




Southern Pennines: Strategic Development Corridor



Strategic Programme Outline Case

March 2019



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Supporting Documents

A standalone Executive Summary has been published separately.

Further detailed evidence is available on TfN's website at:

<https://transportforthenorth.com/>

1 Introduction

Background

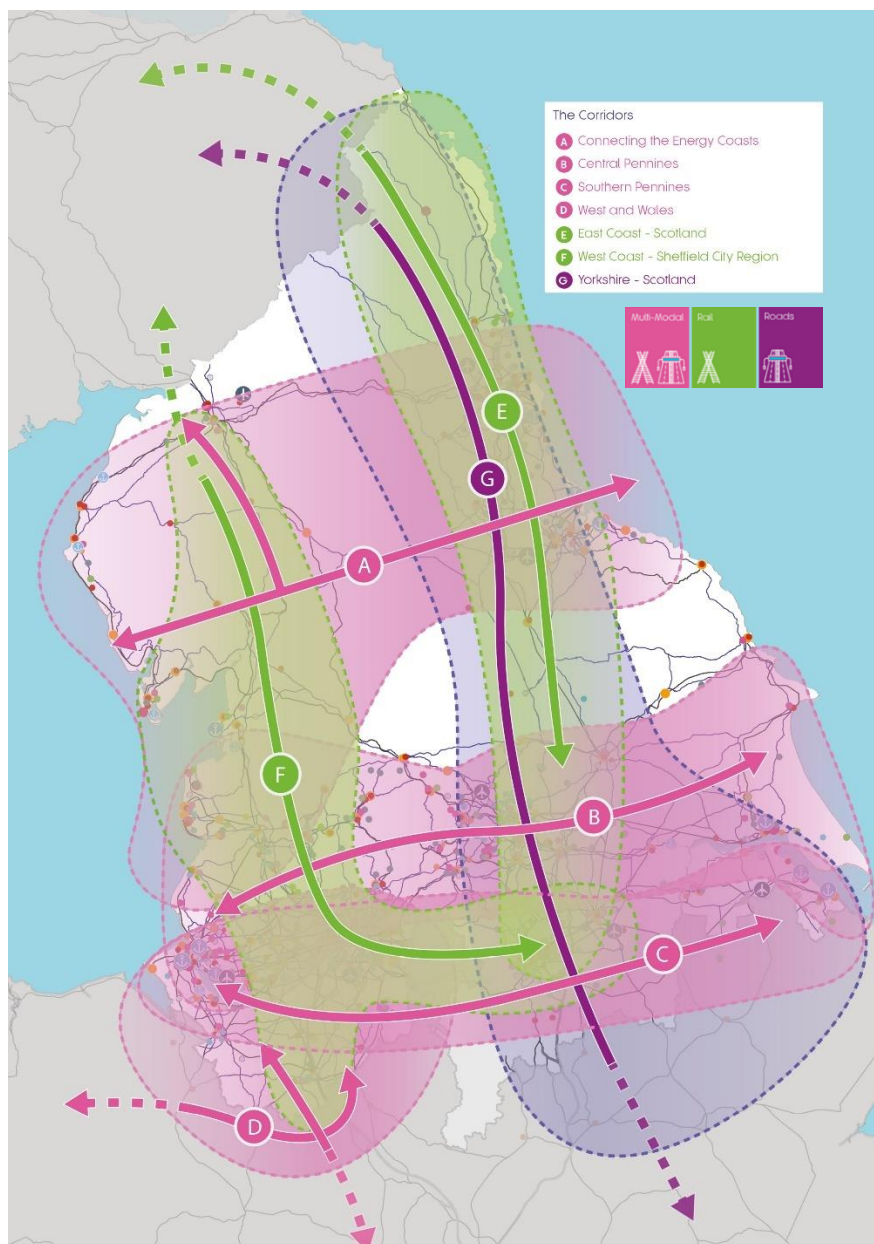
- 1.1 The people of the North are at the heart of the Transport for the North (TfN) Strategic Transport Plan (STP)¹. An effective, efficient Northern transport network is a fundamental part of everyday life – connecting people to jobs, health, education and leisure opportunities, connecting businesses to each other and allowing the efficient movement of goods and services. A transport system that is fit-for-purpose with strong north - south and east - west connections will be the backbone of a strong economy for the North and for the UK.
- 1.2 The STP has a horizon year of 2050 to align with the *Northern Powerhouse Independent Economic Review* (NPIER)² and to enable the development of a long-term transport investment programme for the North. This will mean that TfN and its Partners can work with Government to secure funding to deliver the right schemes in the right place at the right time, providing certainty for local transport authorities to plan complementary investment and also for the private sector to plan commercial investments. The pipeline of investment will give confidence to businesses across the North to invest and grow, give the supply chain, including Small and Medium Enterprises (SMEs), confidence to plan interventions, build up their skills base, and collaborate across industries.
- 1.3 Building on existing and proposed projects, the Strategic Development Corridors (SDCs) represent strategic geographical and economic areas with the strongest potential towards transformational growth in the North. Combining evidence from the 2017 Integrated Rail and Major Roads Reports, the STP identifies seven corridors (see Figure 1) where evidence indicates delivery of transformational growth is dependent on bringing forward major road and rail investment.
- 1.4 These corridors complement Northern Powerhouse Rail (NPR), Integrated and Smart Travel and three Strategic Road studies³, which form part of the reference case for this study. This study specifically seeks to explore the Southern Pennines Strategic Development Corridor (SDC).

¹ Strategic Transport Plan for the North (Final)

² <https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf>

³ Northern Trans Pennine Routes; Manchester North-West Quadrant; Trans Pennine Tunnel

Figure 1: TfN Strategic Development Corridors



Source: TfN Strategic Transport Plan

- 1.5 The SDCs have been developed to represent where most of the largest gaps between demand and performance currently exist, and where there is likely to be the greatest economic potential to improve connectivity and the economic interaction between the existing key economic clusters and assets of the North of England and facilitate potential future clusters in other locations. Investment considered within the context of these corridors is focused on interventions that will benefit the whole of the North. Acknowledging the possibility that locations of demand and investment priorities may change over time with land use decisions and market responses, which will be informed by future iterations of the STP. The study does not consider interventions with a predominantly local impact.

Transport for the North

- 1.6 TfN is the voice of the North of England for transport; a statutory body of elected leaders and a partnership of business leaders from across the whole of the North of England who collectively represent all of the region's 16 million citizens.
- 1.7 Alongside local political Leaders, TfN's Board also has representatives from the national transport bodies (Network Rail, Highways England and HS2 Ltd) and works closely with its neighbours in Wales, Scotland and the Midlands.
- 1.8 TfN's vision is of *"a thriving North of England where world class transport supports sustainable economic growth and improved opportunities for all"*. As England's first Sub-National Transport Body, TfN was established to transform the transport system across the North of England. It has a clear remit to plan the transport infrastructure required to support transformational economic growth in the North.
- 1.9 The statutory powers that have been granted allow and require TfN to:
 - Develop and implement a STP for the North of England.
 - Act as 'one voice' for the North, clearly communicating Pan-Northern priorities to the Secretary of State for Transport.
 - Coordinate and deliver smart ticketing systems across the North.
 - Become a statutory partner in rail and road investment decisions, through the Rail North Partnership and Highways North Board.
 - Oversee (jointly with the Department for Transport) franchised rail services covering Northern and Transpennine Express franchises.
 - Promote highways improvements of Northern significance, with the agreement of Government and relevant highway and local authorities.
 - Decide on capital grants.
- 1.10 Complementing the work of existing local transport authorities and with powers devolved down from central government rather than up from local government, TfN's role is to add value, ensuring that funding and strategic decisions about transport in the North are informed by local knowledge, expertise and requirements.
- 1.11 A vision of a transformed North was set out in the NPIER. 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 improved transport infrastructure and services for passengers and freight.
- 1.12 The NPIER also established that a transformed North could see an additional 850,000 jobs and almost £100 billion additional Gross Value Added (GVA), over and above 'business as usual' trends, by 2050.
- 1.13 It is crucial that the productivity gap which currently holds back growth in the North is reduced, to ensure that all of the North performs as well as the rest of the UK. A step-change in strategic transport infrastructure investment is a vital enabler to achieve the North's economic aspirations –

establishing a value-for-money investment programme, within an ambitious, but realistic, funding envelope, is TfN's primary responsibility.

Definition of Pan-Northern

- 1.14 TfN has gone some way to defining what is meant by the term 'Pan-Northern'. A key component of this is subsidiarity; pursuing governance and decision making at a local level, whilst accounting for the appropriate scale of organisation required to exercise powers at a regional (for example, Pan-Northern) level.

The Definition of Pan-Northern

Why? "Facilitate and enable transformational growth of the economy through improved connectivity for people, businesses and goods to, from and within the North."

How this will be achieved:

- By enhancing the North's major transport networks to operate more efficiently and more reliably and to increase network resilience
- Supporting, informing and influencing present and future land-use development
- Promoting and enhancing the built, historic and natural environment
- Supporting the reduction of transport-related carbon emissions and contributing to improvement of air quality
- Ensuring proposed transport interventions offer value for money
- Improving journey time, quality and choice

- 1.15 It flows from this principle that TfN is the appropriate level at which to take transport decisions impacting across geographies in the North, whilst local authorities are the appropriate level at which to take transport decisions that are contained within a locality in the North and where investment is not necessarily driven by Pan-Northern aspirations. 'Pan-Northern' is a short-hand, encompassing, definition which refers to transport interventions that naturally fit within TfN's remit.

The rationale for Strategic Development Corridors

- 1.16 Interventions considered within the SDC programmes are complementary to ongoing Strategic Road Studies, NPR, and other committed improvements, which are all included within the 'reference case' for this study. Ultimately all interventions identified in this SDC study are aimed at supporting TfN's objectives, including transformational growth in the North. However not every scheme will transform the transport system in its own right. Investment in the SDCs, in addition to the interventions included in the reference case, is required to:
- Maximise/enhance the benefits of reference case interventions

- Distribute the benefits of the North's 'major transformational-infrastructure projects⁴' for example through improving connectivity to the NPR/HS2 gateways
- Achieve early benefits of Pan-Northern transport investment through identifying potential short, medium and long-term interventions within the programme
- Fill gaps in TfN's wider programme, targeted at the corridors where the greatest potential to unlock transformational economic growth and contribute to the other key STP objectives (such as improving efficiency, inclusivity and the environment), has been identified.

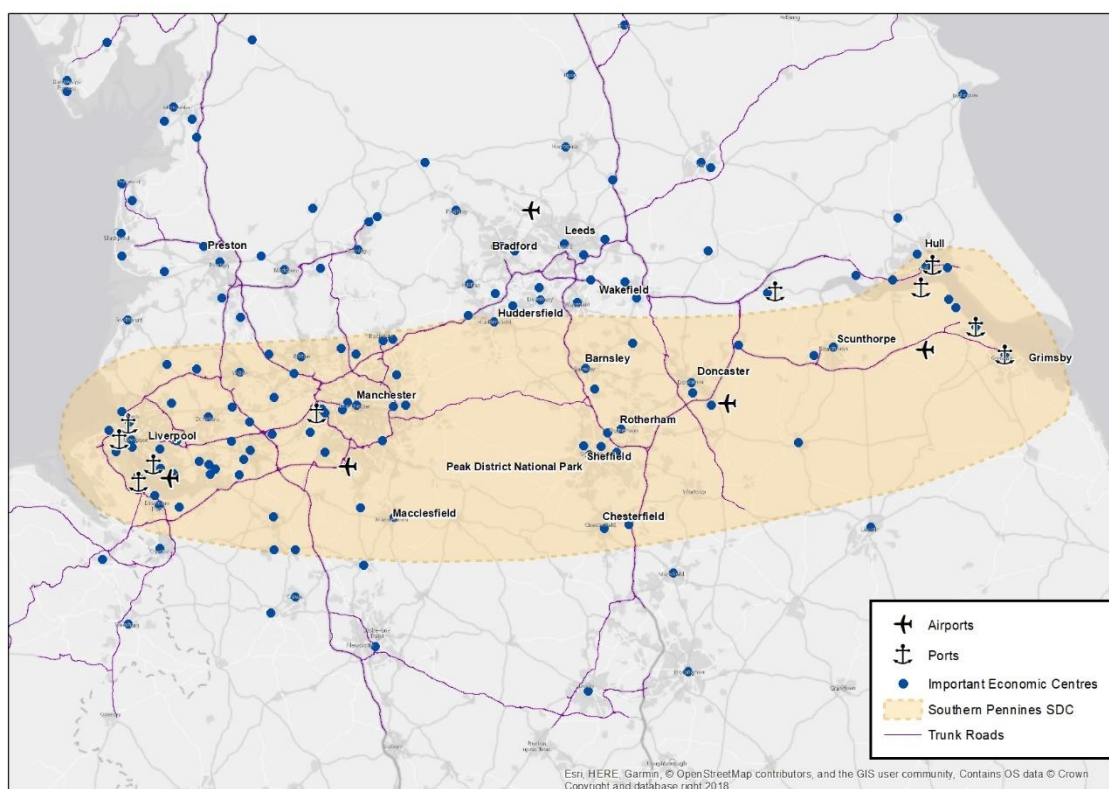
1.17 The SDCs, including technical and overall governance arrangements, have been developed and delivered by partners and stakeholders as detailed in Option Assessment Process and Management Dimension.

The Southern Pennines SDC

- 1.18 The Southern Pennines 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 several international airports. It also provides access to parts of West Yorkshire such as Kirklees, Wakefield and Leeds City Region, and connects North Lincolnshire to Sheffield, Manchester and Liverpool.
- 1.19 This includes physical links to the Midlands, North Wales, and Scotland, as well as through ports to Northern Ireland, the Republic of Ireland, Europe and beyond.
- 1.20 The North's prime and enabling capabilities – as listed in the Northern Powerhouse Independent Economic Review (2016) – are highly represented in this economic area. Figure 2 shows the geography covered by the Southern Pennines SDC and the Important Economic Centres it contains.

⁴ The three ongoing Strategic Road Studies, Northern Powerhouse Rail

Figure 2: Important Economic Centres in the Southern Pennines SDC



- 1.21 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 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.
- 1.22 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. The Health and Life Sciences sectors are also of critical importance for the Liverpool City Region, as with its neighbours across the North West of England, it forms one of three main concentrations of Life Science clusters in the UK.
- 1.23 Within the corridor, freight and logistics connectivity can continue to strengthen the operations and investment at the corridor's ports, airports and inland ports. Enhancing strategic connectivity to the growth plans of the airports, Port Salford, iPort Doncaster 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.
- 1.24 Connectivity between Manchester, Bolton and Preston was also considered within this study. There are emerging economic ties between Lancashire

and the Sheffield City Region in terms of advanced engineering and manufacturing (e.g. at Salmsbury Enterprise Zone).

- 1.25 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 and quality of life from the enhanced strategic connectivity. The Peak District National Park was the UK's first national park. It is a treasured landscape of exceptional natural beauty shaped by the interaction of people and nature over thousands of years. Lying at the heart of the country, surrounded by urban areas, it is easily accessed by the 16 million people living within an hour's drive.

Scope of Strategic Development Corridor SPOC

- 1.26 The TfN SDC business cases have been developed to a level of detail approaching a conventional 'single-scheme' Strategic Outline Business Case (SOBC)⁵, but greater than a Strategic Outline Programme (SOP). To distinguish them from these two documents defined in HM Treasury (HMT) and Department for Transport (DfT) guidance, they have given the description of Strategic Programme Outline Case (SPOC).
- 1.27 HMT public sector business case guidance⁶ describes a Strategic Outline Programme (SOP) Business Case content specified to be appropriate to a programme of interventions, but at an early stage and with a relatively low level of detail, particularly in terms of Value for Money appraisal.
- 1.28 TfN's vision for its SDC business cases is that they demonstrate the justification for a sequenced programme of interventions within the context of the NPIER and transformational economic growth. The business case documents seek funding commitment sufficient to progress development of early sequence interventions and to further refine the overall programme.
- 1.29 It follows that the SDC programme of varied and wide-ranging interventions sequenced over an extended time horizon could not directly follow the above process. However, there are interdependencies and synergies between interventions within and between the SDCs which mean that the case for individual interventions would not represent its contribution to the whole package. For example, an early intervention may not deliver its full potential benefits until later interventions in the programme have been delivered.

⁵ DfT guidance uses SOBC whereas more recent Treasury guidance uses Strategic Outline Case (SOC) for the equivalent development stage for interventions with a single approval

⁶

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/469317/green_book_guidance_public_sector_business_cases_2015_update.pdf (Oct 2015)

- 1.30 Funding approvals for interventions within the SDC programmes will be sought through the UK public sector's staged approach to major investment decisions as shown for transport projects in Figure 3.

Figure 3: The Three Phases of the Decision Making Process



Source: DfT Transport Business Cases

- 1.31 Fundamental to this process is the need for procurement activity to be complete before finalisation of the Full Business Case (FBC) and all required contracts entered shortly after an affirmative final investment decision. Business cases will be developed for interventions within the SDC individually or in packages of interventions sufficiently similar or related that they can be procured together.

Structure of SPOC

- 1.32 The TfN SPOCs have been developed with reference to the HMT Green Book⁷ best practice and DfT transport analysis guidance: WebTAG. The 2018 HMT Green Book requires a public-sector business case to evidence five main 'dimensions' (previously these were known as cases). TfN's SDC SPOCs follow this convention, in being structured as follows:
- An **Introduction** comprising chapter 1
 - The **Strategic Dimension** comprising chapters 2 to 7
 - The **Economic Dimension** comprising chapters 8 to 15
 - The **Financial Dimension** comprising chapters 16 to 18
 - The **Commercial Dimension** comprising chapters 19 to 21
 - The **Management Dimension** comprising chapters 22 to 29
 - **Glossary**
 - **Appendices** which provide supporting detail
- 1.33 Each of the five business case dimensions opens with an explanation of its underlying purpose, followed by the key messages from that dimension. Each of the five dimensions closes with a summary. For the Economic Dimension, the summary is provided in the form of a Value for Money (VfM) statement which follows the approach set out in DfT's VfM Framework⁸ document. Each SPOC is accompanied by a standalone non-technical summary document.

Supporting Documents

- 1.34 A standalone Executive Summary has been published separately.
- 1.35 Passenger rail interventions, which in many cases have impacts which are not contained within the corridor boundaries, have been represented in a separate exercise resulting in the production of a Pan-Northern Rail Report.
- 1.36 Freight interventions (road and rail) have been considered within a separate Freight SPOC.
- 1.37 Further detailed evidence is available on TfN's website at:
<https://transportforthenorth.com/>

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

8

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669041/strategic-case-supplementary-guidance.pdf (December 2017)

Strategic Dimension

The Strategic Dimension of a business case sets out to demonstrate:

- That to achieve rational aims, there are problems that need to be solved and opportunities that need to be taken (the **case for change**)
- That transport investment (including in technology solutions) is an appropriate way to deliver that change and that TfN is the appropriate promoter (the **need for intervention**)
- That an appropriately broad approach has been taken to identifying interventions and a robust approach taken to shortlisting (the **option assessment process**)
- That constraints, interdependencies and the needs/capabilities/views of stakeholders have been identified and taken into consideration in selecting a way forward (the **wider context**)

2 Introduction

Background

- 2.1 The Strategic Dimension sets out the robust **case for change**, which underlies the proposed programme of interventions for the Southern Pennines Strategic Development Corridor (SDC), and how it fits with wider policy objectives. It goes on to summarise the **need for intervention**, which justifies Transport for the North (TfN) promoting strategic transport interventions, drawing this evidence together in identifying a set of **objectives** specific to the SDC.
- 2.2 The Strategic Dimension goes on to explain key elements of the wider context and summarises the process through which an SDC Programme, tested against different levels of demand growth, has been developed.
- 2.3 The Strategic Dimension has been developed with reference to HM Treasury (HMT)⁹ and Department for Transport (DfT)¹⁰ business case guidance. It

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf

has drawn on DfT Supplementary Strategic Case Guidance, with respect to its *Transport Investment Strategy*¹¹ and Rebalancing Toolkit¹².

Policy Context

- 2.4 The UK Government, as well as regional and local authorities, have identified the need for investing in strategic infrastructure to improve the country's productivity and increase economic growth and overall wellbeing in a way that is socially and environmentally responsible. In addition, the need for rebalancing the economy and shifting away from targeting purely 'net national' impacts has become increasingly important.
- 2.5 TfN needs to create an economy that works for everyone and every region has been highlighted in several national, regional and local policies. Infrastructure projects and changes delivered to stimulate the economic development of the Southern Pennines SDC needs to consider these policies to ensure consistency with the wider national framework and other infrastructure initiatives.

National Policy

- 2.6 At a national level, the Government's Industrial and Transport Investment strategies outline the need to actively support the UK's long-term productivity and economic development through strategic infrastructure projects and investments^{13,14}.
- 2.7 The *Industrial Strategy* sets the overall objective of creating an economy that boosts productivity and earning power throughout the entire UK. It identifies five main foundations of productivity:
- Ideas – 'the world's most innovative economy'
 - People – 'good jobs and greater earning power for all'
 - Infrastructure – 'a major upgrade to the UK's infrastructure'
 - Business Environment – 'the best places to start and grow a business'
 - Places – 'prosperous communities across the UK'

¹¹

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669041/strategic-case-supplementary-guidance.pdf (December 2017)

¹²

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf (December 2017)

¹³ HM Government, *UK Industrial Strategy*

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf

¹⁴ Department for Transport, *Transport Investment Strategy* (2017)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/624990/transport-investment-strategy-web.pdf

2.8 Improved infrastructure plays a key role in the Industrial Strategy, as the need for better connectivity to link up people and markets to attract investment has been highlighted. To stimulate more inclusive economic growth through transport investments, the strategy also takes greater account of regional imbalances to ensure that growth can be achieved across all regions in the UK.

2.9 DfT's *Transport Investment Strategy*¹⁵ is closely aligned with the Industrial Strategy. The key objectives of the Transport Investment Strategy are shown in Table 1.

