and economic strategies at a local level.

Consultation

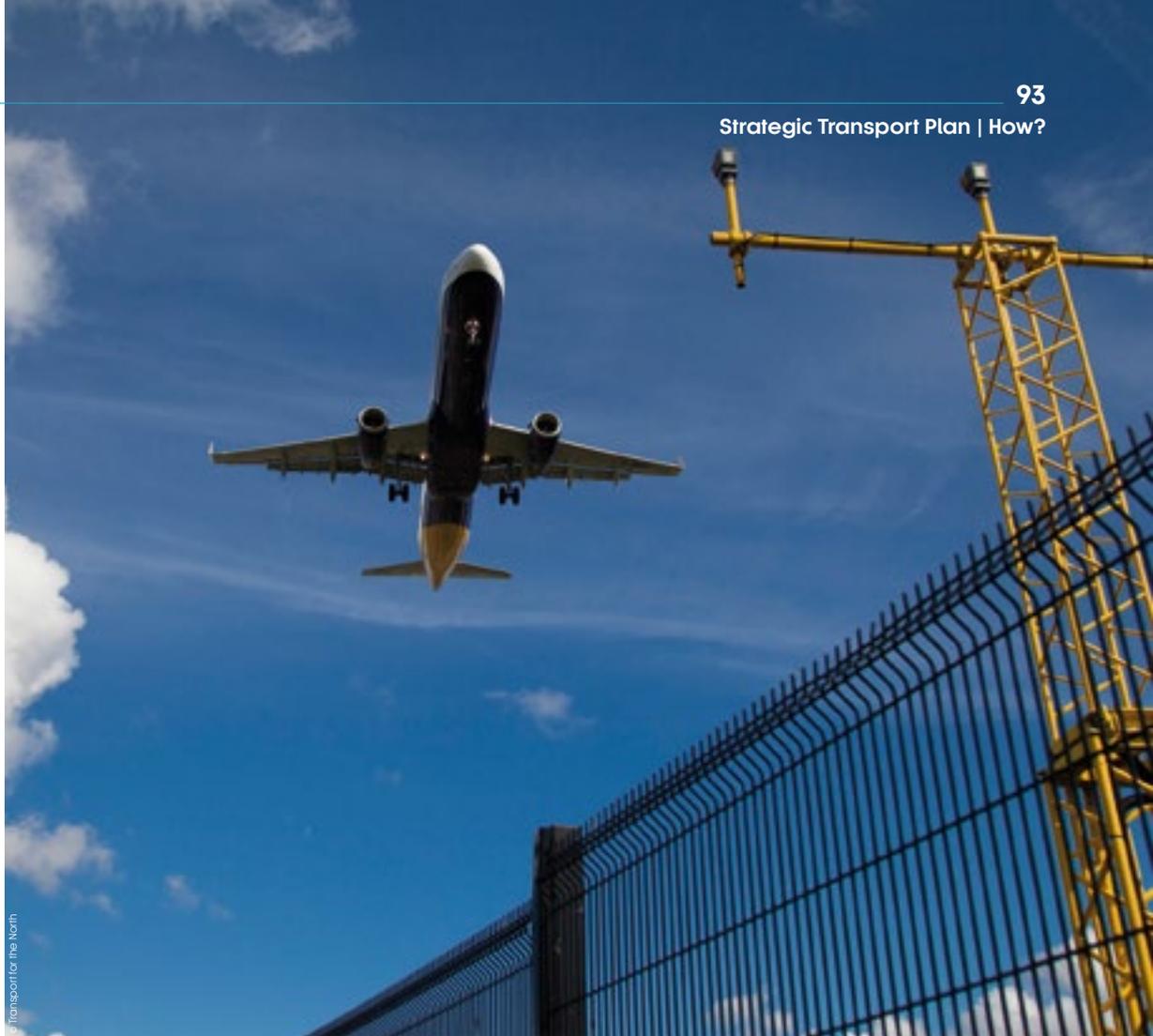
The Draft Strategic Transport Plan was published by Transport for the North in January 2018. Transport for the North wants to hear the views of transport users, individuals, and organisations by completing the online consultation questionnaire available at transportforthenorth.com. There are two online questionnaires; one if you are responding to the Strategic Transport Plan, and one if you are responding to the Integrated Sustainability Appraisal. Paper copies of both consultation questionnaires are available on request. Alternatively, if you would prefer to respond in greater detail, you can send a written submission by email to transportplanconsultation@ipsos-mori.com or by post to the address below. We would also welcome comments on any aspect of the Draft Strategic Transport Plan. Hard copies of the full Draft Strategic Transport Plan are available on request. Please get in touch using the details provided if you would like information in alternative formats. The public consultation will be open until April 2018. Further details are available on the Transport for the North website at transportforthenorth.com. You can also submit hard copies of your response to:

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Appendix A

Strategic Transport Plan evidence base and supporting documents

TfN Strategic Transport Plan associated documents

Independent Integrated Sustainability Appraisal (2018)
Long Term Rail Strategy (2018)

Other TfN supporting evidence

Campaign for Better Transport - Key challenges in developing a Strategic Transport Plan for the North (2017)
Enhanced Freight and Logistics Analysis (2018)
Future Transport Demand Statement (2017)
Initial Integrated Rail Report (2017)
Major Roads Report (2018)
Northern Powerhouse Independent Economic Review (2016)
Northern Transport Skills Report (2018)
The Northern Independent International Connectivity Commission Report (2017)

Supporting TfN Partner strategies and plans

Blackburn with Darwen Local Transport Plan (2011)
Blackpool Local Transport Plan (2011)
Cheshire and Warrington Matters: Strategic and Economic Plan for Cheshire and Warrington (2014)
Cheshire and Warrington Sub-Regional Transport Strategy (2015)
Cheshire East Local Plan Strategy (2016)
Cheshire West and Chester Local Transport Plan – Integrated Transport Strategy 2011-2026 (2011)
Cumbria Strategic Investment Plan (2016)
Cumbria Local Transport Plan (2011)
Cumbria Local Enterprise Partnership - Infrastructure Plan (2016)
Cumbria Strategic Economic Plan 2014-2024 (2014)
Durham Local Transport Plan (2011)
East Riding of Yorkshire - Local Transport Plan Strategy (2015)
Greater Lincolnshire Local Enterprise Partnership - Strategic Economic Plan 2014 – 2030 (2016)

Greater Manchester - 2040 Transport Strategy (2016)
Hull Local Transport Plan (2011)
Humber Local Enterprise Partnership - Strategic Economic Plan (2014)
Lancashire Local Transport Plan (2011)
Lancashire Strategic Transport Prospectus (2016)
Lancashire Local Enterprise Partnership - Strategic Economic Plan and Growth Deal (2014)
Leeds City Region - Strategic Economic Plan (2016)
Leeds City Region - Transport Strategy (2009)
Liverpool City Region – A Transport Plan for Growth (2015)
Liverpool City Region - Long Term Rail Strategy (2014)
Liverpool City Region Local Enterprise Partnership - Growth Strategy (2014)
Moving Cumbria Forward: Cumbria Transport Plan Strategy 2011-2026 (2011)
North East Local Enterprise Partnership Strategic Economic Plan (2017)
North Lincolnshire Local Transport Plan (2011)
North East Lincolnshire Local Transport Plan (2011)
North Yorkshire – A Strategic Transport Prospectus for North Yorkshire (2015)
North Yorkshire Local Transport Plan 2016-2045 (2016)
Northumberland Local Transport Plan (2011)
Our Journey – A 20 Year Transport Manifesto for the North East (2016)
Sheffield City Region - Integrated Infrastructure Plan (2016)
Sheffield City Region - Transport Strategy 2011-2026 (2011)
Sheffield City Region - Strategic Economic Plan and Growth Deal (2014)
Stronger Together – Greater Manchester Strategy (2013)
Tees Valley - Strategic Transport Plan Framework (2016)
Tees Valley - Strategic Economic Plan (2016)
Tees Valley Local Enterprise Partnership - Strategic Infrastructure Plan (2014)
Tyne and Wear Local Transport Plan (2011)
Warrington Local Transport Plan Strategy (2011)