Table 1 DfT's Transport Investment Strategy Objectives

Objective	Challenge
Create a more reliable, less congested, and better-connected transport network that works for the users who rely on it	Current transport networks have become increasingly out-of-date and experience increasing demand, causing delays and less reliability. In many places the transport network does not provide the connections people and businesses need.
Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities	UK productivity lags behind other developed countries and prosperity and benefits haven't been shared evenly between different regions, leaving some communities being left behind.
Enhance the global competitiveness by making Britain a more attractive place to trade and invest	The long-term success in a globalised world will depend on the UK's ability to attract job creating investment, enhance the country's industrial strengths and enhance global trade.
Support the creation of new housing	Transport infrastructure is considered as one of the keys to unlocking development and delivering places people want to live.

2.10 The necessity for improved transport links is also highlighted in the '*Making our Economy Work for Everyone*' report by the Inclusive Growth

¹⁵ Department for Transport, *Transport Investment Strategy* (2017)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/624990/transport-investment-strategy-web.pdf

Commission¹⁶. This report outlines that connecting people to economic assets and opportunities needs to be a key priority to enable inclusive economic growth. The report also states that investment in social infrastructure is required indicating the necessity for building transport and economic connectivity for regions and places which were previously disadvantaged due to poor transport links.

- 2.11 The DfT's Local Transport White Paper: *Creating Growth, Cutting Carbon: Making Sustainable Transport Happen*¹⁷ vision is "...for a transport system that is an engine for economic growth, but one that is also greener and safer and improves quality of life in our communities". The key objectives identified by the White Paper are to encourage economic growth, reduce carbon emissions and encourage the wider objectives of transport (such as more physical activity, improved road safety and air quality). Similar references to socially and environmentally responsible economic growth are included in the UK Industrial Strategy. Guidance from 'The Clean Growth Strategy'¹⁸ (Department for Business, Energy and Industrial Strategy) acknowledges that it is essential to reduce emissions with the lowest possible net cost to UK businesses and maximise the social and economic benefits arising from the change. This is envisaged by accelerating clean growth, improving energy productivity for businesses, promoting the shift to low carbon transport and using innovation in low carbon transport technology and fuels.
- 2.12 The Ministry of Housing, Communities and Local Government's 2018 draft *National Planning and Policy Framework*¹⁹ sets out the need for sustainable development that has three overarching objectives: economic, social and environmental. The framework identifies the need for significant weight to be placed on supporting economic growth and productivity but states that opportunities should be taken to secure net gains across the three objectives.

¹⁶ Inclusive Growth Commission, *Making our Economy Work for Everyone* (2017)
https://www.thersa.org/globalassets/pdfs/reports/rsa_inclusive-growth-commission-final-report-march-2017.pdf

¹⁷ DfT *Local Transport White paper: Creating Growth, Cutting Carbon: Making Sustainable Transport Happen* (2011)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3890/making-sustainable-local-transport-happen-whitepaper.pdf

¹⁸ Ministry for Business, Energy and Industrial Strategy, *The Clean Growth Strategy: Leading the way to a low carbon future* (2017)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf

¹⁹ Ministry of Housing, Communities and Local Government, *draft National Planning and Policy Framework* (2018)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685289/Draft_revised_National_Planning_Policy_Framework.pdf

Regional Policy

- 2.13 At the regional level, the aspiration of improving the country's productivity and economic development through improved transport links is emphasised in different policy documents. The *Strategic Transport Plan (STP)*²⁰ published by TfN in 2018 has a clear vision of "connecting and growing the economy of the North of England". This vision is supported by key Pan-Northern transport objectives:

Figure 4: TfN's Key Pan-Northern Objectives



- 2.14 The STP identifies seven SDCs (based on the 2017 Integrated Rail and Major Roads Reports), including the Southern Pennines SDC, as shown in Chapter 1. These corridors are representative of where evidence indicates delivery of transformational growth is dependent on bringing forward major road and rail investment.
- 2.15 Through the Northern Powerhouse Independent Economic Review (NPIER), transport investment has been shown to be a key enabler for growth in the North's economy. In short, transport has three main roles that can help support the North's existing and future economic assets and clusters:
- 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.

²⁰ Transport for the North, *Strategic Transport Plan* (2018)
https://transportforthenorth.com/wp-content/uploads/TfN-Strategic-Plan_draft_lr.pdf

- Moving goods - supporting businesses to move freight and goods in efficient, multi-modal ways.
- 2.16 Collectively, these three roles provide the key aims of the STP for the North, and will be achieved through improved:
- Connectivity between the North's economic assets and clusters;
 - Multi-modal connectivity improvements;
 - Delivering nationally significant infrastructure projects, major employment and major local development approvals;
 - Cross-border connectivity with the North's economic neighbours; and
 - Supporting the international connectivity of the North.
- 2.17 The STP is closely aligned with the "*One North*" report published in 2014²¹, which first set out the vision for a Northern Powerhouse. One North highlights the need for a new strategic approach to connect the cities of the North to support improvements in economic performance. The outlined approach emphasises the necessity for improving connectivity to maximise economic growth in the North. The STP envisions a highly interconnected and integrated region of thriving cities, acting as a valuable counterweight and complement to London.
- 2.18 The need for better connectivity and closer collaboration in the North is also demonstrated by the NPIER²² published in 2016. The NPIER outlines the performance gap between the North and the rest of the UK with respect to productivity and identifies the lack of agglomeration, poor connectivity and transport links as key factors (among others) that hinder the economic development of the North. The NPIER concludes that improved connectivity between key settlements can help to:
- promote a higher employment rate, by improving access to centres of employment
 - promote higher productivity, by improving access to markets
 - increase the pool of workers available to work in higher productivity urban locations
 - increase the effective scale of cities and the associated benefits of agglomeration
- 2.19 The NPIER set out a bold vision of economic transformation for the North that will rebalance the UK economy and increase international competitiveness. It articulates the vision of a transformed North and concluded that improving economic performance in the North could bring significant benefits for the UK economy by 2050 of:

²¹Transport for the North, *The Northern Powerhouse: One Agenda, One Economy, One North* (2015) <https://www.transportfornorth.com/wp-content/uploads/A-report-on-the-Northern-Transport-Strategy-1.pdf>

²² Transport for the North, *The Northern Powerhouse Independent Economic Review* (2016) <https://transportfornorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf>

- £92 billion (15%) increase in Gross Value Added (GVA) (the measure of the value of goods and services produced in an area, industry or sector of an economy)
 - 850,000 additional jobs
 - 4% higher productivity than in a business as usual scenario.
- 2.20 This uneven development between different regions within the UK and the need for rebalancing the UK economy is also the focus of the 'Rebalancing Toolkit' developed by the DfT²³. This toolkit is designed to help authors of strategic cases assess how a project fits with the objective of spreading growth across the whole country.
- 2.21 The evidence base on the visitor economy and transport demand in the North of England acknowledges that there are positive impacts the visitor economy can have on improving inward investment levels, owing to the increased "attractiveness of place" and that transport connectivity plays a key role since *"the visitor economy both provides demand on the transport network and the provision of the transport network enables growth of the destinations"*²⁴. If supported by the right infrastructure and increasing the ease of connectivity, this will drive an increased demand for services in the North and the airports and ports could make an increased material contribution to international connectivity²⁵.
- 2.22 The Northern Freight and Logistics Report²⁶ identifies the need for better connectivity with respect to freight and logistics. The report sets the out the overall objective: *"Maximise the efficiency of the movement of goods to, from and within the North of England to contribute to the transformation of the economy of the Northern Powerhouse"*.

Southern Pennines SDC Specific Policy

- 2.23 Within the regional areas of the Southern Pennines study area, several strategies and policy documents in the form of Local Transport Plans and Transport Strategies, support the overall goals of improving transport infrastructure, social wellbeing and economic growth.

²³ Department for Transport, *Strategic Case Supplementary Guidance Rebalancing Toolkit* (2017) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf

²⁴Transport for the North, Strategic Transport Plan Evidence Base, *Visitor Economy and Transport Demand in the North of England – Analysis undertaken by Merseytravel* (2019) <https://transportforthenorth.com/wp-content/uploads/Visitor-Economy-and-Transport-Demand-in-the-North-Analysis-min.pdf>

²⁵ Transport for the North, *Independent International Connectivity Commission Report* (2017), https://transportforthenorth.com/wp-content/uploads/International-Connectivity-Report_websafe.pdf

²⁶ Transport for the North, *Northern Freight and Logistics Report* (2018) <https://www.transportforthenorth.com/wp-content/uploads/TfN-Freight-and-Logistics-Report.pdf>

- Objectives highlighted by the Sheffield City Region Transport Strategy 2040 which covers Sheffield, Doncaster, Rotherham and Barnsley and; The West Yorkshire Transport Strategy 2040 covering Wakefield, Kirklees, Bradford, Leeds and Calderdale, highlight the need to support economic growth for these areas, by implementing well-connected transport modes whilst also enhancing social inclusion and health of people within these areas, whilst reducing vehicle emissions for a sustainable future and providing safe and secure transport.
- In addition to supporting economic growth and social wellbeing within the study area, the Transport Plan for the Humber (2018) and The North Lincolnshire Council Transport Strategy 2026 highlight a long-term and sustainable vision for transport for communities within the area, that is safe for the population whom reside and work within the Humber area and which contributes to an overall prosperous environment. This includes developments which facilitate housing development plans such as the Lincolnshire Lakes Development.
- Similarly, the Cheshire East Council Local Transport Plan Final Strategy 2011-2026 aims to ensure a sustainable future by creating conditions for business and economic growth. To ensure a sustainable future in terms of transport, the strategy identifies key transport roles identified as; improving transport connections and accessibility of transport services. Emphasis is made on minimizing the need for travel whilst also ensuring that sustainable transport alternatives are more attractive and efficient for the public, which will ultimately reduce emissions from private car use.
- The Greater Manchester Transport Strategy 2040²⁷ aims to support sustainable economic growth, improve quality of life for area population, protect the environment and develop an innovative city-region. To promote growth for the area, this will need to be achieved by improved connectivity both on a local and pan-northern level with support from a 5-year Delivery Plan²⁸ setting out achievable short-term delivery priorities. Priorities are ranged from transformational investment from HS2 and the East - West rail connections across the North along with more reliable and safer road systems within the area. The overall strategy for 2040 focuses on long-term challenges such as an ageing population, effects of climate change and increasing productivity and reducing poverty and social inequality with the City

²⁷ The Greater Manchester Transport Strategy 2040

https://downloads.ctfassets.net/nv7y93idf4jq/7FiejTsJ68eaa8wQw8MiWw/bc4f3a45f6685148eba2acb618c2424f/03_GM_2040_TS_Full.pdf

²⁸ The Greater Manchester Transport Strategy 2040 Draft Delivery Plan 2020-2025

https://downloads.ctfassets.net/nv7y93idf4jq/5hRlqXwdkyhmDgisGbIrtf/07fc1de5331e68a76b2490d1b9aa54be/190111_Delivery_Plan_2020-2025_Draft_MASTER_final.pdf

region. Effective transport systems are key to support a strong economy for the area both locally and nationally to transfer business and skills, and to encourage active travel which will improve social inclusion and health and wellbeing through integration across different modes of transport.

- The Peak District's Sustainable Transport Action Plan (2012-2017) aims to enhance the use of public transport by maximizing integration between modes of travel. As the Peak District is an area with high volume of tourists, a key objective is to promote walking, strengthen visitor economy for that area by raising awareness of using non-car modes and providing high-quality non-car transport central to visitor experience. Where public transport is accessible, the action plan aims to design transport infrastructure that is sympathetic to the National Park. Investments in key transport initiatives are aimed at achieving a thriving economy that improves the wellbeing of communities and residents.
- In terms of supporting and sustaining economic growth, The Strategic Economic Plan for Leeds City Region²⁹ and the Humber LEP³⁰ include strategies and objectives covering infrastructure, business and economic growth, place and skills resulting in increased productivity. These objectives will be achieved through improved access along key growth corridors including upgrades for rail passengers and freight and through creating areas of growth for transport and infrastructure services for the area. Sustaining economic growth will be achieved through access for businesses to expert support and finance and through multi-modal investments, these will create jobs and allow for new investment opportunities and resulting increase in productivity for the area. Economic support and investment will provide access for skilled workforces and employment opportunities for residents, increasing the proportion of skilled employees will result in benefits for the economy.

- 2.24 The objectives highlighted from these plans and strategies all target improving economic growth, transport infrastructure, social inclusion and wellbeing of the population. By improving transport infrastructure and connections within these areas, this will aid economic growth and social health. These areas will be more accessible in terms of employment, residency and leisure which will also contribute to more sustainable travel.

The Reference Case

- 2.25 The Government is already funding a significant programme of transport interventions across the North. In addition, further investment is being

²⁹ Leeds City Region Strategic Economic Plan 2016-2036 http://investleedscityregion.com/system/files/uploaded_files/SEP-2016-FINAL.pdf

³⁰ Strategic Economic Plan Humber LEP 2014-2020 <http://www.humberlep.org/wp-content/uploads/2014/11/StrategicEconomicPlan.pdf>

planned by both central Government and local bodies. This includes road investment schemes put forward by Highways England, transport schemes developed by combined and local authorities across the North, Pan-Northern schemes such as NPR being developed by TfN, and HS2, led by Central Government.

2.26

2.27 Figure 5 illustrates the HS2 (Phases 1, 2a and 2b) and the Northern Powerhouse Rail (NPR) reference case. Combined, these will transform journey times and service frequencies between the North's largest cities and to London, Birmingham and the Midlands. It is therefore expected that significant investment in new transport infrastructure will be delivered in the coming decades to address connectivity challenges of the current transport system.

Figure 5: Emerging vision for the Northern Powerhouse Rail Network



Source: TfN Strategic Transport Plan

- 2.28 In this context, a Reference Case, considered to be a 'do-minimum' scenario, has been developed by TfN which includes both committed schemes and non-committed strategic interventions that can be reasonably expected to be delivered in the medium and long term and are necessary to achieve the North's economic growth aspirations.
- 2.29 For the purposes of this study, the Transport Appraisal Guidance (WebTAG) definition of reasonably foreseeable has been extended for the SDCs to include any strategic intervention that is at Strategic Outline Business Case (SOBC) stage or equivalent, including interventions without an identified funding route. Post 2027 the reference case includes other work programmes identified by the STP as necessary to achieve the North's economic growth aspirations. For a full list of interventions covered by the reference case for the Southern Pennines SDC, see Table 3.

Table 2 Reference case parameters and assumptions

2020-2027	Post 2027
STP 'baseline investment assumptions' will be included in the Reference Case (already been confirmed by Highways England, Network Rail and DfT as committed).	Reference Case includes other work programmes identified by the STP as necessary to achieve the North's economic growth aspirations; HS2, NPR, Northern Trans-Pennine Routes, Trans Pennine Tunnel & Wider Transport Connectivity Assessment and Manchester North-West Quadrant.
Interventions identified by the SDC consultants and TfN as being 'reasonably foreseeable'.	Reference Case should be developed to ensure a 'do-minimum' standard within the transport model is represented.
WebTAG definition of reasonably foreseeable has been extended for the SDCs to include any strategic intervention that is at SOBC stage or equivalent, including those without an identified funding route.	
Expect to include interventions within Highways England's Road Investment Strategy and Network Rail's Enhancements Delivery Plan	

Table 3 Reference Case: List of interventions (Road/Rail)

Road	Rail
<ul style="list-style-type: none"> • M62 J19/ South Heywood Link Road • M6/ M58 & A49 Wigan Link Road • M58/M6 interchange improvement (short term) • M6 J21A-26 Smart Motorway • Foxdenton - A663 Broadway Link Road • Preston Western Distributor and new M55 J2 • Penwortham Bypass • Transpennine Tunnel (Tunnel option including A628 Tintwistle Bypass, Mottram Moor and A57 Link Roads, Improvements to the M67, Improvements to the A616 from the A628 to the M1) • A6 to M60 Link (SEMMMS Package) • Poynton Relief Road (SEMMMS Package) • M60 J8 to M62 J20 Smart Motorway • Full WGIS (Port Salford Western Gateway Infrastructure Scheme) • M60/ M62/ M66 Simister Island • Manchester North West Quadrant Early Wins • Manchester North West Quadrant Improvements Package • M60 J24-27 & J1-4 • South Manchester HS2 requirements (SEMMMS Package) (including rail elements) • M18 J3 improvement • A1 Redhouse to Darrington • A1 Doncaster Bypass • A630 Parkway widening and M1 J33 improvements • A61 Dualling between A616 and M1 J36 • Warmsworth Dualling • A164 & A164/ A1079 Jocks Lodge Junction Improvement Scheme • A63 Castle Street • A63 Garrison Road Roundabout • M62/ M606 Chain Bar • M621 J1-7 Improvements • East Leeds Orbital Route • M1 Junction 45 Improvement & Temple Green Park-and-Ride • M1/ M62 Lofthouse Interchange • Aire Valley Expansion • M62 junction 27 • M62 junction 28 	<ul style="list-style-type: none"> • HS2 Phases 1,2a and 2b including all station works to accommodate services; • Northern Powerhouse Rail programme; • Network Rail Enhancement Delivery Plan²³ schemes, including: • Transpennine Route Upgrade; • North West Electrification Programme; Committed service frequency and rolling stock enhancements via franchises • Hope Valley capacity (CP5 North of England programme), Midland Main Line Bi-mode Enabling (CP5 Midland Main Line programme); • Sheffield-ECML electrification (GRIP 3); • W12 gauge clearance between Port of Immingham and Doncaster; • Derby to Sheffield Line Speed Improvements Phases 1 and 2 (Passenger Journey Improvement Fund)

- 2.30 The programme of interventions put forward within this Strategic Programme Outline Case (SPOC) has been developed to maximise the overall benefits of the interventions in the Reference Case and to improve the spatial distribution of benefits.

Structure of Strategic Dimension

- 2.31 The remainder of the Strategic Dimension of this SPOC is structured as follows:
- Chapter 3 sets out the Case for Change which is the foundation for the programme of interventions justified within this business case
 - Chapter 4 outlines the Need for Intervention and identifies SDC objectives
 - Chapter 5 explains the wider context with influence on the deliverability of the programme and the interventions within it
 - Chapter 6 summarises the option assessment process which identified interventions within the SDC
 - Chapter 7 summarises the findings of the Strategic Dimension

3 The Case for Change

Introduction

- 3.1 This chapter sets out the Case for Change which underlies the justification for strategic investment in the Southern Pennines development corridor. Fundamentally, transport investment infrastructure is required to support transformational growth in the North which in turn increases the potential for national economic growth.
- 3.2 The Case for Change is based on identifying problems which need to be solved and opportunities which need to be taken to allow and support growth in the North's economy.

Need for growth in the North's economy

- 3.3 The North is home to 515,000 businesses, more than 6.8 million jobs, and over 15 million people, with population growth of 6.7% over the last 20 years.
- 3.4 The North has a wealth of high-profile, growing UK-wide and international businesses, and a long history of innovation, utilising the rich and diverse set of assets and talent to support national growth. Over the last decade businesses and employees across the North have generated an additional £65 billion (25%) to the UK economy. Today the North is the second most productive region in the UK in absolute terms, with a total economic contribution of over £332 billion, 19% of the UK's total.
- 3.5 However, while some individual economies of the city regions of the North have experienced strong economic progress, the North as a region lags behind London and the South East with respect to its economic performance. A significant and widening performance gap between the

North and the rest of the UK has become evident and will continue to grow unless action is taken to reverse this trend.

- 3.6 Investment in transport infrastructure is required to support transformational growth in the North and subsequently increase the potential for national economic growth due to:
- **The size of the North's economy:** being the second most productive region in the UK in absolute terms demonstrates the North's importance to national productivity.
 - **Poor productivity performance:** When considered on a GVA per hour worked basis the North's productivity level is 88% of the UK average. The North also performs poorly when productivity is measured on a GVA per worker or per capita basis and this productivity gap is growing.
 - **A need to invest in and support the NPIER Prime and Enabling Capabilities³¹:** The Capabilities are key differentiators of the North's economy on an international level, which are highly productive and capable of competing on national and international stages. Support for these capabilities is required to achieve the ambition for transformational growth.
 - **Transport infrastructure's contribution to economic growth;** Transport can contribute to achieving transformational growth particularly through agglomeration, labour market expansion, connectivity to global markets and encouraging skills investment.

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

Southern Pennines SDC's contribution to the North's Economy

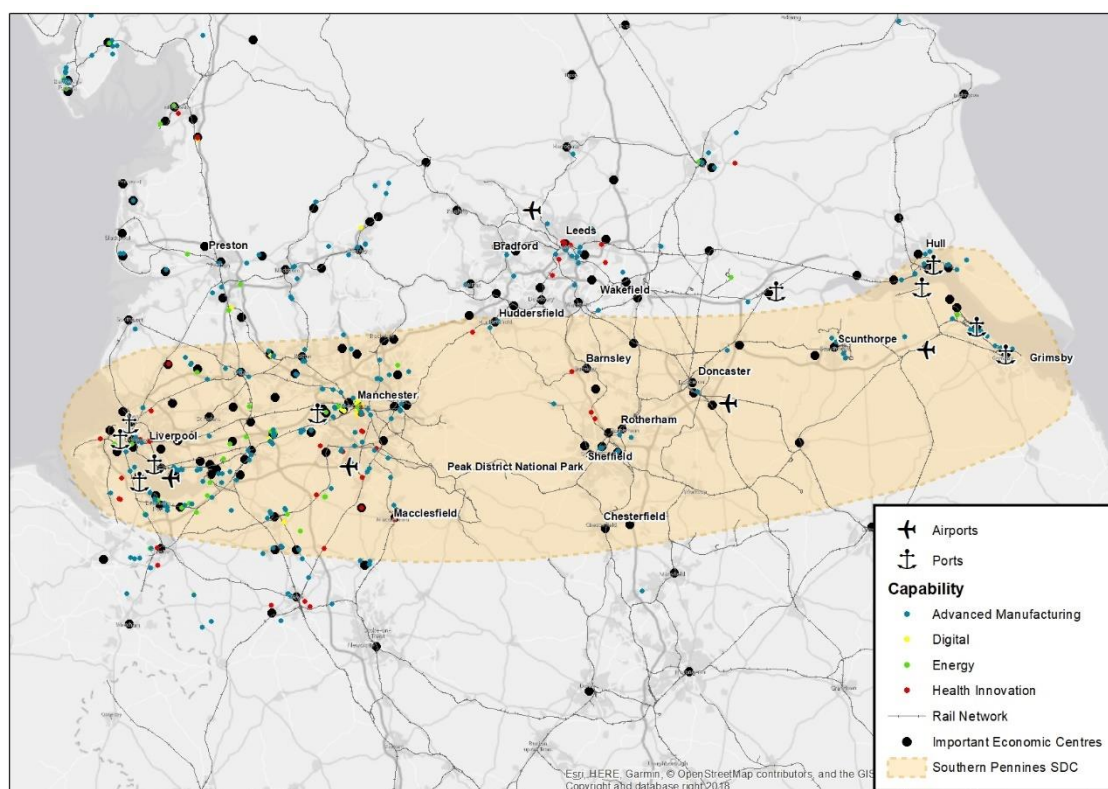
- 3.8 The Southern Pennines corridor provides connectivity between some of the major economic and population centres of the North, including Liverpool, Manchester, Sheffield and Hull, along with major ports, and several international airports. It also provides access to parts of West Yorkshire such as Kirklees, Wakefield and Leeds City Region, and connects North Lincolnshire to Sheffield, Manchester and Liverpool. This includes physical links to the Midlands, North Wales, and Scotland, as well as through ports to Northern Ireland, the Republic of Ireland, Europe and beyond.
- 3.9 Connectivity and transport links between capabilities of the North and key economic centres will play a central role for closing the performance gap in the North and stimulating economic growth. The NPIER has identified several strategic 'prime' and 'enabling' capabilities that are considered to

³¹ The prime and enabling capabilities were identified in the Northern Powerhouse Independent Economic Review (2016). They have been identified as differentiated and distinctive at a Pan-Northern level, highly productive and able to compete at national and international scales. Prime and enabling capabilities are as follows: Advanced Manufacturing, Energy, Health Innovation, Digital, Financial and Professional Services, Logistics, and Education (primarily Higher Education)

have strong potential to contribute to the region's economic development and success.

- 3.10 The existing Important Economic Centres (IECs) have been identified during 2017 based on the STP evidence base (Major Road and Integrated Rail Reports). The map below in Figure 6 of these centres shows how economic activity across the NPIER capabilities is geographically spread across the Southern Pennines SDC, clearly indicating the need for connectivity to facilitate competition, collaboration and specialisation.

Figure 6: Prime Capabilities and IECs in Southern Pennines SDC



- 3.11 The IER identified four areas where the North is highly skilled and globally competitive. These are called 'prime capabilities - promoting, growing and connecting the North's prime capabilities could result in higher productivity:
- Advanced manufacturing – capitalising on the North's industrial heritage and strengths in advanced materials. Manufacturing was worth £46bn in the North in 2014, over a quarter of the UK's total manufacturing output.

- Health innovation - pioneering clinical research and trials particularly in life sciences, cancer and ageing, pharmaceuticals, research and development. The North exported £7.3 billion worth of pharmaceutical products in 2015, accounting for 45% of all medicinal exports from UK.
- Energy - new technologies for energy security, production, distribution, storage, carbon capture, decommissioning and grid management. 31% of the UK's total renewable electricity was generated in the North in 2015.
- Digital - linking digital capabilities such as cognitive computation, simulation/modelling, financial technology, cyber security, high performance computing, data analytics (big data), and strengths in media. The North is home to seven of the UK's 27 key tech clusters.

3.12 The prime capabilities are supported by three 'enabling capabilities':

- Education (particularly higher education providing research capability and technical expertise for supplying skilled labour and export strengths);
- Financial & Professional Services (key business, legal, insurance and financial services); and
- Logistics.

3.13 Currently, areas in the Southern Pennines SDC such as Yorkshire and the Humber and the North West regions have seen around a 1.6% increase in total employees from 2016 to 2017, which is a continuing trend.

3.14 The private sector industry is also on the rise, with employment in the Southern Pennines region increasing by approximately 2.2% year on year.

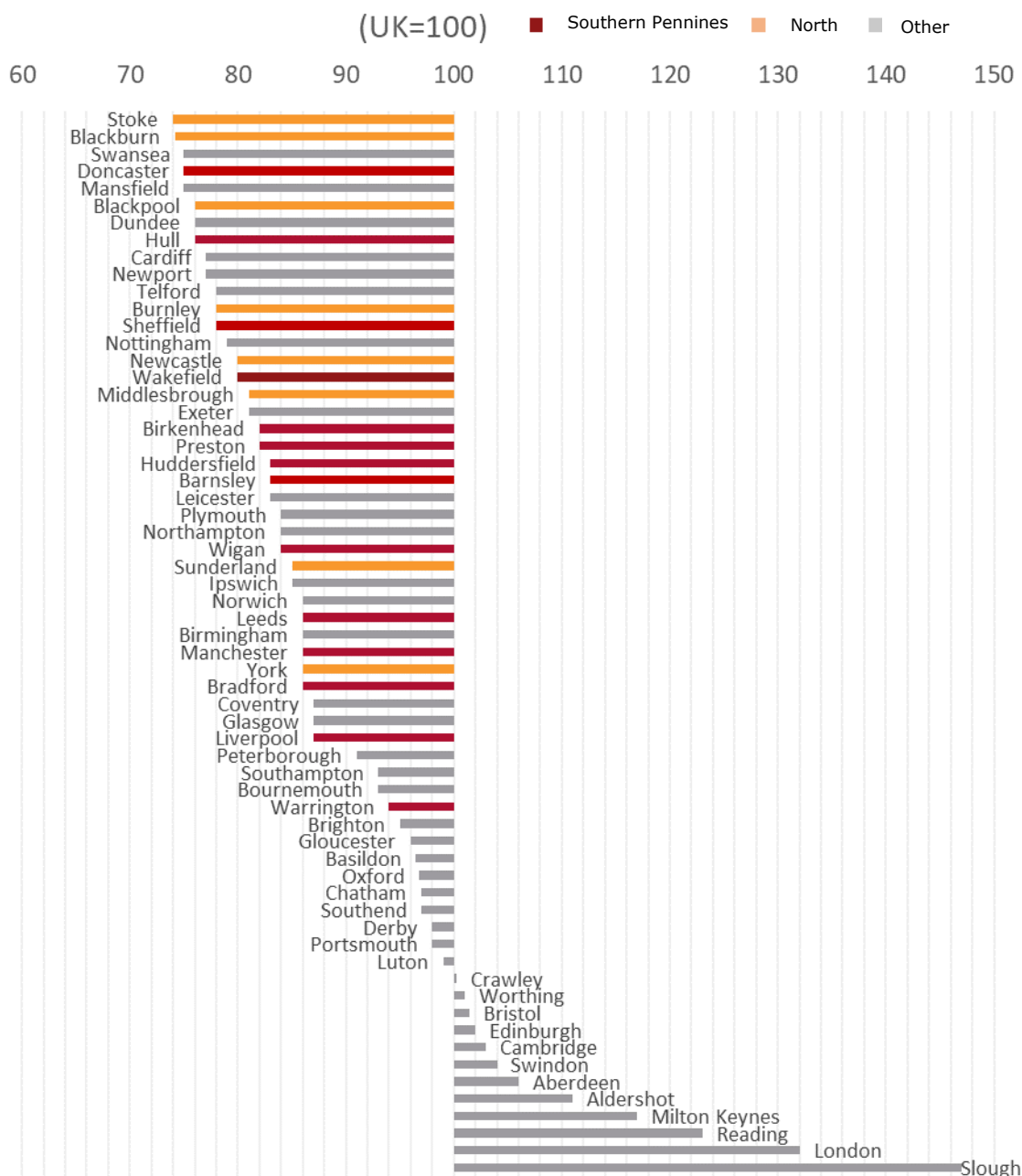
3.15 The corridor is home to globally significant businesses, supply chains and economic assets with major sector representation and international competitive advantages in advanced manufacturing, low-carbon/energy and logistics, including the Energy Estuary in Hull and the Humber. Advanced manufacturing is a 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.

3.16 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. All these significant opportunities transcend to an additional 390,000 jobs compared to 'business as usual' expected in 2050.

3.17 The Independent Economic Review (IER) demonstrated that there is a gap in the North's prosperity and productivity (that is, a performance 'gap', measured by GVA per capita) that is persistent and entrenched, being consistently 25% below the rest of England average and around 10-15% below the average when London is excluded. Considering the relative

productivity of the major centres in the North of England it can be seen in Figure 7 that many of those which are under performing are located in the Southern Pennines SDC.

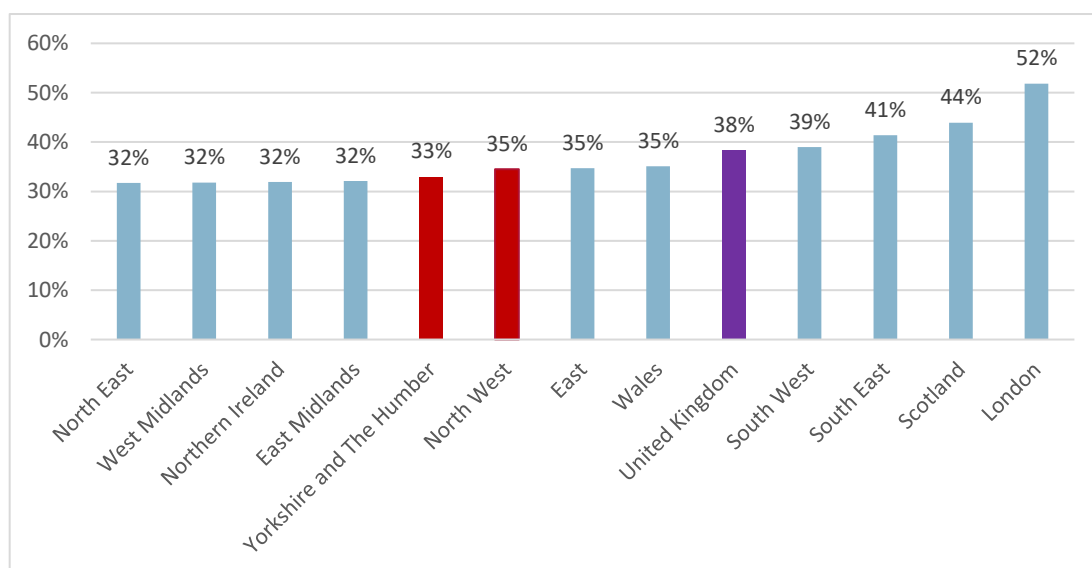
Figure 7: Relative Productivity of major centres within the Southern Pennines SDC, North of England and other parts of the UK (GVA per head index 2015)³²



³² Source: Author's analysis of Centre for Cities, the role of place in the UK's productivity performance, 2-17, productivity performance based on 2015 ONS data (GVA per head index) Southern Pennines cities highlighted in red and other North of England cities highlighted in orange.

- 3.18 While the employment gap is likely to be the result of large numbers of people becoming detached from the labour market as they are not able to find the right job opportunities for them³³, the skills gap is likely to be the outcome of both demand and supply dimensions. From a demand perspective, low educational attainment (especially among younger cohorts) and low employment rates are the key factors contributing to a limited pool of talent that employers can access. From a supply perspective, limited job prospects and an insufficiently dynamic economy to attract and retain higher-skilled workers are critical aspects that influence the attraction and retention of talent.
- 3.19 This is reflected in the proportion of working age population with high levels of qualifications, which is below the UK average in Yorkshire and the Humber and the North West and significantly below London, the South East and Scotland. All these factors play a key role in the development of the labour market³⁴.

Figure 8: Proportion of working age population with NVQA+ qualifications in 2017³⁵



- 3.20 An analysis of UK skills demand demonstrates that the North West is one of the regions with the highest numbers of job vacancies in the UK, according to analysis from the UK Visa Bureau's 'UK Shortage Occupations List' by Small Business Prices, which is in accordance with the findings of the IER. The North West has particularly high demand for financial sector jobs, directors and CEOs, nurses, social workers, mechanical engineers and welding professionals. This suggests that improving access to jobs from areas with fewer vacancies (such as Yorkshire and the Humber) and attracting talent are key priority areas to improve the functioning of labour

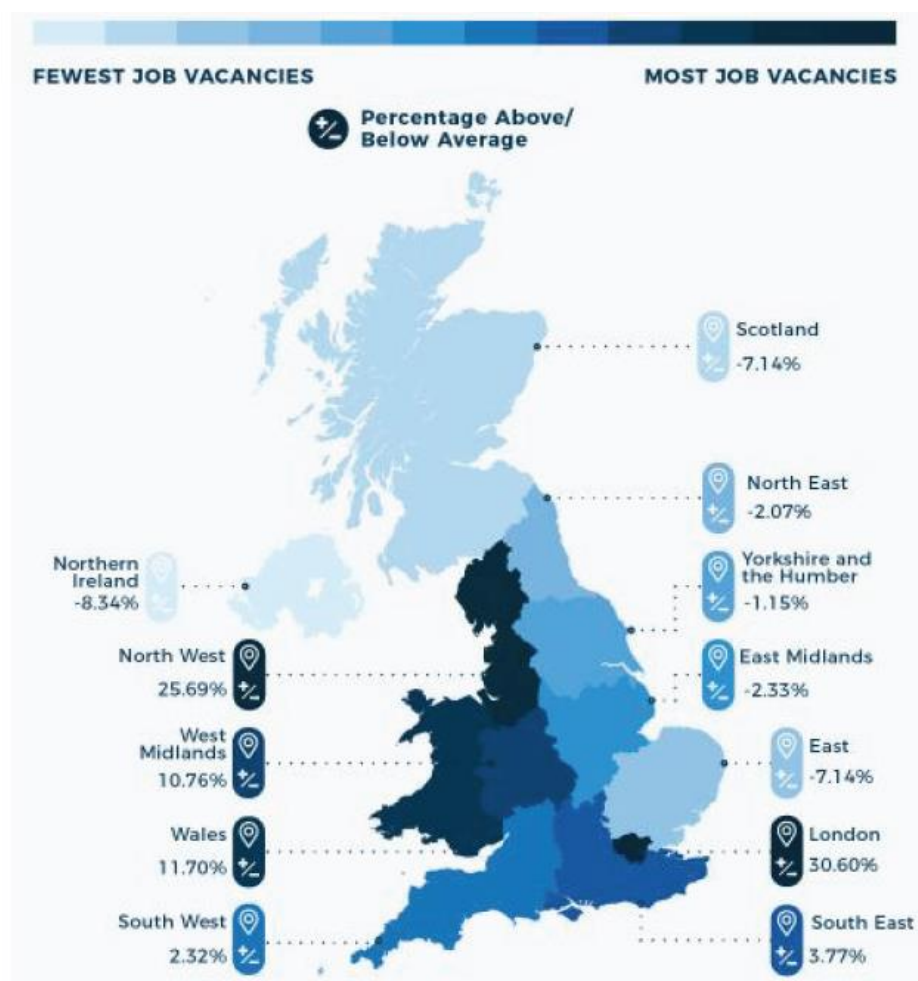
³³ Transport for the North, the Northern Powerhouse Economic Review (2016)

³⁴ Transport for the North, the Northern Powerhouse Economic Review (2016)

³⁵ Annual Population Survey (December 2017 data)

markets across the Southern Pennines SDC. The areas of labour demand is also shown in the figure below, which reflects that outside of London the highest proportion of job vacancies is in the North West.

Figure 9: Skills demand UK by region³⁶



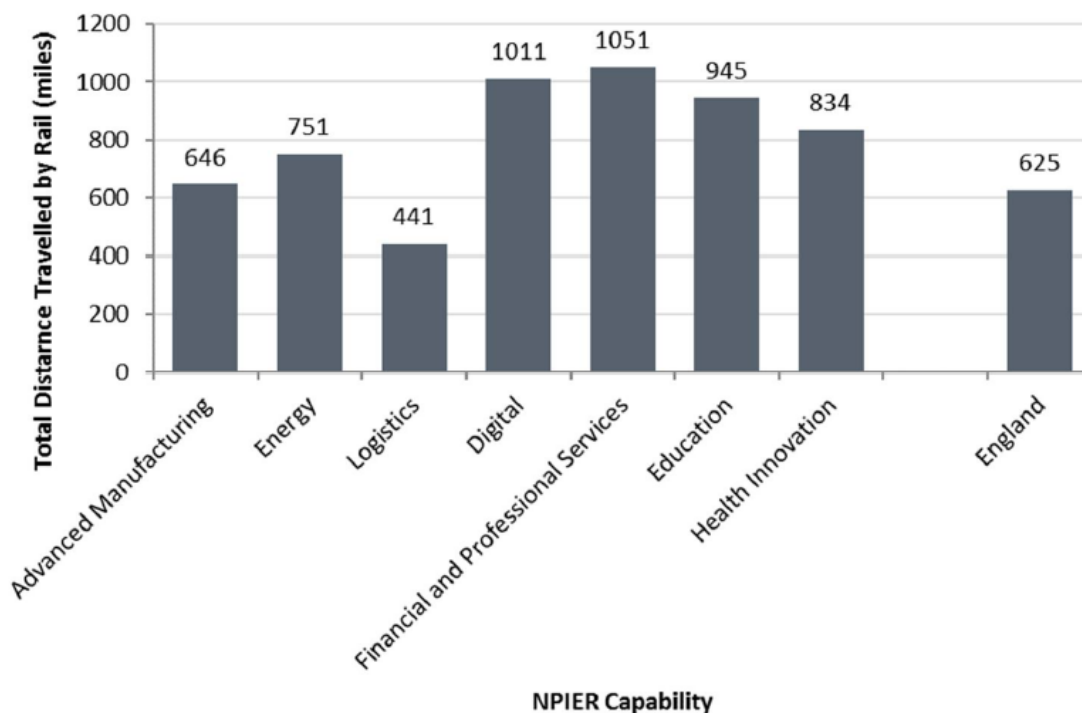
3.21 These are services or skills that provide the expertise and support for the North's economy to flourish, as well as significant generators of travel demand:

- Workers within each of the seven capabilities have distinctive travel patterns, in part a result of the different geographies and occupational breakdowns within each capability, but also because of the different mix of people who work in each capability.
- Since those employed in the four prime and three enabling IER capabilities are typically more highly skilled, better qualified and in higher occupational groups, they would be expected to have a greater propensity to travel, especially by rail.
- Similar trends can be observed in terms of total distance travelled. Workers within all IER capabilities travel greater distances than the

³⁶ Source: <http://smallbusinessprices.co.uk/uk-skills-shortages/>

England average, with those in the digital, financial and professional and educational capabilities travelling the greatest distances. Notably, workers within Finance and Professional Services travel 65% further by rail than the England average.

Figure 10: Weighted average total distance travelled by rail per person per year by NPIER Capability in England³⁷



- 3.22 The four “Prime” capabilities and three “Enabling” capabilities, collectively represent approximately 30% of all jobs in the North and over 35% of GVA.
- 3.23 In a ‘transformed future’ scenario, the Northern economy would become more productive, partly through increasing the skills of its workforce and lowering levels of economic inactivity - both these factors are associated with an increased propensity to travel. All other things being equal, increased productivity would therefore be expected to lead to marked changes in both the travel patterns of individuals and aggregate patterns across the entire North.
- 3.24 East - West connectivity will need to be transformed in order to support the forecasted economic and population growth. Within the corridor, freight and logistics connectivity can continue to strengthen the operations and investment at the corridor’s ports, airports and inland ports. Enhancing strategic connectivity to the growth plans of the airports, Port Salford, iPort in Doncaster and the Ports of Liverpool and the Humber can have associated economic growth benefits along the corridor and the wider

³⁷ Source: Analysis of National Travel Survey (2013) and Business Register and Employment Survey (2015) data

Northern economy. Grimsby and Immingham ports are the busiest in the UK by combined freight tonnage.

- 3.25 Connectivity between Manchester, Bolton and Preston has also been considered. There are emerging economic ties between Lancashire and the Sheffield City Region in terms of advanced engineering and manufacturing (e.g. at Salmsbury Enterprise Zone).
- 3.26 Investment in the Southern Pennines corridor will also need to be sensitive to environmental and sustainability considerations, particularly those affecting the Peak District National Park, as well as identifying the visitor economy benefits and quality of life from the enhanced strategic connectivity.

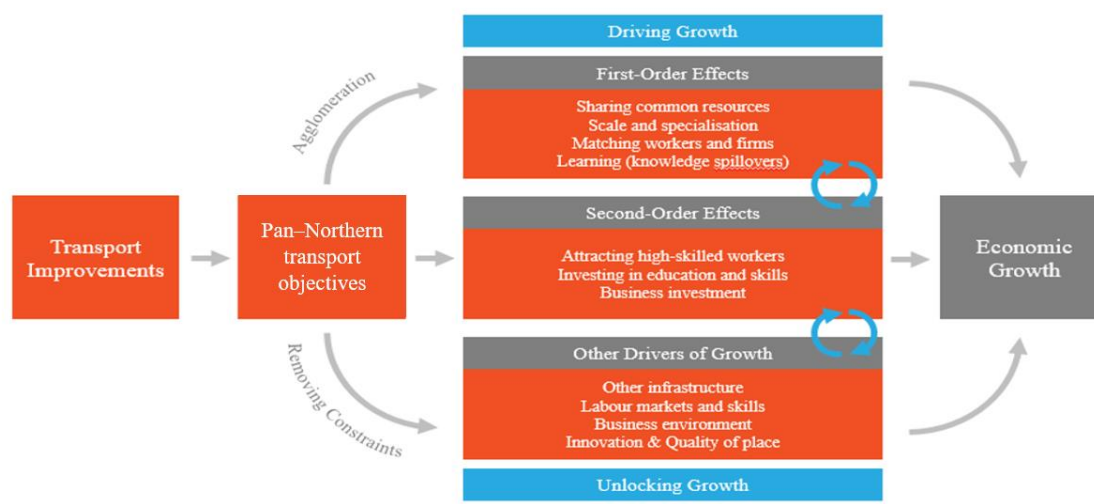
Transport's influence on economic growth

- 3.27 Better connections at a Pan-Northern level, particularly connections between the North's existing and future economic assets, will help provide the conditions in which jobs can be created and growth achieved. To realise the benefits of agglomeration, the North requires its networks of railways, roads and also the main inland waterways, to provide effective, resilient and reliable connections. These connections should meet standards of journey time and frequency set by the North. Sufficient capacity will also be required to accommodate the increased passenger and freight travel demand that growth will bring.
- 3.28 The work undertaken by the NPIER highlighted that transport connectivity is a key enabler of economic growth. This is true for the North of England, as research shows that the key growth sectors cluster in its city centres. Better transport connectivity is important because:
- Investment in skills is more likely to occur where there is access to well-paid jobs and training
 - Foreign investors are more likely to be attracted to locations that are well connected to global markets and which have access to a well-qualified workforce
 - Firms are more likely to specialise and innovate in areas with deep and extensive labour markets
 - Firms can start to cluster and agglomerate more effectively
- 3.29 Overall, the impacts of transport are wide-ranging and can be grouped into three types: user benefits, productivity, and investment and employment impacts³⁸. A logic chain showing how investment in transport infrastructure could flow through to wider economic impacts in the North is shown as Figure 11.