West Yorkshire Combined Authority - Draft Transport Strategy (2016)

York Local Transport Plan (2011)

York, North Yorkshire, and East Riding Local Enterprise Partnership – Strategic Economic Plan Update (2016)

Supporting TfN delivery Partner strategies and plans

Highways England - Road Investment Strategy (2016)

Highways England - Northern Trans Pennine Strategic Study (2016)

Highways England - Trans Pennine Tunnel Strategic Study (2016)

Highways England - North West Quadrant Strategic Study (2016)

Highways England - Economic Growth and the Strategic Road Network (2016)

High Speed Two (HS2) Ltd – Rebalancing Britain (2015)

Network Rail - Long Distance Market Study (2015)

Network Rail – Control Period 5 - Enhancements Delivery Plan (2017)

Network Rail - Railway Upgrade Plan (2017)

HM Government strategies, plans, data and guidance

Department for Business, Energy, and Industrial Strategy – Developing a modern Industrial Strategy (2017)

Department for Business, Energy, and Industrial Strategy – Clean Growth Strategy (2017)

Department for Transport / Transport for the North – Northern Transport Strategy (2015)

Department for Transport - Transport investment strategy (2017)

Department for Transport - Transport analysis guidance (2013)

Department for Transport – Great Britain Transport Statistics (2017)

Department for Transport - High Speed Two From Concept to Reality (2017)

Department for Transport - High Speed Two Phase Two Strategic Case (2017)

Department for Transport - High Speed Two: From Crewe to Manchester, West Midlands to Leeds and beyond (2017)

HM Government - Northern Powerhouse Strategy (2016)

HM Treasury - Green Book Guidance (2013)

HM Treasury – Autumn Statement (2016)

HM Treasury / Infrastructure and Projects Authority - National Infrastructure and Construction Pipeline (2016)

Supporting stakeholder reports

British Academy - A New Deal for the North (2017)

CBI - Shaping Regional Infrastructure (2017)

Centre for Cities - Building the Northern Powerhouse - Lessons from the Rhine-Ruhr and Randstad (2016)

Growth Track 360 Prospectus (2018)

Homes for the North - Future Housing Requirements for the North (2017)

Institution of Civil Engineering - Delivering a Northern Infrastructure Strategy (2017)

IPPR North - The Northern Powerhouse in action (2017)

IPPR North - Gateways to the Northern Powerhouse: A northern ports strategy (2016)

IPPR North - Transport for the North: A blueprint for devolving and integrating transport powers in England (2015)

Midlands Connect - Midlands Connect Strategy: Powering the Midlands Engine (2017)

National Infrastructure Commission - Congestion, capacity, carbon: priorities for national infrastructure - Consultation on a National Infrastructure Assessment (2017)

National Infrastructure Commission – High Speed North (2016)

Northern Powerhouse Partnership - Powerhouse 2050: Transforming the North (2017)

Transport Scotland – National Transport Strategy (2016)

Visit Britain – Official Statistics (2017)

Welsh Government - Prosperity for All: the national strategy (2017)



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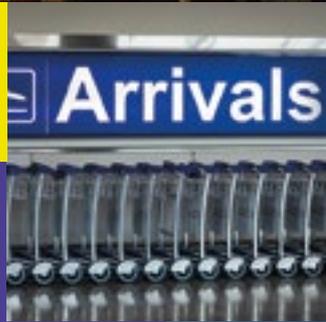
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