³⁸ Anthony J. Venables et al., *Transport investment and economic performance: Implications for project appraisal* (2014)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/386126/TIEP_Report.pdf

- 3.30 Investment in transport benefits both rail passengers and all road users, as well as industry. The forecast growth within the NPIER shows an increase in road and rail usage. This also links to the road and rail freight moved within and out of the North. The key increases in freight flows are currently north - south routes. Additional investment in east - west connectivity would bring opportunities for more people and goods to be moved in those directions and growth in traffic through Northern ports which could see growth in containers and construction goods being moved around the North generating warehousing and processing capability. Close working with the private sector and our partners will be required to see progress made.
- 3.31 Improving transport connectivity in the North of England (both between and within cities) and to/from North Wales will support and enable growth in the key growth sectors and their high value jobs by bringing towns, cities and economic centres across the North closer together, creating the agglomeration benefits of a much larger, single economy.

Figure 11: Transport interventions and economic performance



Source: Adapted from frontier economics: Assessing the productivity benefits of improving inter-city connectivity in Northern England (2016), Figure 2.

- 3.32 Markedly improved Pan-Northern connectivity is required to facilitate the development of bigger and more agglomerated labour markets across the North. Closing the transport investment gap will help to address connectivity issues, especially between cities.

Transport Baseline

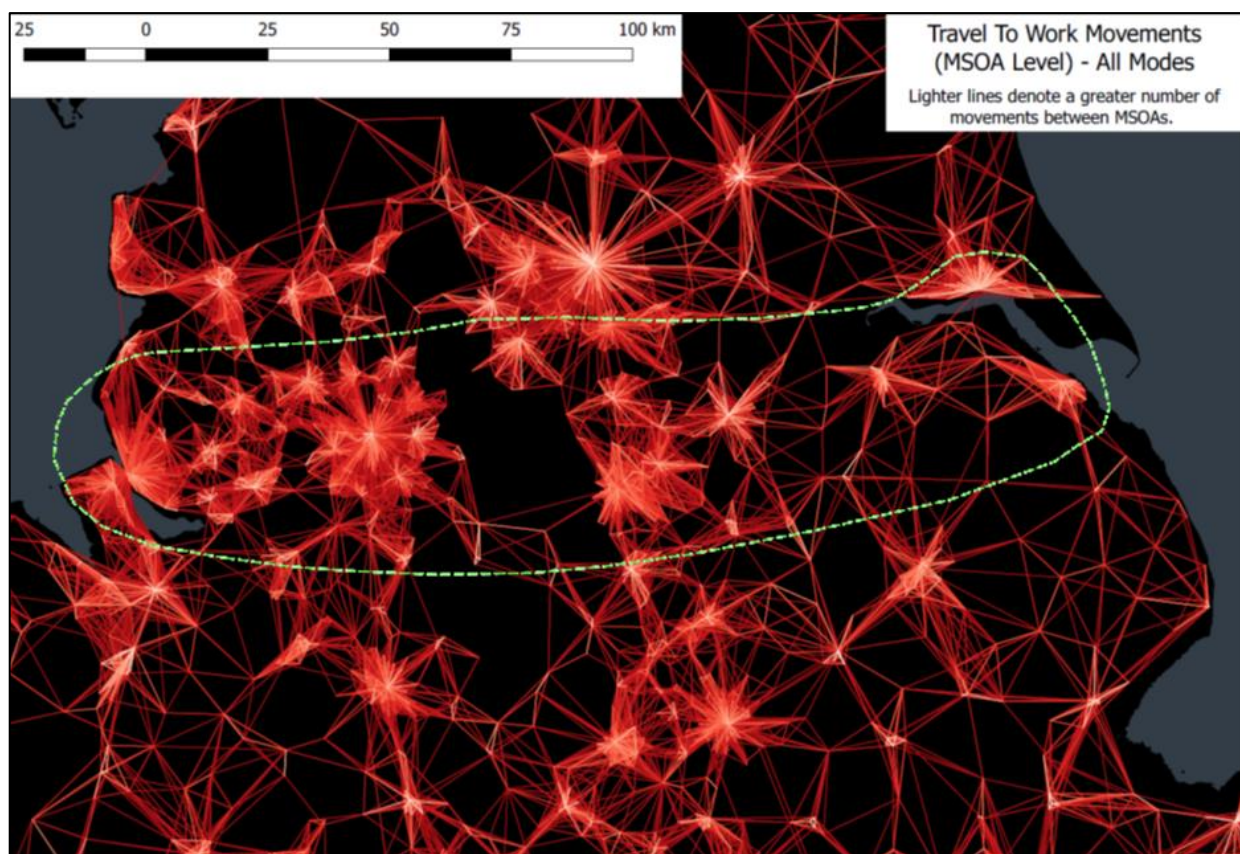
Highway Network

- 3.33 The Major Roads Report (MRR) was produced in 2016 as part of the evidence to support the STP. As part of that process, a Major Road Network (MRN) was defined, encompassing the existing Strategic Road Network (SRN), as well as key connections between Important Economic Centres on local authority-controlled roads. It was defined with the objective of improving the performance and resilience of the network across multiple

authority boundaries and was subject to rigorous consultation with partners before being ratified at TfN's Partnership Board.

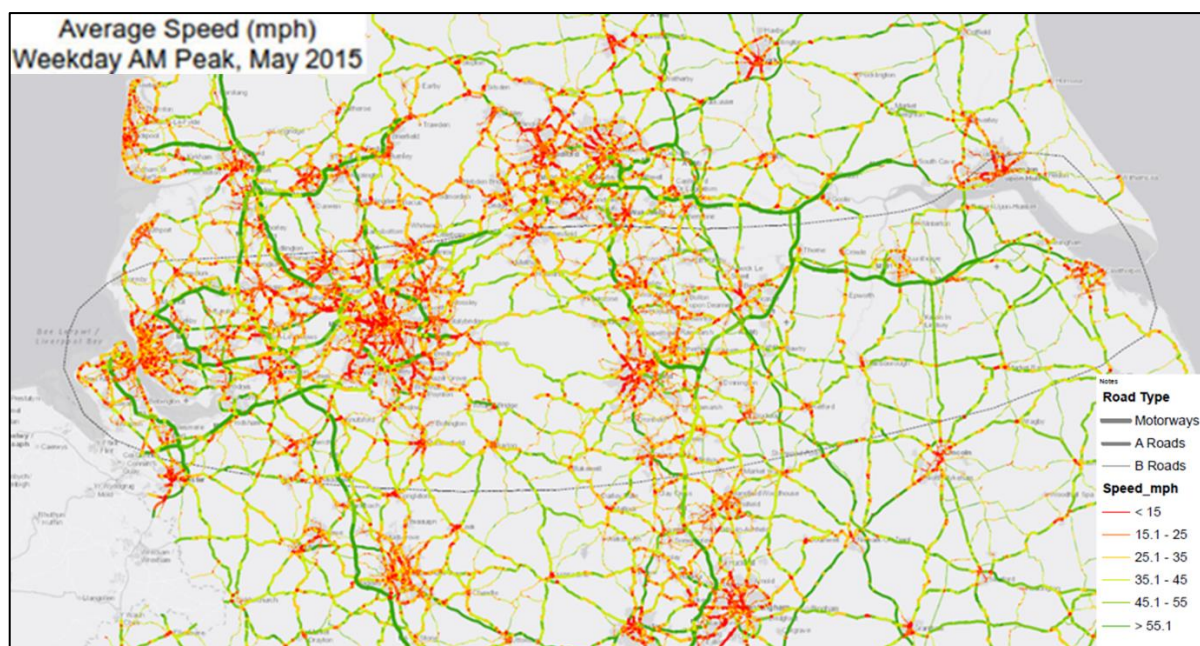
- 3.34 Based on NPIER and current clusters of economic activity in the North, the MRN connects approximately 200 Important Economic Centres across the North, including towns, cities, ports, airports, enterprise zones, universities and other key employment sites. It will not be a 'fixed network', but a network that will adapt as the North's economy itself develops and progresses ahead.
- 3.35 The key movements of commuter patterns are seen towards the major settlements such as Greater Manchester, Leeds City region and Liverpool City Region. The M1 provides a spine for road travel along the north-south length of the corridor, taking in towns and cities such as Leeds, Wakefield, Barnsley, Sheffield and Nottingham. A similar north-south axis can be seen on the western side of the Pennines, where the M6 and M61 provide key strategic routes. A key movement within this corridor is seen between Greater Manchester and Liverpool City Region.
- 3.36 There are significant number of intra-area trips within Greater Manchester, such as from Manchester to Stockport, Wigan, Bolton and Oldham.
- 3.37 Intra-area trips also form key movements in Sheffield City Region, between Sheffield, Rotherham, Doncaster and Barnsley. A cluster of commuting movements can also be seen in the Humber LEP area.
- 3.38 Travel to work within the Southern Pennines area are shown in the Figure 12, including trips by the road and rail network.

Figure 12: Travel to Work movements -All Modes (2011 Census Data)



- 3.39 Much of the MRN for the North, is currently operating at or close to capacity during peak periods. Average inter-urban speeds between important economic centres are low, typically less than 30 mph during peak periods, and below 40 mph during inter peak periods in the Corridor as seen in Figure 13.

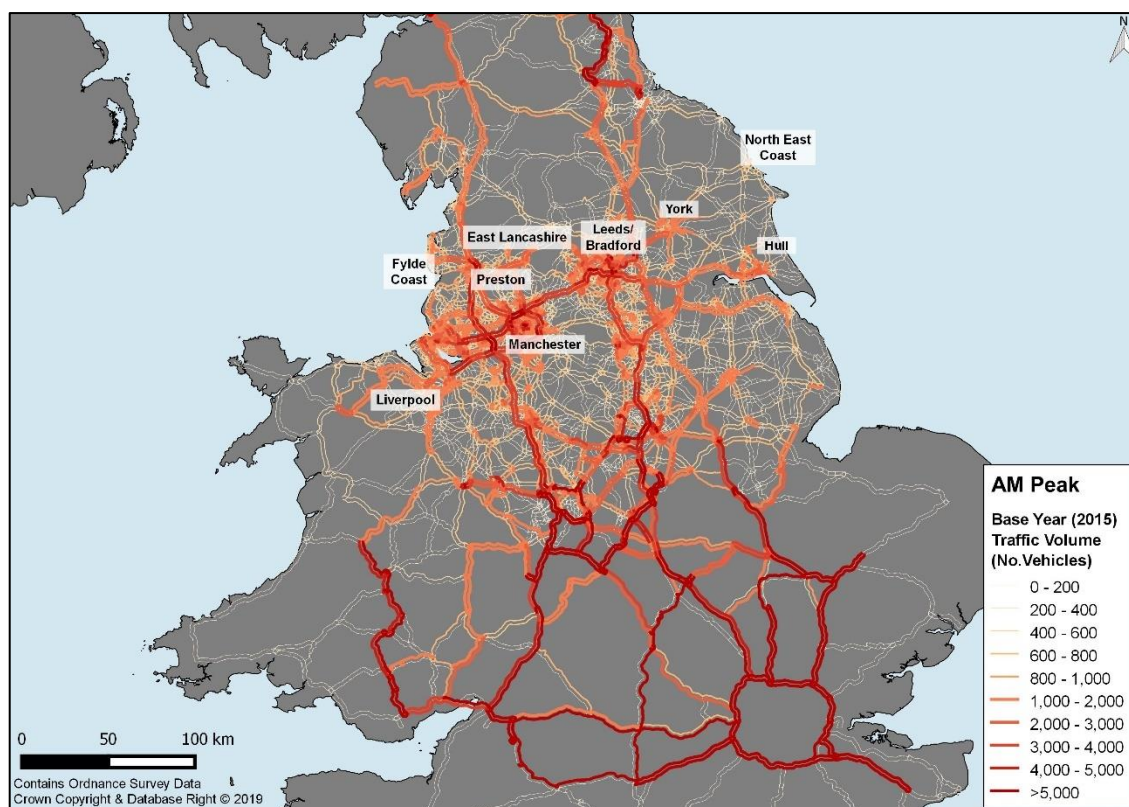
Figure 13: Average Road Speeds³⁹



- 3.40 The M62 is the only continuous east - west dual carriageway road across the North, carrying half of all trans-Pennine traffic. The M62 will continue to have a central role in supporting future East - west movements and the realisation of transformational and local growth opportunities. The ability of the Northern Powerhouse to work together as one and generate the benefits for the whole of the UK is currently heavily dependent on the successful operation of just one road subject to a high risk of closures in winters. Even where North - South links have helped establish a recognisable economic spine such as the M1 and A1/A1(M)/A19, current and emerging pressures in terms of efficiency, reliability and resilience are evident, and constraining potential growth.
- 3.41 The key routes of the north's network are shown to have certain points of Daily Traffic volumes exceeding 2,000 vehicles as seen in the Figure 14 below.

³⁹ Source: DfT Trafficmaster Data – average road speeds (mph) for the weekday morning peak (May 2015)

Figure 14: Daily Traffic Volumes⁴⁰ on the TfN Major Road Network



- 3.42 Highways England's commercial research into the role of the SRN notes that three of the top 20 developments adjacent to the SRN in England between 2014 and 2016 were in a very focussed area of the North West: Omega on the M62 in Warrington, Airport City (World Logistics Hub) and at Logistics North on the M61 in Bolton, all of which benefit from connectivity to Manchester Airport (the predominant source of airfreight in the North⁴¹) and the Port of Liverpool.
- 3.43 Looking elsewhere across the North, Partners such as the Sheffield City Region are supporting enhanced connectivity to the Humber Ports to build on the established links via the M1 and the M18 to the specialist freight hub of East Midlands Airport for the very same reason. Easily accessible locations to major roads and container ports are key to supporting the Sheffield City Region's ambition for logistics, building on existing investment by the likes of Aldi and ASOS in the Dearne Valley and Markham Vale to the south.
- 3.44 Between Greater Manchester and the Sheffield City Region, the SRN consists of largely single carriageway roads (A57/A628/A616/A6102)

⁴⁰ Source: Highways England's Trans-Pennine South Regional Highway Model

⁴¹ <https://www.transportforthenorth.com/wp-content/uploads/TfN-Freight-and-Logistics-Report.pdf>

through the middle of the Peak District National Park, taking almost 90 minutes through one of the country's most valued habitats and landscapes.

- 3.45 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.
- 3.46 TfN is working with Highways England, Department for Transport and local TfN partners on identifying a shorter tunnel option as well as looking at wider connectivity across the Southern Pennines SDC. This includes ensuring that the road connectivity improvements would be an exemplar scheme involving environmental enhancements to benefit the Peak District National Park. A similar approach towards various other corridors have been taken to ensure potential for a robust and sustainable list of interventions to be developed for the future.
- 3.47 It should be acknowledged that both the Transpennine Upgrade Programme and all the interventions included in the Southern Pennines SOP are at an early stage of development. Further assessment of all interventions will be firmly controlled by government guidance on scheme appraisal, including the consideration of environmental impacts.

Passenger Rail Network

- 3.48 The East Coast and West Coast Main Lines transect the Southern Pennines corridor, providing North - South connectivity between the area and key centres across the UK. To the west, the WCML connects Crewe to Preston, with spurs to Manchester and Liverpool. To the east, the ECML connects Grantham to York, with a spur westward toward Leeds. In addition, the Midland Main Line (MML) provides North - South connectivity through Derby to Sheffield.
- 3.49 Aside from the main lines, there are a number of key east-west routes, which provide connectivity between the major stations across the corridor. The Chat Moss, The Cheshire Lines Committee (CLC), Mid -Cheshire and 'Bolton corridor' routes connect Liverpool, Chester and Preston to Manchester and stations on the WCML, as well as serving intermediate markets. To the east of the corridor, principal routes include Leeds – Hull via Selby, Doncaster – Hull via Goole, Doncaster – Grimsby/Cleethorpes via Scunthorpe (which also provides direct connectivity between North and North East Lincs and Manchester Airport) and Sheffield – Lincoln via Worksop.
- 3.50 The western and eastern sides of the corridor are connected via two primary routes across the Pennines. To the north, the north Transpennine corridor connects Manchester and Leeds via Huddersfield and the Calder Valley connects east Lancashire and West Yorkshire via Todmorden and Hebden Bridge. Further south, the Hope Valley route connects Manchester to Sheffield via Stockport.

- 3.51 As is the case with the wider North, rail journey times and service frequencies vary considerably across the rail network in the corridor. Certain journeys, particularly those operating via the East Coast, West Coast and Midland Main Lines, achieve high average speeds, which are competitive with private car travel between urban centres. Others are much slower, with some average speeds below 40mph, even between larger economic centres. This is a result of a number of factors, including infrastructure capability, rolling stock characteristics and the number of intermediate station calls.
- 3.52 The North currently has a modal share for rail for commuting of 3.4%, defined both in terms of residence and workplace. Whilst this is comparable with the rest of England outside of London and the South East, and potentially masks concentrations of the higher rail modal share on key routes to/from for journeys to the North's larger urban centres, but indicates that overall, a relatively small proportion of the North's population use rail to commute, and that there is significant scope for rail to increase its share of the market as the economy grows.
- 3.53 There is currently a disparity between north - south and east - west passenger rail connectivity in the North of England. Those services which utilise the East Coast, West Coast and Midland Main Lines for some or all of their journey tend to be significantly quicker than those operating across east - west corridors such as the North Trans Pennine, Hope Valley, Tyne Valley or Calder Valley routes.
- 3.54 Some major Northern cities such as Bradford and Hull lack direct connectivity to other major cities, such as Birmingham and others have no direct link to London.
- 3.55 It is important to the North that its businesses can readily access important suppliers, markets and collaborators beyond the North of England, particularly in key centres such as London, Edinburgh and Birmingham, as well as Economic Centres such as Cambridge.

Figure 15: Intercity and Interurban Services Average Speed Map



- 3.56 HS2 Phases 1 and 2a will provide a step-change in north - south connectivity once completed in 2026/27. The scheme will deliver a dedicated high-speed railway line between London and Crewe, with high speed services running on the 'conventional' rail network to Liverpool, Manchester and further north on the West Coast Main Line. HS2 Phases 1 and 2a will significantly reduce journey times and increase capacity between cities in the North of England, Birmingham and London.
- 3.57 Current proposals for Phase 2b of HS2, intended for completion in 2033, will extend the dedicated high-speed line from Crewe to Manchester via Manchester Airport, as well as create a further line which will link Leeds and Sheffield to London via the East and West Midlands. A link to the East Coast Main Line at York will allow high speed services to serve destinations north of York, including Darlington, Durham and Newcastle.
- 3.58 Connectivity between the North's centres, in terms of passenger service frequencies and journey times, is too often poor, extending the perceived distance between centres and acting as a barrier to travel. Issues such as overcrowding and poor on-board facilities can make rail travel unproductive, effectively removing one of rail's key advantages over other modes.
- 3.59 Direct rail connectivity to some leisure destinations is currently poor – for example there are often no direct rail services between coastal centres and potential sources of visitors in major population centres in the North and elsewhere.
- 3.60 Where services do exist, timetables and capacity provision are not always aligned to seasonal demand patterns and special events, with evidence of overcrowding at key times. Facilities on-board trains serving tourist destinations are not always well-suited to the needs of groups and families, nor those with luggage, where storage space can be limited. Infrequent services and slow journey times, particularly on routes which could serve as a gateway to National Parks and rural destinations, present a further barrier to rail travel.
- 3.61 Currently, rail service provision from economic centres to their catchments in the evening is inconsistent. There are some good examples of connectivity in the evening, but there are also examples of last departures earlier than 10pm, particularly on Sundays. First arrival times on Sundays can also be poor in some cases, and certain lines are closed entirely, preventing any services from operating. Additionally, a few open lines are void of any passenger services and in certain cases this is expected to continue into the next franchise. Investment in service improvements committed in the Northern and TransPennine Express franchises will go some way towards addressing these issues, but gaps will remain.
- 3.62 However, the full benefits of this investment cannot be realised without sustained improvements to enable journey time reductions and further frequency increases, particularly on key east-west corridors.

- 3.63 The TransPennine Route Upgrade (TRU) project is designed to do that, and to deliver much faster journeys, at a higher frequency and with more capacity, than today's railway. The TRU would help build towards the Northern Powerhouse Rail (NPR) programme, being developed by TfN and the Department for Transport, working collaboratively with Northern Partners.
- 3.64 The community rail movement has helped to put the local community at the heart of their railway by creating job and local enterprise opportunities; creating social cohesion through supporting diversity and inclusivity and by reducing the adverse societal effects caused by the abandonment of parts of the railway. Community Rail has been a catalyst for bringing partners together to work towards physical, economic and social regeneration. This includes a notable, growing number of community station projects across the North helping to support wider regeneration, as well as signs of community rail playing a broader role in community development.
- 3.65 With regards to international connectivity, passenger rail provides:
- surface access (either directly or via interchange with other modes) to the North's airports (particularly Manchester, Newcastle, Liverpool John Lennon, Leeds Bradford, and Doncaster Sheffield), ensuring that airports can draw upon the widest possible catchment areas, making it attractive for airlines to expand global connections.
 - wider rail connectivity to continental Europe via the HS1 Link and the Channel Tunnel.
- 3.66 Surface access to the North's five key rail-connected port areas on major estuaries (Humber, Immingham, Tees, Mersey, and Tyne), and several rail-connected sub-regional ports. During 2014/15 178 million tonnes of freight was transported through ports in the North, almost 38% of the Great Britain total. In addition, the North boasts a network of inland waterways (such as the Manchester Ship Canal access to Trafford Park, access to Hull via the Humber, etc.), where rail may play a role in improving intermodal connectivity.
- 3.67 Rail can play a significant role in addressing the barriers to travel faced by a diverse section of society. Accessibility both to/from and at rail stations and on trains should not be barriers to travel and TfN is committed to supporting improvements to stations and trains and influencing new franchise commitments to reduce the barriers to travel for all.
- 3.68 The majority of the network is twin-track, with limited opportunities for faster services to overtake slower services (including freight services). This can mean that infrastructure is heavily -utilised relative to capacity, sometimes despite a low quantum of service. Further limitations are imposed by flat junctions, signalling capability, and capacity at key interchange and terminal stations (which will pose a key challenge when integrating major interventions such as HS2 and NPR with conventional services). These issues can lead to poorly distributed services and limit opportunities to increase frequencies and improve journey times.

International Freight Connectivity

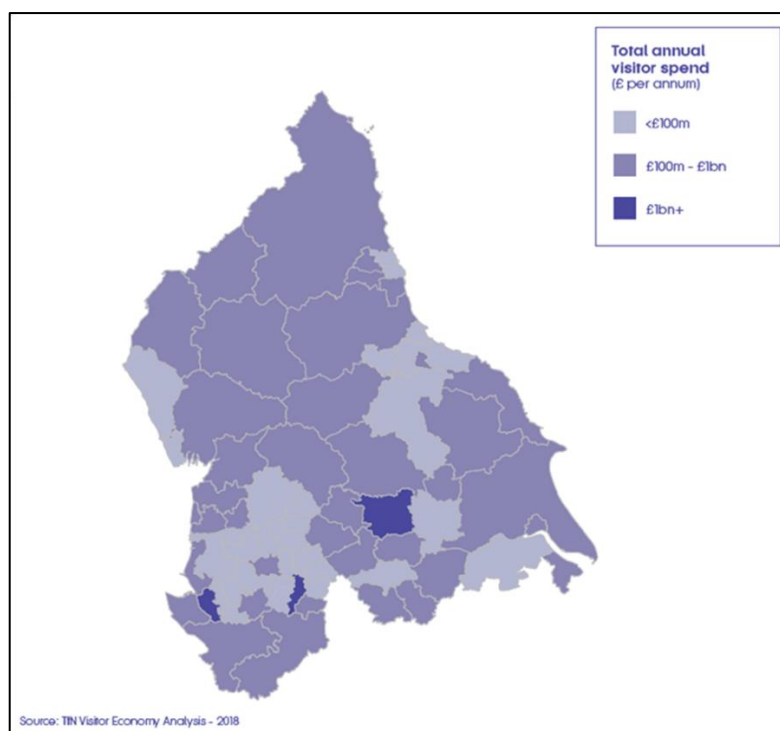
- 3.69 In the UK, port volumes have fallen by approximately 17% since 2005; the ports within this corridor area have seen volumes drop by up to 13%. This is primarily due to the reduction in bulk cargo such as coal with ports now looking to alternative revenue streams such as Intermodal and alternative fuels such as biomass. Ports, including the minor ports across the SDC, have significant potential to grow as connectivity to them from the national road and rail transport network is improved.
- 3.70 The North has a small air freight market with the majority moving to and from the region doing so via airports further south, contributing to road congestion. However, the notable air freight volumes are carried out of Manchester (120,181 tonnes in 2017) and Doncaster Sheffield (8,657 tonnes in 2017). Manchester Airport recorded 10% growth in freight volumes in 2017 over 2016. Doncaster Sheffield's freight volumes fell by 7% in 2017 over 2016, however the airport is planning for future growth in this area through their Vision Plan
- 3.71 Manchester's long-haul routes to destinations such as Dubai, Doha, Abu Dhabi, Beijing, Singapore, Hong Kong, New York and Houston as well as new routes to Africa and India have provided more freight capacity. Increased opportunities to ship freight via northern airports could contribute to traffic reductions on North - South routes as well as increasing competitiveness.

Visitor Economy

- 3.72 The visitor economy is a significant employer in some parts of the North, with over 25% of employment. These areas tend to be, but not exclusive to, the more rural areas of the North. The NPIER capabilities do not explicitly cover the economic value added to the north of England by tourism. It is therefore identified within this report on the basis of the significant and increasing role that it plays in maintaining the vitality of Important Economic Centres.
- 3.73 The North's visitor economy currently consists of over 369 million visitors per year, contributing more than £17 billion to the economy, including over £2 billion from overseas visitors⁴². The total visitor spend is currently distributed across the North as shown by the map below.

⁴² TfN Visitor Economy Analysis - 2018 – Undertaken by Merseytravel

Figure 16: Total Visitor spend⁴³



- 3.74 The north of England possesses only one attraction that is captured within the top 20 by visitor numbers in UK, namely Chester Zoo (1.9 million). In many respects, the value of tourism is difficult to capture, as the attraction is a product of the Important Economic Centre itself and may encompass a number of different visitor purposes that are complementary to its business function. Some of the key tourist destinations in the Southern Pennines include the Peak District National Park, The Yorkshire Dales National Park, Liverpool, Manchester, Sheffield, Hull and Chester.
- 3.75 As a whole, transport related services gain the largest revenue from tourism at £28.3bn. The domestic visitor profile is split differently among the regions, with the highest spend manifested in the south west due to the more extensive transport network, and Wales gaining a significantly higher proportion. The number of visitor trips made to the North West domestically is 3rd highest at 12.7m trips, Yorkshire and Humber is 7th with 9.5m trips, and the North East 11th with 3.7m trips.
- 3.76 Within the North West England and Yorkshire and the Humber regions, it was observed that there were about 67 million trips made while about £4.5m was spent in 2017 on all overall tourism trips in these regions.

Growth Forecasts

- 3.77 Transport for the North has produced a Northern Transport Demand Model that estimates how changes in employment, population and the transport

⁴³ Data sources: Great Britain Day Visit report 2013- 2015&2017, GB Travel Survey 2013-2015, International Passenger Survey, ONS/Visit Britain, 2015 and 2016

network could affect travel patterns across the North. The model uses the transformational growth in population and employment from the Northern Powerhouse Independent Economic Review to forecast transport demand on the road and rail networks in 2050.

- 3.78 The NTDM forecasts for 2050 show that there will be high growth in demand for road travel and long-distance rail travel in the Southern Pennines corridor. Predominant growth is seen to be between Lancashire LEP and the Greater Manchester LEP areas in addition to Sheffield LEP areas. While total road demand is seen to grow by an average of 80 to 120%, growth in rail demand is even higher at an average of 300%.
- 3.79 To reflect uncertainty regarding key factors affecting travel demand, Transport for the North has developed various future scenarios representing the potential variation in travel markets in the North by 2050. The assumptions have been grouped so that each scenario represents a coherent and plausible future. No single scenario is more likely than any other but taken together they represent the likely range of outcomes in travel demand in the North.
- 3.80 The future scenarios of the transformational growth are set out in the Northern Powerhouse Independent Economic Review. All scenarios are possible, and indeed may manifest themselves differently across the North depending on spatial planning policies, but this initial forecasting provides a base understanding of the potential future transport demand in a transformed North.
- 3.81 In a transformed North, total demand for road travel is forecast to increase by up to 54% by 2050. This would mean an increase from the current level to 193 billion vehicle kms travelled in the North by 2050. In a more connected North, the growth in road travel demand between the main urban areas is greater than within those areas. In 2015, approximately 34 billion vehicle kms were travelled between these areas in the North, and by 2050 this is forecast to increase to between 37 and 68 billion vehicle kms.
- 3.82 Using the forecasts from the recent research into the North's labour market, further analysis has been undertaken to understand how improved transport connectivity could change commuting patterns and labour markets across the North. The analysis considers alternative patterns of spatial clustering of jobs, either clustered around towns and city centres or more dispersed across urban areas, and how jobs are undertaken, using either face-to-face interaction or digitally, in multiple scenarios.
- 3.83 Total demand for rail travel is expected to be up to four times higher than today, which would mean an increase in the current total to around 760 million trips in the North 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 and 281 million trips, which is between four and six times the level today. In a more connected and

integrated North, the level of rail commuting could increase by up to eight times the level today.

- 3.84 Across the demand scenarios, analysis suggests an increased propensity for people who live in the North to commute to work outside of their home local authority. This is driven by the strong growth projected for high skilled workers in the transformational scenario through to 2015 and the assumption that high-skilled and high-paid workers are much more likely to commute and travel longer distances than lower-paid workers.

Highway Network

- 3.85 The strongest road growth in the Southern Pennines SDC is forecast between Lancashire and Manchester, Liverpool CR and Manchester/Lancashire, and Sheffield and Leeds CR. Growth is anticipated across the east west breadth of this corridor. The various sub-corridors within the Southern Pennines strategic development corridor in its present state experience major road congestion and exhibit restrictions to accommodate the huge future growth that is predicted. The M62 currently carries half of all trans-Pennine traffic, and will continue to have a central role in supporting future East - west movements and the realisation of transformational and local growth opportunities
- 3.86 Key roads in the Greater Manchester area are prone to severe congestion and very low speeds of less than 15mph during peak hours. While most of the transport links within the key cities of Manchester and Preston are congested, there are relatively better speeds on the major roads. Roads linking Wigan and Bolton pass through the centre of small towns with many junctions and homes and businesses which front onto the roads. Speeds are therefore low.
- 3.87 The only connection on the Strategic Road Network between Manchester and Sheffield City Region is the single carriageway A628 Woodhead Pass. Other lower quality alternatives include the A57 Snake Pass linking Manchester and Sheffield via Glossop, and links further south between Macclesfield and Chesterfield via the A623, A537, A6 and A619.
- 3.88 Poor road connectivity across this part of the Pennines results in poor economic connectivity between Greater Manchester and Sheffield City Region. Future growth between these areas will also be constrained due to the lack of road capacity. Improving connectivity between Manchester and the M1 would also provide network resilience by providing alternative routes to the East Midlands and South East England.
- 3.89 Other road -based issues include congestion around the southern sections of the M60 and the M6, and problems due to the mix of local and long - distance traffic.
- 3.90 On the road network, there are choke points on the M18 corridor around Doncaster which is a vital link to a number of other SRN sections in Sheffield City Region, as well as to the Humber ports. Safety issues also

exist on the A63 towards Hull. There are flood zones throughout the subcorridor, as well as a number of SSSIs.

- 3.91 There are severe congestion, safety and driver information issues on the interchange of the M18/M180 corridor and further at the coast. There are also large flood zones, and rail -based connectivity issues.
- 3.92 There is slow moving traffic in many regions of Leeds, Bradford, Manchester and Sheffield. Links surrounding Bradford are seen to have severe congestion issues leading to very low speeds of 15mph. Links between cities of Leeds, Huddersfield and Wakefield also experience congestion and slow speeds.
- 3.93 Figure 17 illustrates the roads which are included in TfN's Major Road Network (MRN).

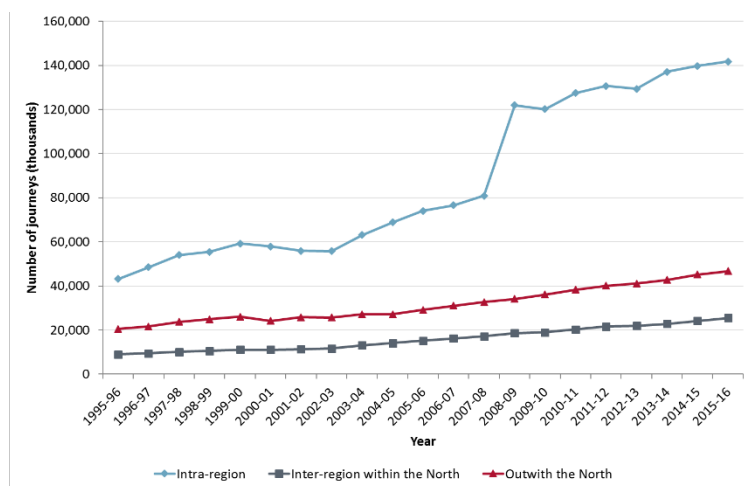
Figure 17: TfN's Major Road Network (MRN)



Rail Network

- 3.94 With specific reference to the Southern Pennines study area, rail demand across the region has increased significantly over the previous two decades. Between 1995/96 and 2015/16 total demand across the North increased by 195%, with the largest increases observed in intra-regional trips - journeys which both began and ended wholly within one of the North East, North West or Yorkshire & Humber sub-regions. This change in demand is illustrated by below:

Figure 18: Passenger journeys in the North



Source: SDG analysis of ORR Data Portal, Tables 15.5, 15.6 and 15.12 for the Integrated Rail Report

- 3.95 The rail network in the North is comprised of a complex series of routes connecting population centres, rural communities, freight and logistics centres and international gateways. It is a mixed traffic railway, with long distance, inter-urban and local passenger services operating alongside both each other and freight services, utilising the same infrastructure and stations.
- 3.96 Passenger services are, as elsewhere in the UK, primarily delivered under franchise agreements between transport operators and the DfT. The North of England's two largest self-contained franchises, Northern and Trans-Pennine Express, were re-let by DfT in 2016. In the first such arrangement of its type, the two franchises are being jointly managed between the DfT and Rail North Ltd, under a Partnership Agreement defining the roles and responsibilities of both parties.
- 3.97 Northern and Trans-Pennine Express provide the majority of inter-urban and local passenger connectivity within the North of England, although the East Midlands, Wales & Borders and West Midlands franchises provide some services in the south of the region and the Merseyrail network serves the Liverpool City Region. Longer-distance connectivity is generally delivered via the region's principal North - South corridors – the East Coast, West Coast and Midland Main Lines. The Intercity West Coast, Intercity East

Coast, Cross Country and East Midlands franchises operate services connecting the North to the rest of Great Britain.

- 3.98 Most rail freight services are operated on a commercial basis, with competition both between operators and between different mode options (road, waterways etc). Key rail freight nodes in the North of England include the international gateways – ports and airports – the Strategic Rail Freight Interchanges at Widnes (Ditton), Wakefield Europort and Selby, and intermodal terminals including those at Trafford Park, Leeds Stourton, Liverpool Garston, Doncaster and Teesport. Intermodal terminals are operated by private freight & logistics companies.
- 3.99 Much of the network in the North of England, aside from the East and West Coast Mainlines, is two-track, although sections of single and four-track are present in places. Almost all of the North's railway uses conventional signalling technology, with fixed block sections. While these vary in form, in every case only one train at a time can be within that block. Some of the blocks on double-track railways can be lengthy due to the distances between signals, and on single-track lines are almost always governed by the distances between passing loops – often many miles. In addition, there are very few grade-separated junctions in the North of England, resulting in conflicting movements at flat junctions across the network.
- 3.100 Recent investment has seen re-control to Regional Operating Centres in Manchester and York, as well as planning in advance of the Digital Railway programme, which will utilise improved technology to enhance capacity on routes across the UK.

Transport and the Environment

- 3.101 The transportation sector accounts for 24 percent of the UK's greenhouse gas emissions. The pollutant causing most concern is nitrogen dioxide (NO₂), which is emitted by road transport and driving the development of Clean Air Plans. In October 2017 the Government published 'The Clean Growth Strategy'. This includes measures to accelerate the shift to low carbon transport. Poor air quality impacts large parts of the study area. Currently 95 Air Quality Management Areas (AQMAs) have been declared in the Southern Pennines corridor, with city wide AQMAs in Sheffield, Wakefield and Liverpool. A large proportion of Greater Manchester and local areas surrounding sections of the motorway network have also been designated as AQMAs, including the M1 corridor north of Sheffield. Even with improved emission characteristics of the national vehicle fleet, any further traffic growth has the potential to worsen these conditions.
- 3.102 The Southern Pennines SDC includes 34 different National Character Area (NCA). Designated high value landscapes within the Southern Pennines SDC includes the Peak District National Park, Lincolnshire Wolds Areas of Outstanding Natural Beauty (AONB) and the Spurn Heritage Coast. Poorly located or designed transport infrastructure has the potential to degrade existing landscape character and visual amenity. Several areas such as Leeds and GM are developing Clear Air Zones for implementation while

some cities such as Bradford are looking to identify actions to address emissions.

- 3.103 By the nature of the Pennines (which within the corridor is largely designated as the Peak District National Park and further contains high value biodiversity and cultural heritage designations) running North - South through the centre of the SDC and covering a significant part of the SDC, any efforts to improve east - west connectivity or local or regional connections within the Pennines and its fringes will risk significant adverse landscape, biodiversity and cultural heritage impacts.
- 3.104 Where possible, schemes should avoid sensitive areas, and where this is not feasible, measures should be implemented to mitigate the negative impacts or consider options which might enhance the environment alongside the stated objectives. In national planning policy there is a strong presumption against any significant road widening or the building of new roads through a National Park, unless it can be shown there are compelling reasons for the new or enhanced capacity. In order to satisfy these tests any schemes will need to contribute positively to the local environment by achieving net benefits to the wildlife and landscape qualities of the area and finding opportunities to promote access to the National Park.
- 3.105 The aim is to increase opportunities for people to experience the landscapes and special qualities of the area. Such an approach will require exceptional standards of design from the outset to achieve an exemplar solution which contributes positively to the sustainability and quality of life in the area. An assessment of environmental impacts would be required as schemes are developed further.

Freight Movements within the North

- 3.106 Freight and logistics is a key element of the Southern Pennines corridor, connecting the major ports on the Humber with those on the Mersey and the urban areas around Leeds, Manchester and Sheffield. The major road and rail networks also provide links to southern England and Scotland including major ports out with the North.
- 3.107 At the UK level, approximately 33% of freight tonnage uses ports in the North, contributing nearly 20% of GVA (£4.4 billion). In contrast to the heavy volumes of port goods, the volume of high value air freight makes up only a very small percentage of freight to/from the UK (around 2.3 million tonnes of freight).
- 3.108 There are three major freight ports within the Southern Pennines corridor, these are the ports of Hull, Immingham and Grimsby, along with a number of minor ports including Goole, Killingholme and the Humber river terminals. Additionally, other major ports are located just out with the corridor boundary and will impact upon freight flows within the corridor. These ports account for almost 17% of all UK sea freight in 2016 with Grimsby and Immingham being the largest, handling 11% of all UK port volumes.

- 3.109 On the road network the most significant freight routes in the study area are on the M6, M62, M1 and A1(M) as well as the routes leading to the Ports of Hull (A63), Immingham and Grimsby (M180/A180 and A160). Freight is especially vulnerable to resilience issues on the MRN as the primary users of the network and due to operational needs for timeliness of deliveries and the cost of delays and this is certainly evident around the Port of Liverpool where there are access and capacity issues on the A5036.
- 3.110 With the proposed rise in freight traffic from 2016 to the forecast year of 2050 with NPIER Growth, there are significant concerns regarding regional air quality and contribution of emissions to the atmosphere in the North. Within the Corridor, the largest road freight growth is predicted to be on the M6 south of Warrington. Significant growth is also predicted on the M1 south of Sheffield.
- 3.111 On the rail network the largest freight flows are recorded on the routes between the East Coast Main Line (ECML) and the Ports of Immingham and Grimsby. Additionally, the West Coast Main Line (WCML) has significant freight flows primarily driven by the various intermodal rail services from the southern ports of Felixstowe, Southampton and London Gateway to rail freight terminals in the North. These services also exist on the ECML.
- 3.112 Major rail freight terminals are located in Manchester, Liverpool, Leeds, Wakefield, and Doncaster where onward journeys by road are required to deliver containers to their intended destinations or pick them up to begin their journey to one of the UK's major ports. There are also significant industrial facilities clustered around the Humber and the Mersey which generate a number of freight movements.
- 3.113 Drax Power Station, located near Selby receives regular deliveries of biomass pellets from ports on the Humber, Tees and Mersey by rail. Should the rail network within the corridor area be compromised for any reason, this will have serious impacts on energy production. The rail network in general suffers from line speed and gauge issues which are challenging for increasing the number of freight movements.
- 3.114 Short sea Ro-Ro services operate out of the many ports within the corridor area such as those on the Humber to destinations in Central Europe such as Rotterdam, Cuxhaven and Zeebrugge and Scandinavia such as Brevik and Esbjerg. Services also operate out of Liverpool to Ireland.
- 3.115 There is a significant growth forecast on both the road and rail networks between 2016 and 2050 as seen in the Figures below. Road is by far the dominant mode for the movement of freight and in 2050 is forecast to represent 91% of all cargo tonnes lifted (or 88% of all cargo tonne km) in the North of England (a growth of 33.1% cargo tonnes lifted or 61.8% cargo tonne km). This will put significant pressure on the existing road infrastructure as the consumer demand for freight increases and will have a negative impact on congestion and regional air quality. In addition, while the rail freight share is smaller, growth is expected and is driven primarily by the movement of intermodal freight between the Southern ports and the

North of England. In 2050, rail is expected to make up 7.3% of all cargo tonnes lifted and 11.6% of all cargo tonne km. This reflects a growth (between 2016 and 2050) of 39.8% and 52.9% respectively. Capacity on the rail network for freight is a key issue, which the projected growth will only exacerbate.

- 3.116 Figure 18 and Figure 19 provide an illustration of the forecast growth in rail and road freight cargo respectively in the Southern Pennines SDC.

Figure 18: 2016 to 2050 Difference in Rail Cargo Tonnes in Southern Pennines SDC



Figure 19: 2016 to 2050 Difference in Road Cargo Tonnes in Southern Pennines SDC



Future Technologies and Societal Change

- 3.117 We are potentially at the start of profound change in how we move people, goods and services around. This is driven by innovation in engineering, technology and business models. The gathering pace of technological change through the delivery of higher speed and capacity digital networks, the connection and automation of vehicles, the adoption of robotics, zero emission propulsion, sharing of transport assets and new approaches to payment could transform the travel and the provision and management of infrastructure and services. Globally, nationally and locally, vehicle, infrastructure and service providers, across both the public and private sectors are investing in and adopting a range of new technologies and will disrupt current travel markets; however, the scale and timing of transformational change is unclear.
- 3.118 Furthermore, these disruptors to transport will not only affect the way transport networks are used, they will also shape whether and when people make journeys. The ability to operate remotely from the traditional work place, access health, education and other daily needs from home, and the ability to work while travelling may lead to shifting travel patterns and reductions in the need to make journeys during the established and narrowly defined weekday morning and evening peak periods.
- 3.119 There are significant variations in digital connectivity across the North. The fixed and mobile network coverage is primarily strong in the main centres, with the latter having greater coverage through the delivery of 4G into more remote areas. However, there is a considerable gap in connectivity the further away populations are from the North's main conurbations. This limits opportunities for e-commerce, home education and tele-working in areas already suffering from poorer levels of physical connectivity, damaging the North's ability to reach local, regional, national and global markets from less connected areas.
- 3.120 The Infrastructure Commissions report into 5G and telecommunications technology suggested that high speed communications should be installed along all major transport corridors. With a digital backbone associated with road and rail networks, provided through fixed and mobile infrastructure facilitated by a number of providers, as well a consistent 'utility' of digital provision to all homes, business and centres for services, the true potential for hyper-connectivity can start to be realised. Major infrastructure upgrades implemented in the corridor should consider the potential to contribute to the 'digital backbone'.
- 3.121 The national transport infrastructure providers are continuing to roll out digital technologies to their networks with both Highways England and Network Rail delivering both operational and monitoring systems to provide efficiency improvements users. However, at the local level there are varying levels of uptake of digital and smart systems for network management and providing services to users. Furthermore, issues in the Corridor associated with transport connectivity and the associated environmental impacts may be reduced through technological advances in:

- Connected Vehicles;
- Automation and robotics;
- Zero emission propulsion;
- Shared assets;
- On account payment systems; and
- Additive Manufacturing.

3.122 Whilst uncertain, technology has the potential to reduce the demand for travel as well as enabling significant benefits to both those using the transport network and to network operators. Further work on transport interventions will need to take account of the potential impacts of technological and societal changes.

Transport challenges and economic opportunities

3.123 The fundamental challenge for the North's economy is to improve the economic interaction between the key economic clusters and assets of the North to improve the sharing of knowledge, supply chains, resources, and innovation to drive agglomeration benefits and productivity. Physically connecting the North's towns, cities, economic centres and international gateways will facilitate this. It can also create agglomeration economies centred on areas of commercial and industrial specialisation.

3.124 There are distinct economic strengths in each of the SDCs that require support from future transport investment as well as important connectivity challenges that need to be overcome, if the North as a whole is to deliver transformational growth. While significant investment in transport infrastructure is currently planned for the region, there is a need for a programme of further Pan-Northern investments to maximise and realise the opportunities from the major transformational infrastructure projects such as HS2 or NPR.

3.125 Better transport connectivity increases the physical proximity of firms, workers and consumers and concentrates economic activity into clusters. Improving transport connections between the North's cities, towns, economic centres, infrastructure and assets allows for greater opportunities. This will be supported by a strong logistics industry. This section presents the key transport challenges and economic opportunities that can be realised with a programme of investments in the Southern Pennines SDC.

Supporting business interactions within the North

3.126 In spite of the North's strengths, there remain persistent and entrenched gaps in the North's GVA per capita and productivity performance compared to the rest of the UK. The North's GVA per capita gap has been consistently some 25% below the rest of England average (or 10-15% below when London is excluded) since the 1980s.

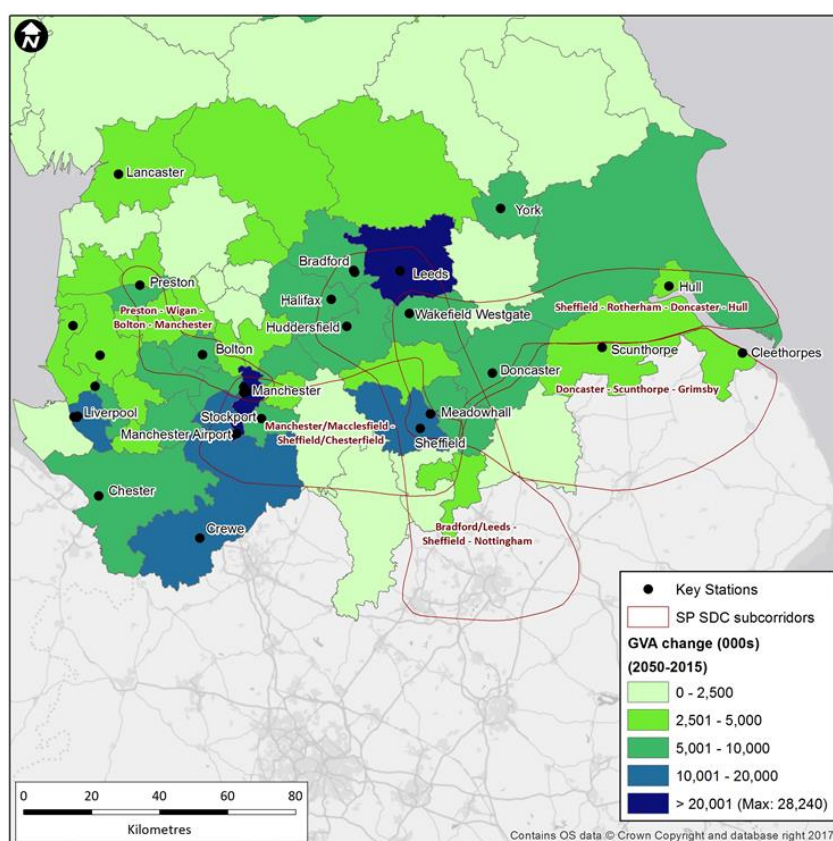
3.127 In 2014, this economic gap equated to a £4,800 per person difference in income between the North and the UK average, and a £22,500 per person

difference between the North and London. Understanding the components of the performance gap helps to contextualise why the North continues to face these persistent challenges and thus how to challenge them. The performance gap is accounted for partly by an 'employment gap' – where low levels of unemployment impact on the North's GVA – but mainly by the 'productivity gap', which accounts for the largest proportion of the performance gap and is associated closely with a widening of the gap which has taken place during the post-recession period.

- 3.128 This performance gap has been driven in the North by a combination of factors such as:
- Insufficient high-skilled workers and too many low-skilled workers
 - 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
 - Sub-optimal transport links and underinvestment in transport
- 3.129 This can be demonstrated tangibly, for example, through the legacy of public underinvestment in transport in the North of England – for every £1,943 spent per person in London on current or planned transport projects, £427 is spent in the North. The effects of the North's persistent underperformance relative to the rest of England manifest in real terms in the form of lower-than-average wages for workers, which has multiple and adverse knock-on impacts on health and social welfare issues, such as benefit dependency, increased health and social care costs, and lower aspirational motivations. Typically, areas with low attainment levels have higher economic inactivity and unemployment counts, as is the case in the North. By contrast, investment in health-promoting built environments and education provide a return on investment through a healthy, skilled and motivated workforce, leading to improved productivity.
- 3.130 Delivering agglomeration benefits in a polycentric system which also has significant rural areas 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.
- 3.131 The Southern Pennines corridor links clusters of industries including advanced manufacturing and energy, health innovation, digital, and financial & professional services in the conurbations of Greater Manchester, Central Lancashire, Cheshire & Warrington, Leeds and Sheffield City Regions, and Hull & the Humber.
- 3.132 Key strengths and priorities for the LEPs across the study area include Health innovation & Life Sciences, Advanced Manufacturing, Energy and Nuclear excellence and Digital Technologies, supported by Financial & Professional services, research & innovation activities, and important wider

service & visitor economies across the study area. 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. Connectivity would also contribute to enabling access and hence the means to opening up housing development sites to the population.

- 3.133 The majority of the North's workers live and work in the same local authority district. Without transformational investment in the North, these commuting patterns are not expected to significantly change in the future. However, in a transformed North, the proportion of workers taking employment outside of their home district is expected to markedly increase, from around 35% of workers to almost 60% by 2050. The greatest change is expected for highly skilled workers, which could see cross boundary commuting increase to over 70% of workers. These forecasts are a result of transformational investment in the transport system, but also growth in the North's prime and enabling capabilities, which support the benefits of agglomeration.
- 3.134 Whilst each city is already in relatively close proximity to each other (around 40-50 miles apart, except for Newcastle), at present there is limited interaction between cities in the North.
- 3.135 Increasing the effective density of each individual city, through improved transport links for example, could help foster greater agglomeration and boost productivity in those cities. Doubling the size of a city alone can increase productivity by 3-8%. Creating more dynamic places where people and businesses thrive will be an important factor in boosting productivity and jobs and realising the economic opportunity of the North's economy.

Figure 20: GVA change (000s) 2015-2050 for Southern Pennines SDC

Supporting the needs of the North's residents

- 3.136 For the majority of road and rail users, there should be significant concern that London will continue to receive the lion's share of tax-payers' money spent on transport and that these disparities will widen further as the Greater London Authority gets to keep business rate revenues which have historically been pooled, in part, to rebalance the economy. The biggest rail project currently set to specifically address the needs of those in the north of England is the delivery of a range of projects including improvements to the journey time to Manchester Airport through the Ordsall Chord, which will cost £498.1m (3.4% of the cost of Crossrail).
- 3.137 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. Many of the current journeys between Northern economic assets and clusters are slow and infrequent, both in absolute terms and compared with journeys to and from London. For example, it currently takes longer to travel by rail between Liverpool and Hull than it does to travel twice the distance between London and Paris.
- 3.138 The North's transport system needs to be accessible, resilient, safe, well-maintained and accommodating for the free-flowing movement of people for work, leisure, education and other personal business trips. Better transport links make jobs more accessible, provide greater choice and can

deliver a better quality of life. This will also help the North's deprived areas reach their full economic potential. For an employee seeking work, better links increase the number and range of job and career opportunities available. For an employer, better connectivity increases the ability to access and compete across a larger labour market catchment area.

- 3.139 Index of Multiple Deprivation (IMD) data shows that 14 of the 20 English towns and cities with the highest levels of deprivation are in the North. Furthermore, 14 of the 20 English local authorities with the lowest healthy life expectancy (both male and female) are also found in the North. Boosting the economy of the North would reduce the deficit, by reducing work-related welfare benefits and by increasing real wages and spending power.
- 3.140 People's wellbeing can also be adversely impacted by a reduction in a 'sense of place'. This can be caused by vehicle emissions leading to dirty deposits on buildings and the corrosion of some building materials, to the transport network and associated high levels of traffic causing severance that makes it difficult or prevents people from easily accessing the services that they require in their local area.
- 3.141 High levels of traffic may also reduce opportunities for physical activity, for example by making it unpleasant or dangerous to walk or cycle along a route, or even by causing the perception of danger. As well as this reduction in physical activity having a direct effect in terms of health through measures such as obesity, it also helps to prevent people enjoying their locale and can also lead to reduced social cohesion.
- 3.142 It is a challenge to ensure that improvements to transport networks do not produce unacceptable social impacts, and that inclusive transformational growth improves people's lives across the North.
- 3.143 It is important that all members of society feel able to use the transport network with confidence. Issues such as affordability, security and physical accessibility, as well as ease of navigation and ease of use, are crucial. Improving the journey experience, for example through smart ticketing and more accessible rail rolling stock, will help with this.
- 3.144 Rail can play a critical role in matching skilled workers with appropriate employment as a result of its specific characteristics – notably the capability of transporting large numbers of workers into town and city centre locations without being subject to highway congestion and its associated impacts on journey time, the environment and quality of life.
- 3.145 For these longer-distance journeys, rail will have key journey time advantages relative to road travel, as well as enabling direct access to central locations. In some cases, particularly to/from London, connectivity is currently strong, and will undergo a further step-change improvement with the introduction of HS2.
- 3.146 Investment being delivered through the TransPennine Express franchise will go some way toward addressing overcrowding and improving service

frequencies, and the introduction of the 'Northern Connect' brand in the Northern franchise will complement the inter-urban network by delivering a distinct customer offer and improved service quality.

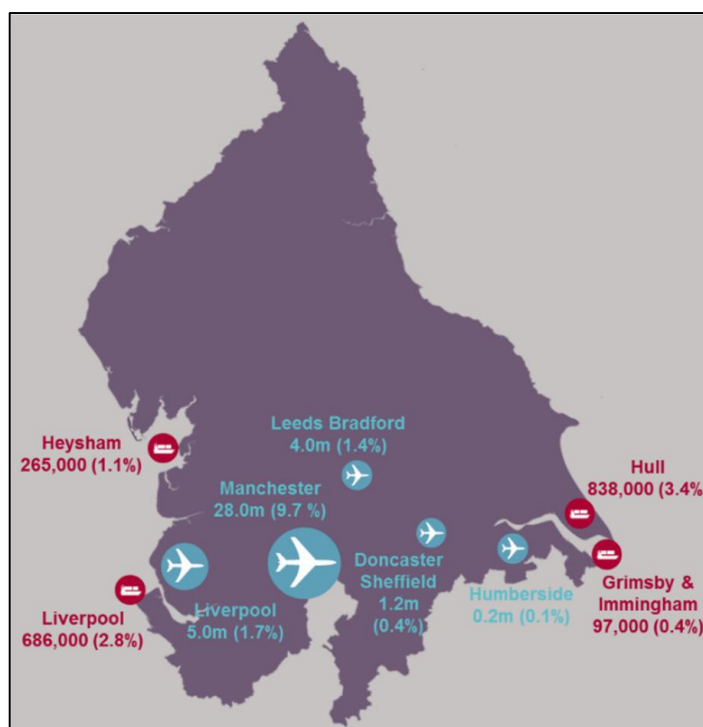
- 3.147 As set out in the STP, a step change in the level of rail connectivity between the North's largest cities is required to support opportunities and choices to the next generation of workers and businesses. It would support economic transformation in the North by delivering faster and more frequent 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. NPR will help deliver the integrated Northern labour markets that are necessary to achieve economic transformation, unlock investment potential and create opportunity and new economic choices for millions of people across the North.
- 3.148 Making the North's airports more accessible by public transport will allow the benefit of these assets to be felt across the North. Whilst the provision of direct rail connectivity to airports is not always achievable nor desirable, interchange between rail and other forms of public transport must be made quick and simple.
- 3.149 Connectivity on the wider network must enable fast and seamless journeys across the North. While some gains to airport accessibility could arise from HS2 Phase 2b and NPR schemes, they are neither currently committed nor planned to be delivered until the 2030s, and even then, will not fully address connectivity to the North. Given the constraints on rail services to the existing Manchester Airport rail station, and their importance to the wider northern economy, it is a priority to improve rail accessibility to the airport during the 2020s.
- 3.150 Aside from Manchester Airport, the North's other regional airports provide for direct access between international destinations and markets and their catchment areas across the North. None of these airports are served directly by the national rail network, with interchange to other forms of public transport required to complete the door-to-door journey. This requirement can pose a barrier to use, particularly for those travelling in family groups and with luggage, and good quality information and through-ticketing is not always available.
- 3.151 Disruption to facilities and services can have a big impact on both the accessibility of rail services to disabled people, and on disabled people's confidence in travelling by rail. TfN will work with train operators to ensure that the needs of those with reduced mobility and hidden disabilities and appropriately and courteously provided for.
- 3.152 The North's quality of life is an underpinning asset which supports its economy, particularly in providing an attractive place for people to live, work, invest and visit. Rail has an important part to play in supporting improvements to quality of life.

- 3.153 The Digital Railway programme has the potential to significantly improve both capacity and reliability through the implementation of digital signalling systems and traffic management. Harnessing this technology will enable the rail network to be more flexible and responsive to changes in demand and improve the reliability of key assets such as signalling.

International Passenger Connectivity

- 3.154 Overall, some 43.7 million air passengers were carried on all flights to/from the North's airports in 2017, around 15% of the UK total.
- 3.155 The TfN International Connectivity Report (TfN 2017) stated that International passenger connectivity provided by the North's airports contributed over £5.5 billion towards the North's GVA in 2016 and this is anticipated to have increased in 2017. The largest proportion of air passengers consists of outbound leisure trips, which contributed around £0.5 billion to GVA in 2016. The bulk of the GVA contribution from passengers (£5 billion) comes from the boost to business productivity brought about through direct international air connections to/from the North's airports. In total, there were around 2 million return business related air trips to/from the region in 2016.
- 3.156 Whilst the North currently accounts for around 25% of the UK's population, its seven airports handle around 15% of all airport passengers in the UK and the ports around 6% of all ferry passengers. This suggests a degree of underperformance in the connectivity provided given the relative scale of the population and economic base. Based on current airport masterplans and DfT assessment, the North has potential capacity for an additional 60 million air passengers. The performance of the ports is largely dictated by geography with ports in the south of England being much closer to Continental Europe and therefore much more viable for passenger connections by sea.

Figure 21: Annual Passenger Movements and Percentage of UK Total⁴⁴



- 3.157 The international air passenger market in this corridor area is dominated by Manchester airport which was the 3rd busiest airport in the UK in 2017 with around 27.7 million passengers. Other international airports within the SDC are Liverpool John Lennon Airport (4.9 million passengers), Leeds Bradford (4.1 million passengers), Doncaster Sheffield (1.3 million passengers) and Humberside (190k passengers).
- 3.158 There were around 2 million return business-related air trips to and from the North in 2016, with £5 billion of GVA in the North currently from air passengers derived from business productivity brought about through direct international air connections to and from the North's airports.
- 3.159 Passenger movements via the ports are also substantial with services between Hull and both Rotterdam and Zeebrugge.
- 3.160 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.
- 3.161 In terms of connectivity between adjacent areas, good connectivity between the Corridor and Manchester Airport is vital in providing long haul routes not provided by Leeds Bradford, Liverpool, Humberside or the Doncaster Sheffield airports. Foreign investors are more likely to be attracted to locations that are well connected to global markets and that have access to

⁴⁴ Source: Based on UK Civil Aviation Authority - rolling year ending October 2017; and DfT UK international and domestic sea passenger crossings (excluding passengers temporarily disembarking 'port calls' in the UK), 2017

a well-qualified workforce. An example of Manchester airport business/hub destinations are provided below in Figure 22.

Figure 22: Manchester Airport Business/Hub Destinations

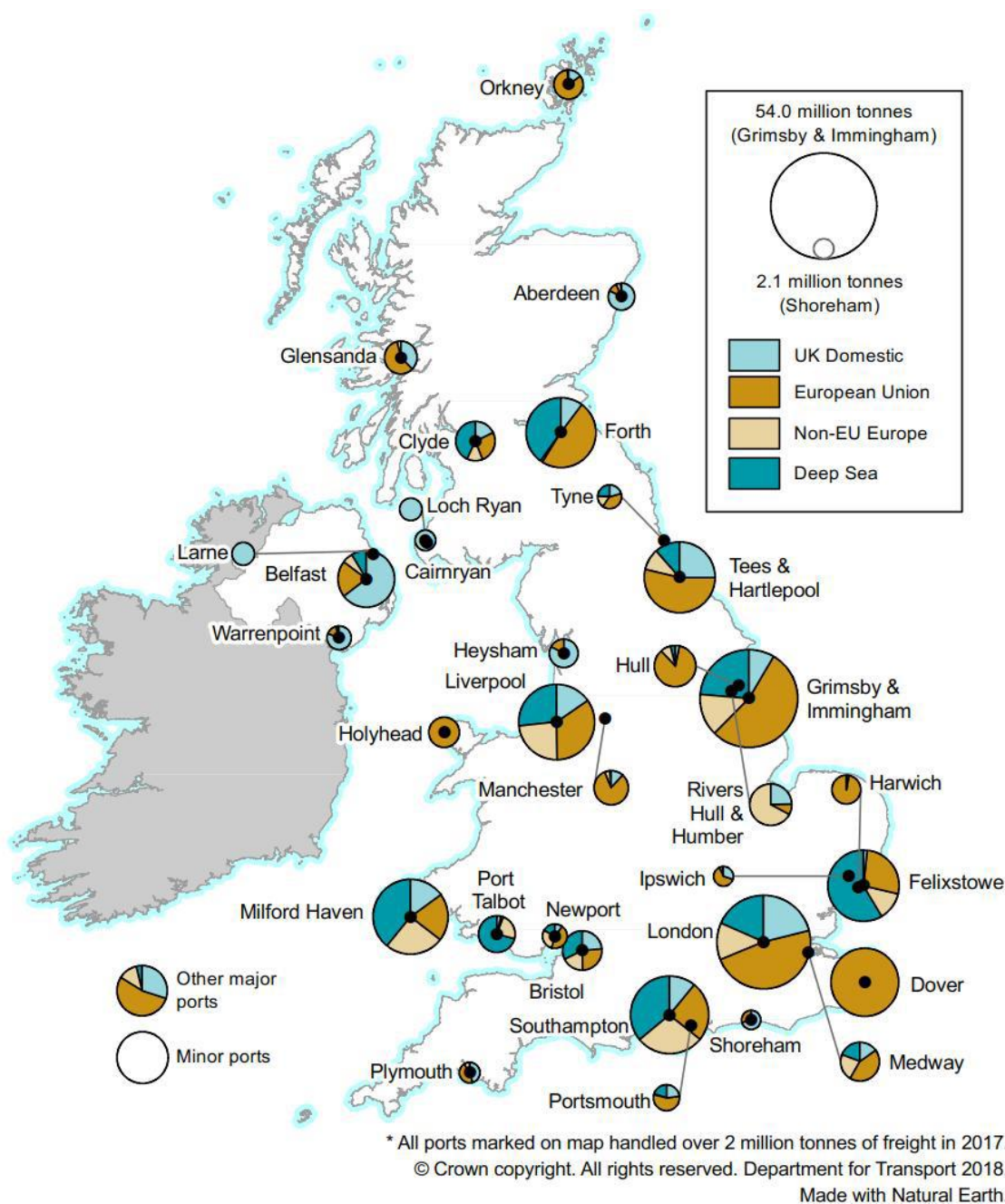


- 3.162 Easier access to the North's airports can also support additional economic growth by enabling increased development of sites near or adjacent to the North's airports. Liverpool John Lennon Airport and Leeds Bradford International Airport are major employers in the Corridor, contributing £115 million and £336 million GVA yearly to the regional economy and 2,700 and 2,350 direct jobs respectively.

Moving Goods: Connectivity between the North's economic assets

- 3.163 The Southern Pennines corridor will greatly benefit from the better connectivity between the Ports of Liverpool and the Humber Ports. This is because the concentration of warehousing in the corridor is such that the goods and materials handled at the ports can be processed then exported or moved elsewhere. At the UK level, approximately a third of freight tonnage uses ports in the North and contributing nearly one fifth of the GVA (£4.4 billion, in 2016).

Figure 23: UK Major Ports – Domestic and International Annual Freight Tonnage⁴⁵



- 3.164 In addition to dedicated freight and logistics companies within the North, freight movements are an important part of supply chains for most businesses including the North's prime capabilities. The North has significant amount of distribution centre capacity covering all types of warehousing.
- 3.165 The growth of the online retail sector is putting enormous pressure on the transport infrastructure as the volume of goods being delivered increases and the expected service level requires same or next day deliveries. Road

⁴⁵ Source: DfT UK Port Freight Statistics, 2017 (Statistical Release August 2018)

freight is often inherently less expensive to handle goods by road, by comparison with rail freight, since it is free at the point of access, not restricted to a timetable, and there are lower handling charges. However, a more congested, less reliant road network could hinder this.

- 3.166 As the economy grows, so will the demand for goods and consequently the movement of goods. These increases will put additional pressure on the already constrained key links such as the M62.
- 3.167 The Enhanced Freight and Logistics Analysis⁴⁶ considers 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.
- 3.168 Currently, the commodities that arrive at Northern ports stay primarily within the North, with the biggest flows to and from the ports using east – west routes. Biomass represents a significant market for the Northern ports, with Liverpool and Immingham handling large volumes to support Drax, which generates 8% of the UK’s electricity. To see the Northern ports’ opportunities maximised, there needs to be strong connectivity to and from them via the major transport networks.
- 3.169 Investment in Liverpool2 and continuing growth of the Humber Ports has given strength to the concept of a rail 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, enhancing engagement with freight businesses that are not as strongly aligned to the ports in other ways. This will assist Northern Ports with being more competitive with the ports in the South, currently 60% of freight destined for the North of England is delivered to southern ports, which is currently putting unnecessary pressures on north-south routes and corridors.
- 3.170 Where modal shift from road to rail may not currently be seen as economically viable, there is 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. Freight routes and paths must be planned alongside passenger rail not as an afterthought.

Supporting the Built/Natural Environment

- 3.171 Promoting and supporting the natural environment and built environment with respect to sustainable travel options associated with the major transport networks will be a key opportunity and necessity of future transport initiatives. This is also a key objective in the TfN STP. This will include making best use of existing transport infrastructure before investing

⁴⁶ Source: TfN Enhanced Freight and Logistics Analysis, January 2018

in new capacity; and ensuring that new infrastructure is designed to minimise the negative impacts on both the natural and built environment

- 3.172 Additionally, reducing the impact of transport on local communities and environmentally sensitive areas will become a priority to ensure high levels of quality of life and a healthy ecosystem.
- 3.173 While transportation contributes to substantial socioeconomic benefits, transport is also heavily impacting environmental systems. Congestion, noise pollution and air pollutants have been increasingly monitored (several Air Quality Management Areas have been established in the UK and identified as a serious threat to quality of life and local ecosystems. The North has experienced an increase in severance, noise and visual impact of rail.
- 3.174 Poor air quality impacts large parts of the study area. Currently 95 Air Quality Management Areas (AQMA) have been declared in the corridor, with city-wide AQMA in Sheffield, Wakefield and Liverpool. A large proportion of Greater Manchester and local areas surrounding sections of the motorway network have also been designated as AQMA, including the M1 corridor north of Sheffield. Even with improved emission characteristics of the national vehicle fleet, any further traffic growth has the potential to worsen these conditions.
- 3.175 The transportation sector accounts for 24 percent of the UK's greenhouse gas emissions. In October 2017 the Government published 'The Clean Growth Strategy'. This includes measures to accelerate the shift to low carbon transport. In addition, Local Authorities are currently developing Clear Air Strategies to tackle air pollution in cities.
- 3.176 The Southern Pennines SDC includes 34 different National Character Areas (NCA). Designated high value landscapes within the Southern Pennines SDC includes the Peak District National Park, Lincolnshire Wolds Areas of Outstanding Natural Beauty (AONB) and the Spurn Heritage Coast. Poorly located or designed transport infrastructure has the potential to degrade existing landscape character and visual amenity.

4 The Need for Intervention

Introduction

- 4.1 The Need for Intervention builds on the Case for Change set out in Chapter 3. It focusses on the problems and opportunities identified as being key to the unlocking of transformational growth. It firstly shows why investment is needed beyond the interventions assumed to be delivered in the Reference Case. It then identifies why TfN is the appropriate promoter for the additional infrastructure investment required and what objectives,

subordinate to TfN's STP⁴⁷ objectives, TfN aims to achieve with a programme of investment in the Southern Pennines SDC.

Why further investment is needed

- 4.2 Across the North there are both physical (such as highway connectivity, journey times and reliability) and economic barriers restricting trade and business interactions. These barriers limit clustering of businesses, i.e. agglomeration economies, causing under-utilisation of the potential knowledge/innovation spill-overs resulting from improved efficiencies. When the transformational growth is factored in, synergies between road and rail will be critical to addressing these challenges and opportunities, as will an understanding of how transport demands will change in the future.
- 4.3 In a 'transformed future' scenario, the Northern economy would become more productive partly through increasing the skills of its workforce and lowering levels of economic inactivity - both these factors are associated with an increased propensity to travel. All other things being equal, increased productivity would therefore be expected to lead to marked changes in both the travel patterns of individuals and aggregate patterns across the entire North.
- 4.4 Under the transformational scenario, growth is expected in high and medium-skilled occupations (an increase of 35,300 and 1,600 jobs per annum by 2050 respectively), while jobs in low-skilled occupations are expected to stabilise from 2030 after a decline since 2015. In a transformed North, by 2050:
- total demand for rail travel is expected to be up to four times higher than today, to around 760 million trips.
 - total demand for road travel is forecast to increase by up to 54% by 2050, to around 193 billion vehicle km travelled.
- 4.5 The major transformational infrastructure projects included in the Reference Case (including HS2, Northern Powerhouse Rail, Northern Trans-Pennine Routes, Trans Pennine Tunnel & Wider Transport Connectivity Assessment and Manchester North-West Quadrant), are focussed on delivering improved connectivity between the North's city regions. A significant proportion of the growth catalysed by these projects will therefore be focussed on major towns and cities. To achieve transformational growth across all parts of the North, not just in the large urban conurbations, and realise the necessary rebalancing of the northern and UK economies will require further transport intervention.
- 4.6 Building on these foundations, the SDCs represent an economic area where the evidence to date indicates most progress towards the transformational growth scenario would be made by bringing forward Pan-Northern road and rail investment over the lifetime of the STP, with investment in all corridors critical in achieving TfN's and Partners collective ambitions.

⁴⁷ Provided in the Regional Policy Section of this report (SPOC January 2019)

Why TfN is the appropriate promoter

- 4.7 TfN's remit is focused on the identification and recommendation of strategic transport interventions (set out in its STP), which generally support longer distance trips and have a pan-northern impact. TfN will also work with partners to support complementary investment at a local level to ensure that a 'whole journey' and 'total network' approach to improving transport is followed.
- 4.8 There is no other authority or organisation with a remit that would make them an appropriate alternative; which is not to say that Highways England and Network Rail, which come closest, would not have a role in delivering interventions.

The sub-objectives of the SDCs

- 4.9 Subordinate to the four objectives set out in the STP, a set of sub objectives were set at the SDC level, to ensure that TfN's aims for investment are achieved. These sub objectives were developed in consultation with stakeholders, including one to ones with industry, to support both the STP's objectives and the aspirations for Pan-Northern interventions. Sub objectives underwent a rigorous process of approvals including Transport Appraisal Guidance (TAG) and SDC Project and Programme Boards.
- 4.10 These sub objectives are set out in the following table together with their performance measures.

Table 4 SDC Sub-objectives

STP Objectives	Sub Objectives	SDC Performance Measures
Transforming the economic performance	Improving productivity across the North	Does the scheme improve the connectivity for people and/ or goods?
	Improving links between the North's ports, airports, and strategic transport interchanges and the major transport networks for people and goods	
	Supporting, informing and influencing present and future land-use development in the North	Does the scheme improve accessibility to [any of] the North's four prime capabilities?
Increase efficiency, reliability, integration and resilience in the transport system	Improving efficient operational performance of existing major transport networks	Does the scheme improve the throughput of existing transport networks?
	Increasing the capacity and capability of the major transport networks for people and goods	
	Improving the reliability of the major transport networks for strategic transport movements of people and goods	Does the scheme improve the predictability of journey times?
	Improving travel choices and user experience for the movement of people and goods across the North	Does the scheme improve customer/ driver experience including via increased choice?
	Increasing the resilience of major transport networks	Does the scheme improve the resilience/ recovery of major transport networks?

STP Objectives	Sub Objectives	SDC Performance Measures
Promote and enhance the built, historic and natural environment	Improving sustainable travel options and making best use of the North's existing major transport network. Supporting the reduction of transport-related Greenhouse Gas (GHG) emissions and improvement of air quality across the major transport networks	Does the scheme increase use of sustainable travel options associated with the major transport networks and reduced transport-related emissions (CO2, NOX, PM)?
	Reducing the impact of transport on local communities and environmentally sensitive areas	Does the scheme reduce the impact of transport in environmentally sensitive areas?
		Does the scheme reduced the impact of transport on local communities?
Improve inclusivity, health, and access to opportunities for all	Supporting the delivery of Transformational Infrastructure and employment projects	Does the scheme improve access to economic assets of National or Pan-Northern significance?
	Supporting and enhancing the visitor economy	Does the scheme improve access to major tourist destinations?
	Supporting and enabling the delivery of strategic housing sites	Does the scheme improve integration with local transport networks?
	Supporting an affordable inclusive transport network with enhanced access to key opportunities, education and skills.	
	Improving integration and coordination with local transport networks	

5 Wider Context

Introduction

- 5.1 This section summarises the wider context of the proposed programme of interventions for the Southern Pennines corridor. By outlining the programme's delivery constraints, as well as interdependencies with other implemented or planned projects as well as wider stakeholder needs and views, this section aims to provide a bigger picture with regards to the ease of implementation, its relation to other projects and the wider public opinion.

Delivery Constraints and Opportunities

- 5.2 A number of specific and more general constraints have been identified that may affect the delivery of the programme.

Transport Model Limitations

- 5.3 The future travel market scenarios available for use in the transport modelling are as follows:
- National Trip End Model (NTEM)⁴⁸ Core – in line with WebTAG guidance;
 - NTEM Core with spatial plans and TEMPRO constrained at Local Enterprise Partnership (LEP) level;
 - NTEM Core with IER land use uplift, constrained at LEP level; and
 - Northern Transport Demand Model (NTDM) derived transformational high growth.
- 5.4 The models developed are explained further in the Economic Dimension.
- 5.5 Transport modelling has focussed on the NTEM Core scenario during this stage of work. Plans are currently being made to resolve technical issues experienced with additional scenarios through follow-on commissions.
- 5.6 Notwithstanding, the NTEM Core scenario represents a lower travel market than TfN's transformational growth demand forecasts in terms of volume of movements and can therefore be seen as a conservative representation of the benefit to cost ratio (BCR) for a given intervention /programme of interventions.

Urban Highway Capacity

- 5.7 The SPOC recommendations within this report are accompanied with policy recommendations regarding the function and purpose of inter-urban corridors. TfN will ensure that through engagement and dialogue with

⁴⁸ The National Trip End Model forecasts the growth in trip-origin destinations (or productions / attractions) up to 2051 for use in transport modelling. The forecasts accounts for national projections in population, employment, housing, car ownership and trip rate. The analyst is able to vary these forecasts to take into more granular data at a local level, such as from local plans or local industrial strategies, by constraining growth at lower spatial scales.

partners investment plans for inter-urban routes are cognisant of and complement delivery of local strategies for urban transport networks.

- 5.8 We recommend dialogue to ensure that the function and purpose of the routes are harmonised to reflect the local strategies within the urban areas, e.g. the A5103 north of Manchester Airport and the A580 on the approaches to the Manchester and Liverpool urban areas.

Interdependencies

Reference Case

- 5.9 As set out in the reference case definition, the basis against which the programme of interventions in the Southern Pennines SDC is assessed includes some improvements which are not yet committed. Therefore, the basis of the assessment and conclusions reached in this SPOC are dependent on implementation of the reference case. That is not to say the programme does not have benefits in its own right, however this has not been examined as part of this stage of work.

Major Transformational Infrastructure Projects

- 5.10 Part of the rationale for the SDCs is to build on and extend the benefits of other significant investments in TfN's wider programme. Schemes such as NPR would benefit from the implementation of the proposed programme of interventions. As the major transformational infrastructure projects and SDC projects target the improvement of inter-city transport links, it can be expected that complementary benefits can be achieved. Furthermore, as HS2 is expected to function as an additional catalyst for NPR⁴⁹, the integration of both projects with the proposed programme of SDC interventions will have additional complementary benefits. That is not to say the programme does not have benefits in its own right; however, this has not been examined as part of this stage of work.
- 5.11 An overarching programme perspective is required to ensure the view of these complementary benefits is retained as various packages and interventions move forward in the delivery process.

Wider Policy Context

- 5.12 The proposed programme of interventions is not only closely aligned with key national, regional and local policies, but it is also expected that these policies are interdependent with regional interventions as suggested here. Notably, the programme of interventions will also lead to strong complementary benefits for non-transport policies.

⁴⁹ Global Railway Review (2018)

<https://www.globalrailwayreview.com/news/67419/hs2-npr-ambitions-greater-manchester/>

- 5.13 Key national non-transport policies and strategies such as the UK Industrial Strategy or the Making our Economy Work for Everyone report⁵⁰, also identified the need for investing in strategic infrastructure to improve the country's productivity and increase economic growth and overall wellbeing. As a result, it is expected that the proposed programme of interventions will play a central complementary role for achieving the objectives of these strategies.
- 5.14 The NPIER identified poor connectivity and transport as one of the factors driving the productivity gap in the North. Forecasts anticipated that a 'transformed' North, where there were improvements to transport connectivity, as well as the skills base and innovation, would lead to an additional 850,000 jobs, 4% Increase in productivity and a GVA 15% higher than a business as usual scenario.

Business Case and Funding Approval

- 5.15 The costs associated with the development and construction of the programme are significant and the programme is currently in the early stages of business case development. To secure any government funding toward the scheme the DfT's Transport Business Case process will need to be adhered to. This SPOC is the first step, followed by:
- Strategic Outline Business Case (SOBC) development and approval
 - Outline Business Case (OBC) development and approval
 - Full Business Case (FBC) development and approval

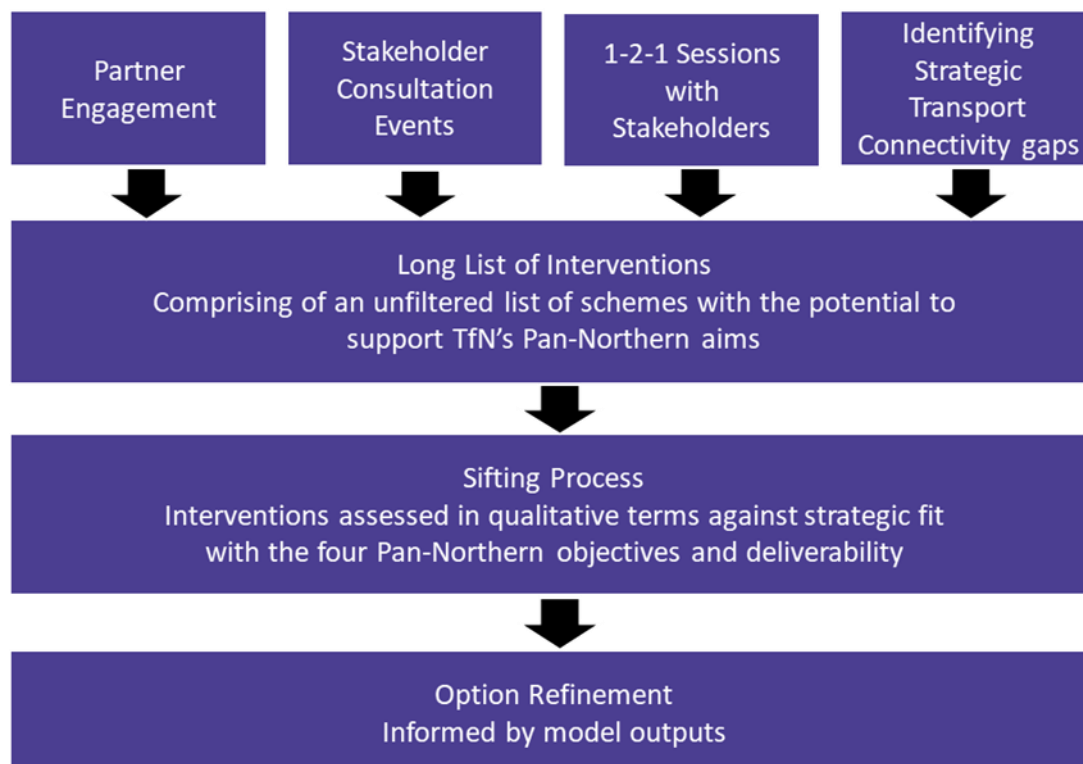
⁵⁰ ibid

6 Option Assessment Process

Introduction

- 6.1 A staged approach has been taken to the identification of Pan-Northern transport schemes in the corridor as shown in Figure 24.

Figure 24: Staged Approach to Pan-Northern transport scheme identification



Stakeholder Consultation

- 6.2 Two phases of stakeholder engagement events were conducted during the preparation of the option assessment process. The stakeholder engagement workshops focused on gathering intelligence around the issues most pertinent to the corridors and also sought to identify the strategic interventions that are required.
- 6.3 Phase 1 of the engagement was used to explain the SDC process and gave partners an opportunity to share problems and issues in the corridor and suggest potential interventions. These suggested interventions formed the long list of interventions which were subsequently assessed in the Option Assessment Report (OAR). Consultations took place in Warrington, Grimsby, Doncaster, Northallerton and Berwick from June 11th – 20th 2018. The workshops lasted for three hours at each location and included 58 attendees in total.
- 6.4 A wide range of issues were raised across the stakeholder events. However, there were a number of consistent themes that are summarised below:

- *Surface Access to Ports and Airports:* With a desire to support economic growth in their areas, stakeholders agreed that reliable access to local ports and airports was hugely important. There was concern that the infrastructure was lacking which resulted in road freight trips to ports in the South of England. The need to look at alternatives to traditional freight movements were discussed including the use of inland water ways and rail.
- *HS2 Connectivity:* It was widely recognised that there was a need to capitalise on the benefits that HS2 would bring to the corridor and ensure that the investment opportunities were maximised. Improved connectivity is required by road and rail to the proposed HS2 stations.
- *Trans Pennine links:* Capacity and reliability concerns were raised about existing trans Pennine links, both road and rail. It was widely accepted that the M62 was at capacity and was considered to be hindering economic growth. There was also notable discussion about poor links between South Yorkshire and Greater Manchester.
- *Clean Air:* Stakeholders were concerned about the clean air targets identified for Leeds and Manchester and the lack of new vehicle technology and infrastructure in place to facilitate.
- *Public Transport:* Stakeholders raised concerns about a lack of suitable alternatives to travel by car. As well as rail journey times, rail frequencies and reliability were identified as poor, especially between Manchester – Leeds, Manchester - Preston and Manchester – Sheffield. It was also noted that there was huge variation in frequencies across the corridors.

- 6.5 In addition to the above key themes raised in the engagement sessions, various table discussions at the workshops also helped to generate several issues across the Southern Pennines corridor. These issues were used to further define the outcomes that these interventions would help address.
- 6.6 Further discussions were held with 'key industry representatives' who were offered a 1-2-1 telephone discussion. Ten interviews were conducted with those who took up the offer. These discussions focused on specific issues relevant to the stakeholder but echoed the themes from the workshops. Poor connectivity between South Yorkshire and the North West was repeatedly mentioned as a constraint that could be alleviated through different means. Discussions advocated specific road or rail projects to enhance connectivity between different areas. Poor public transport connectivity to town fringes, employment centres, and airports was also frequently raised.
- 6.7 The Phase 2 stakeholder engagement for the SPYS Strategic Development Corridor programme consisted of five briefings across both corridors in Scunthorpe, Sheffield, Leeds, Durham and Manchester. The objective of the briefings was to provide an update on the progress made so far, present

the evidence and feedback gathered in Phase 1 and set out the high-level outcomes which have been identified for each corridor.

- 6.8 In total, 112 people attended the Phase 2 briefings. Phase 2 engagement was also used to report back on the type of interventions which had been shortlisted in the Option Assessment Report. It also gave partners an opportunity to ask questions about the process and find out about the next steps of the study.
- 6.9 Consultation events for the Draft STP were also undertaken in parallel and responses shared across the different TfN work streams.

Option identification and shortlisting

- 6.10 For each SDC, a process of identifying and shortlisting interventions with Pan-Northern impacts was carried out. The initial long list of interventions was developed through engagement with stakeholders, complemented by reviewing policies and scheme proposals within the study corridors. Sources included: Highways England's Road Investment Schemes, Network Rail's Enhancements Delivery Plan, TfN STP, Long Term Rail Strategy, Welsh Government's National Transport Finance Plan and local authority schemes. The longlisting exercise took account both of Pan-Northern outcomes, emerging policy and future technology developments.

Following creation of the longlist, a sifting process was undertaken considering each intervention's strategic fit with the four STP objectives and SDC sub objectives (as set out in

Table 4). This was based on a qualitative appraisal of each transport input's likely contribution to the relevant performance measures and deliverability using a four-point scoring scale as set out in Table 5 and aided through application / reference to a set of metrics (covering the four-point scale) for each performance indicator.

Table 5 Assessment scoring scale

Performance Measure	Deliverability	Rating
A strong fit with the desired outcome with large beneficial and/or Pan-Northern or national scale impacts	Strongly deliverable	
A good/reasonable fit with the desired outcome with beneficial and/or sub-corridor level impacts	Likely to be some deliverability issues but are not considered to be insurmountable	
A neutral/marginal impact with the desired outcome and/or with local impacts	Not applicable	
Conflicts with the desired outcome and/or conflict with other interventions, with risk amelioration/mitigation in place	Significant barriers to deliverability that need to be overcome through risk amelioration	

- 6.11 The sifting tool also provides a 'performance rating' for each of the four STP objectives. This does not represent a summation or weighting of the individual performance indicator ratings ('scores'); but rather takes an informed risk-based view of how well/ poorly the potential intervention met the strategic objective when considered across the respective performance indicators.
- 6.12 In order to ensure a consistency of approach the sifting tool was subject to verification and moderation across all SDCs. The outcome of the initial sifting exercise was to classify potential interventions into one of three categories:
- **Potential Core SOP Intervention:** An intervention that has the potential to support transformation improvement, measured against the four Strategic Plan objectives, in its own right
 - **Potential Complementary SOP Intervention:** An intervention that as part of a package of interventions that together have the potential to support transformational improvement (but is not Pan-Northern in its own right). Sequenced delivery could mean that complementary interventions come earlier, they could be the quicker wins.
 - **Non-Pan Northern Intervention:** An intervention that would only have limited benefits as part of a package of interventions but may have local benefits
- 6.13 All STP objectives have been treated with equal importance. Interventions that have the potential to strongly support one or more of the STP objectives may be considered a potential core intervention as part of a

balanced SOP for the SDC as a whole. It is fully recognised that some potential interventions are likely to face barriers to deliverability and these challenges will need to be overcome as part of the scheme development process.

Option refinement

- 6.14 Phase 1 of this study concluded with an Option Assessment Report (OAR) and an initial sifted list of interventions, representing a draft SOP. This draft SOP was appropriately coded into the regional highway and rail models for more detailed appraisal, refinement and package optimisation.
- 6.15 It was the intention to base the optioneering process on a transformational travel market, derived from the NTDM but as described previously this has not been possible owing to technical difficulties encountered during this stage of work.
- 6.16 Due to the reliance on a NTEM core demand scenario only it has been necessary to categorise SOP interventions for each SDC in the following manner:
- interventions that have a strong strategic case and are supported by the NTEM model outputs;
 - interventions that have a strong strategic case but are not adequately represented by the NTEM Core travel market scenario and requiring further development and analysis.
- 6.17 The option refinement process also removed a number of potential interventions where the transport need was met by better performing alternative interventions or the intervention is not expected to make any meaningful contribution to the desired Pan-Northern transport outcomes.

Key Pan-Northern Transport Outcomes and Programme of Interventions

- 6.18 A final strategic outline programme (SOP) of interventions for the Southern Pennines SDC has been defined and is presented below in Table 6 for both road and rail, and shown graphically in Figure 25 and Figure 27 respectively. The Highway SOP proposals alongside the relevant Reference Case interventions are set against the key Pan-Northern outcomes within the Corridor. While all the Passenger rail SOP proposals across the Pan-Northern Strategic Development Corridors have been shown in Figure 26.
- 6.19 The transport interventions shown are indicative at this stage. They are based on the level of evidence currently available at this very early stage of assessment. For many of the Reference Case schemes there remains a critical requirement to continue with the development of cases and to secure funding and TfN will work with partners to try and achieve that. It should also be pointed out that many of these interventions require further development and a positive funding decision before they can be delivered.
- 6.20 Delivery of these draft transport interventions should not be relied upon for planning and development purposes.

Table 6: Strategic Outline Programme of Interventions

Pan Northern Outcomes	Status	Road	Rail/ Public Transport
Improve East - west connectivity and journey times across the southern Pennines area	SDC Reference Case	<ul style="list-style-type: none"> • New road link between the Manchester Relief Road (A6) to M60 as part of the South East Manchester Multi-Modal Study (SEMMMs Package) • New road link between the A6 to Manchester Airport Relief Road and the A523 • TransPennine Upgrade Programme which includes a package of improvements and tunnel option including: <ul style="list-style-type: none"> • Mottram Moor and A57(T) to A57 link roads • A628 Tintwistle Bypass climbing lanes • A616/A61 Westwood roundabout • Improvements made to the M67 • Improvements made to the A616 from the A628 to the M1 	<ul style="list-style-type: none"> • A rail service of 5 trains per hour (tph) between Manchester and Sheffield: Northern Powerhouse Rail (NPR) with 4 services via Stockport and 1 service via Marple • 2tph from Manchester Piccadilly to Buxton • NPR providing 1 tph service from Liverpool to Lincoln via Sheffield • 1tph from Barnsley to Huddersfield
	SDC SOP intervention	<ul style="list-style-type: none"> • Additional TransPennine Upgrade Programme improvements including the M1 to M18 link • Highway interventions to support growth and improve reliability and resilience in the east of Greater Manchester and to facilitate access to and maximise the benefits accruing from an improved Southern Pennines corridor (including M60 Junctions 21 to 24 and 25 to 27 improvements, M60/M67 	<ul style="list-style-type: none"> • Heavy rail capacity and journey time improvement in the South Manchester area and on the Wilmslow and Buxton lines • Preston to York and Sheffield (journey time improvements)

		Denton Island improvements and A6 Disley and High Lane bypass)	
Improve access and connectivity to key growth zones	SDC Reference Case	<ul style="list-style-type: none"> Highway interventions to unlock employment and housing growth potential and to improve strategic and local connectivity across the north and west of Greater Manchester: This includes the South Heywood Link Road from Junction 19 of the M62 	<ul style="list-style-type: none"> Aire Valley Expansion with regeneration and growth opportunities
	SDC SOP intervention		<ul style="list-style-type: none"> New rail station Droylsden/Littlemoss 'Eastern Gateway' to be introduced
Improve access to International Gateways E.g. Airports and Ports	SDC Reference Case	<ul style="list-style-type: none"> Highway interventions to unlock employment and housing growth potential and to improve strategic and local connectivity across the north and west of Greater Manchester: This includes the South Heywood Link Road from Junction 19 of the M62 	<ul style="list-style-type: none"> Aire Valley Expansion with regeneration and growth opportunities W12 Gauge Clearance between Doncaster and Immingham
	SDC SOP intervention	<ul style="list-style-type: none"> Humber Ports access improvements (A63 relief route, A63/A1033 junction, A63 technology improvements, A180, Grimsby Western Relief Road) M18 Junction 4 connection to Doncaster Sheffield Airport and Improved highway access to Manchester Airport from south and west 	<ul style="list-style-type: none"> Rail connection and station for Doncaster Sheffield Airport New station between Barnetby and Habrough

Improve access to South Yorkshire from the M1 and A1(M) corridors	SDC Reference Case	<ul style="list-style-type: none"> • The A1 Redhouse to Darrington route to be upgraded to motorway standard • The A1(M) Doncaster Bypass to be widened to a three-lane motorway • Enhance strategic connections including improvements made to M18 Junction 3 • Improvements made to M1 Junction 33 as part of a package of measures providing an alternative to this section including widening of the A630 Parkway • Dualling of the A61 between the A616 roundabout and the M1 Junction 36, and Warmsworth Dualling 	
	SDC SOP intervention	<ul style="list-style-type: none"> • Package of measures as part of the Sheffield/Rotheram Innovation Corridor that will provide an alternative to the section of the M1 between Junctions 33 and 34 for local traffic • Marr/Hickleton Bypass • Southern Pennines east – west highway connectivity to potential new HS2 station (potentially including new/upgraded route around the North of Barnsley and Doncaster Districts or along the A6195/A635 corridor, A1 to A19 and A19 to M18 	<ul style="list-style-type: none"> • Hallam Line (Journey Time Improvements)

		<p>links and A1 to M1 link in South Wakefield, comprising A1 to HS2 link from Redhouse and M1 to HS2 link)</p> <ul style="list-style-type: none"> • M1 Junction 37a • A61 junction improvements and links to Penistone Road, Shalesmoor and Clay Wheels Lane • A57 South Anston bypass • A61 Dualling between A616 and Grenoside, Sheffield • M18 Junctions 2 to 5 (and online improvements to M18 Junction 2) 	
Improve access to Hull, East Riding, North Lincs and North East Lincs	Reference Case	<ul style="list-style-type: none"> • Improvements to the A164 between Castle Road Roundabout and Victoria Road Roundabout, this includes full reconstruction of the interchange with the A1079 (Jock's Lodge Junction Improvement Scheme) • Capacity improvements made to the Roger Millward Way and Garrison Road Roundabouts, including a footbridge over the A63 to provide better connectivity between the city centre and waterfront area 	
	SDC SOP intervention	<ul style="list-style-type: none"> • A1 improvements (south of Blyth) • A15 improvements (M180 to A46 Lincoln Bypass) • Humber ports access improvements including A63 Technology Improvements 	

		<ul style="list-style-type: none"> • M62 new junctions for Selby and Goole • A15 junctions (A63 to M180), including A1077 improvements, and support housing development at Lincolnshire Lakes 	
Improve rail connectivity within and between South Yorkshire, the Humber, and East Midlands	SDC Reference Case		<ul style="list-style-type: none"> • A rail service of 4tph between Doncaster and Hull: NPR with 1 service via Selby, 2 services conventional fast via Selby and 1 service stopping via Thorne • A rail service of 6tph between Sheffield and Doncaster: NPR with 2 services direct, 1 service conventional fast and 3 services tram-train via Rotherham Parkgate • Additional NPR service between Cleethorpes via Sheffield and Doncaster • 4 tph between Barnsley and Sheffield • 3 tph between Barnsley and Leeds • A rail service of 9tph between Leeds and Sheffield: HS2 with 4 services, 2 services conventional fast, 2 services conventional semi-fast and 1 service conventional stopping • A rail service of 9tph between Leeds and East Midlands: HS2 with 5 services, 2 services conventional fast via Derby, 1 service conventional inter-urban to Chesterfield and 1 service conventional inter-urban to Nottingham

	SDC SOP intervention		<ul style="list-style-type: none"> • Journey time and capacity improvements between Cleethorpes and Doncaster to increase links between Northern Lincolnshire and the Sheffield City Region and the North West • Sheffield to Lincoln (journey time, frequency and capacity improvements) • Penistone Line (journey time, frequency and capacity improvements) • Improvements to the Northern Loop from Sheffield station to HS2, including new stations in South Yorkshire, along with journey time and reliability improvements via Barnsley • Regular 1tph from Barnsley to Doncaster via Meadowhall • Sheffield – Nottingham (journey time improvements)
Improve access to West Yorkshire from the M1, M62 and A1(M) corridors	SDC Reference Case	<ul style="list-style-type: none"> • Capacity improvements, including improvements to the M62/M606 Chain Bar junction and the M621 Junctions 1 to 7 and the M62 Junction 27. Also includes junction capacity improvements the M1/M62 Lofthouse Interchange. • East Leeds Orbital Route • M62 junction 28 • M1 Junction 45 Improvement & Temple Green Park-and-Ride 	

	SDC SOP intervention	<ul style="list-style-type: none"> • Highway improvements within Calderdale, Kirklees and Wakefield Districts (including M62 Junction 24a, North Kirklees Orbital Route and A638 improvements – Dewsbury to the A1(M) and Wakefield to the A1(M)) • M1 corridor improvements (including Junctions 46 and 47, online improvements between Junction 43 and Hook Moor and A63 to the east of Leeds) 	
Improve connectivity within and between Greater Manchester, Lancashire and Merseyside	SDC Reference Case	<ul style="list-style-type: none"> • Highway interchange improvements of the M6/M58 & A49 Wigan Link Road • Improvements made and smart motorways on the M6 Junctions 21A - 26. Also includes the M60 Junction 8 to the M62 Junction 20. • Full WGIS as part of the Port Salford Western Gateway Infrastructure Scheme • Junction capacity improvements made at the M60/M62 and M66 Simister Island • Manchester North West Quadrant Early Wins • Manchester North West Quadrant Improvements Package • Capacity improvements at Foxdenton Lane - A663 Broadway Link Road • Highway interventions to support growth and improve reliability and resilience in the east of Greater Manchester and 	<ul style="list-style-type: none"> • A rail service of 6tph from Manchester to Preston: 1 service fast via Bolton, 1 service fast via Golborne, 1 service semi-fast via Bolton and 3 services stopping via Bolton • 1tph from Manchester Airport to Barrow/Windermere • A rail service of 11tph from Liverpool to Manchester: NPR with 5 services 2 services conventional fast, 1 service conventional semi-fast and 3 services conventional stopper • A rail service of 6tph from Manchester to Wigan: 1 service fast via Golborne, 3 services stopping via Atherton and 2 services stopping via Bolton

		<p>to facilitate access to and maximise the benefits accruing from an improved Southern Pennines corridor including M60 Junctions 24 - 27 and Junctions 1 - 4</p> <ul style="list-style-type: none"> • New Dual Carriageway link between the M55 and A583 to the west of Preston, including a new M55 Junction 2 (Preston Western Distributor) • Capacity improvements on the Penwortham Bypass • South Manchester HS2 requirements (SEMMMS Package) 	
	SDC SOP intervention	<ul style="list-style-type: none"> • Highway interventions to support growth and improve reliability and resilience in the east of Greater Manchester and to facilitate access to and maximise the benefits accruing from an improved Southern Pennines corridor (including M60 Junctions 21 to 24 and 25 to 27 improvements, M60/M67 Denton Island improvements and A6 Disley and High Lane bypass) 	<ul style="list-style-type: none"> • New rail link and town centre station connecting Skelmersdale to Liverpool and Manchester, as well as the national rail network • Windermere and Barrow to Manchester Airport (frequency and journey time improvements) • Preston to York and Sheffield (journey time improvements) • Birchwood park and ride • Heavy rail capacity and journey time improvement in the South Manchester area and on the Wilmslow and Buxton lines in addition to the Bus Rapid Transit Schemes connecting Wigan Borough and Salford City

Figure 25: Southern Pennines SDC Road Reference Case and SOP Proposals

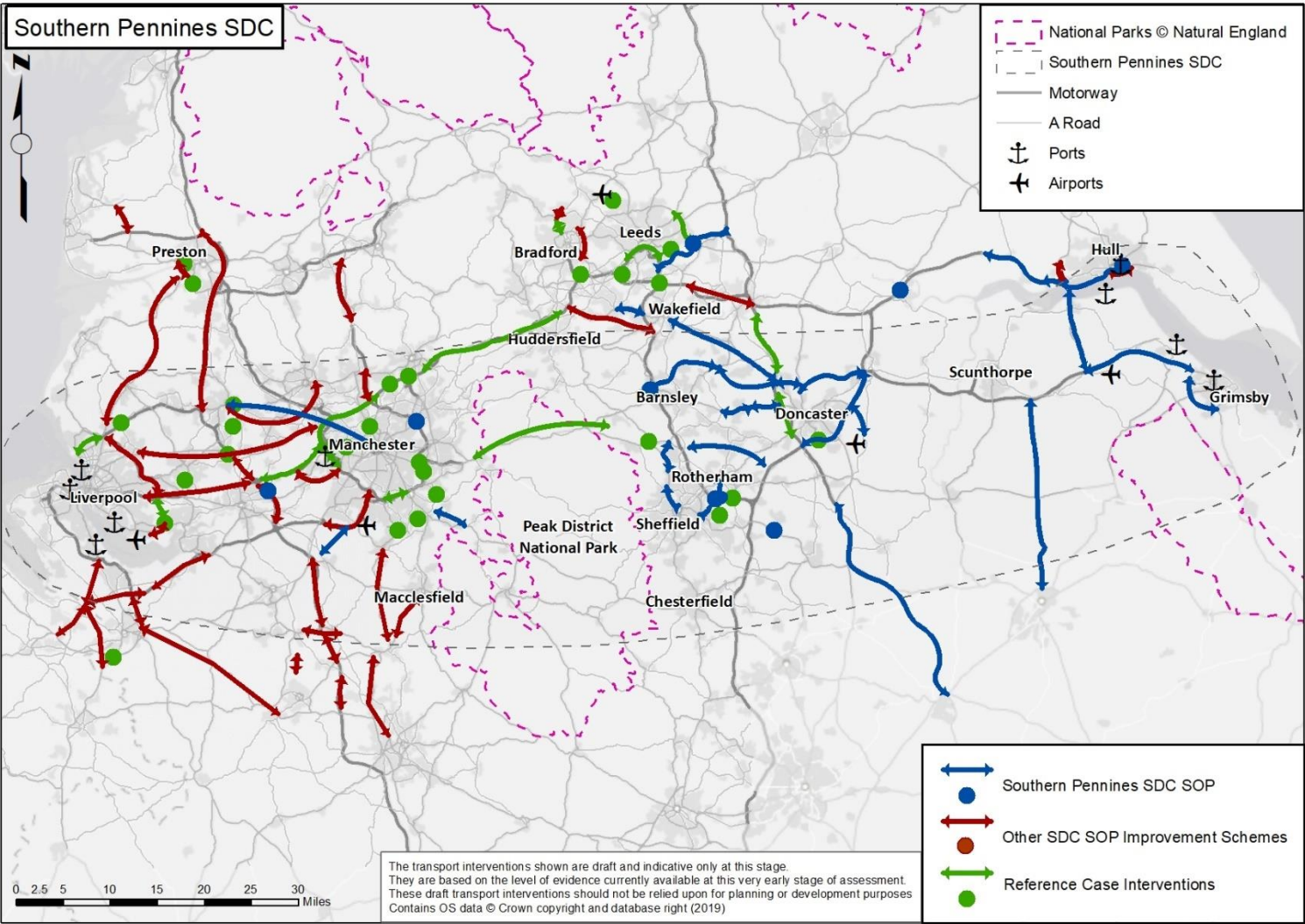


Figure 26: Passenger rail SOP proposals across the Pan-Northern Strategic Development Corridors

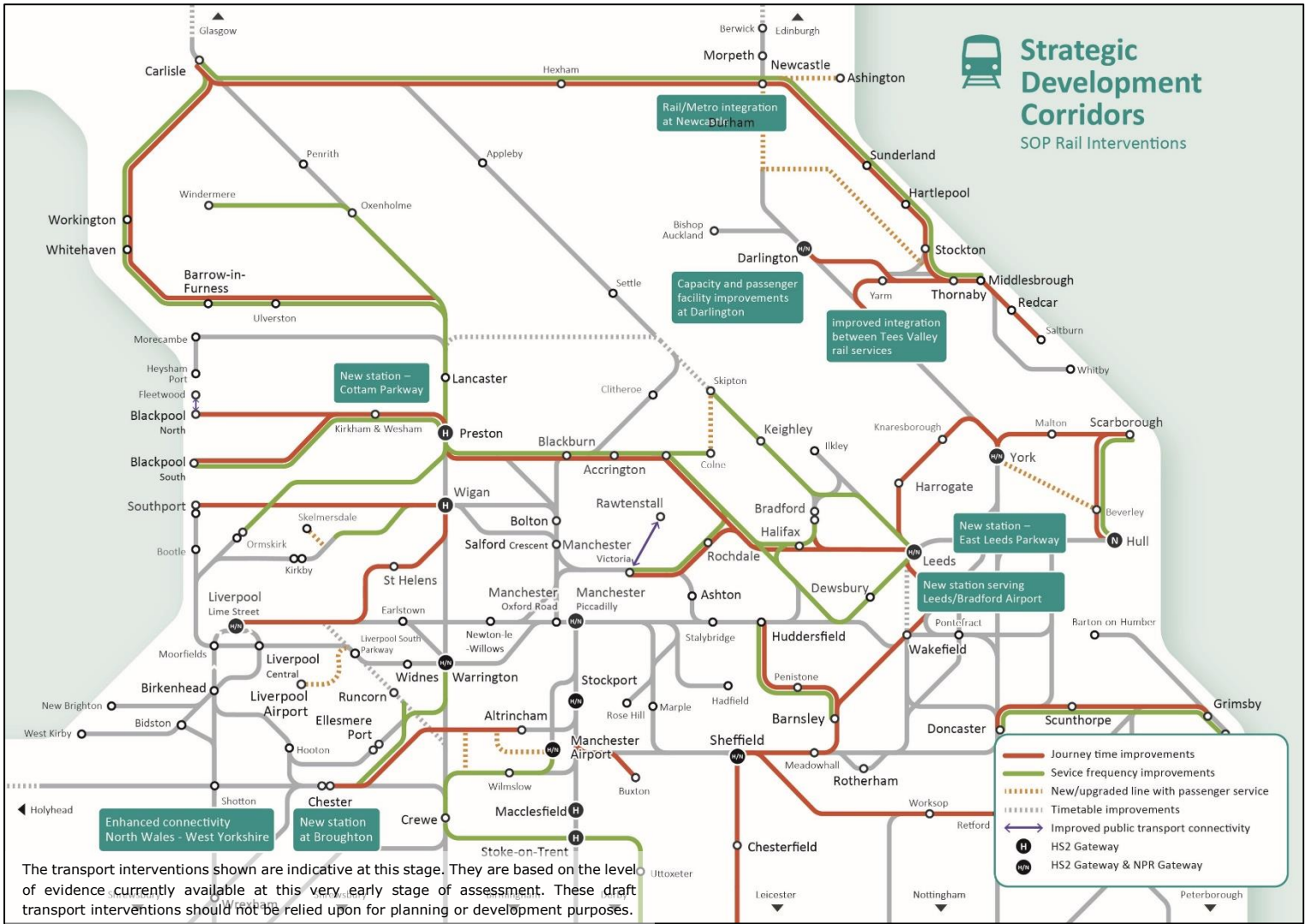
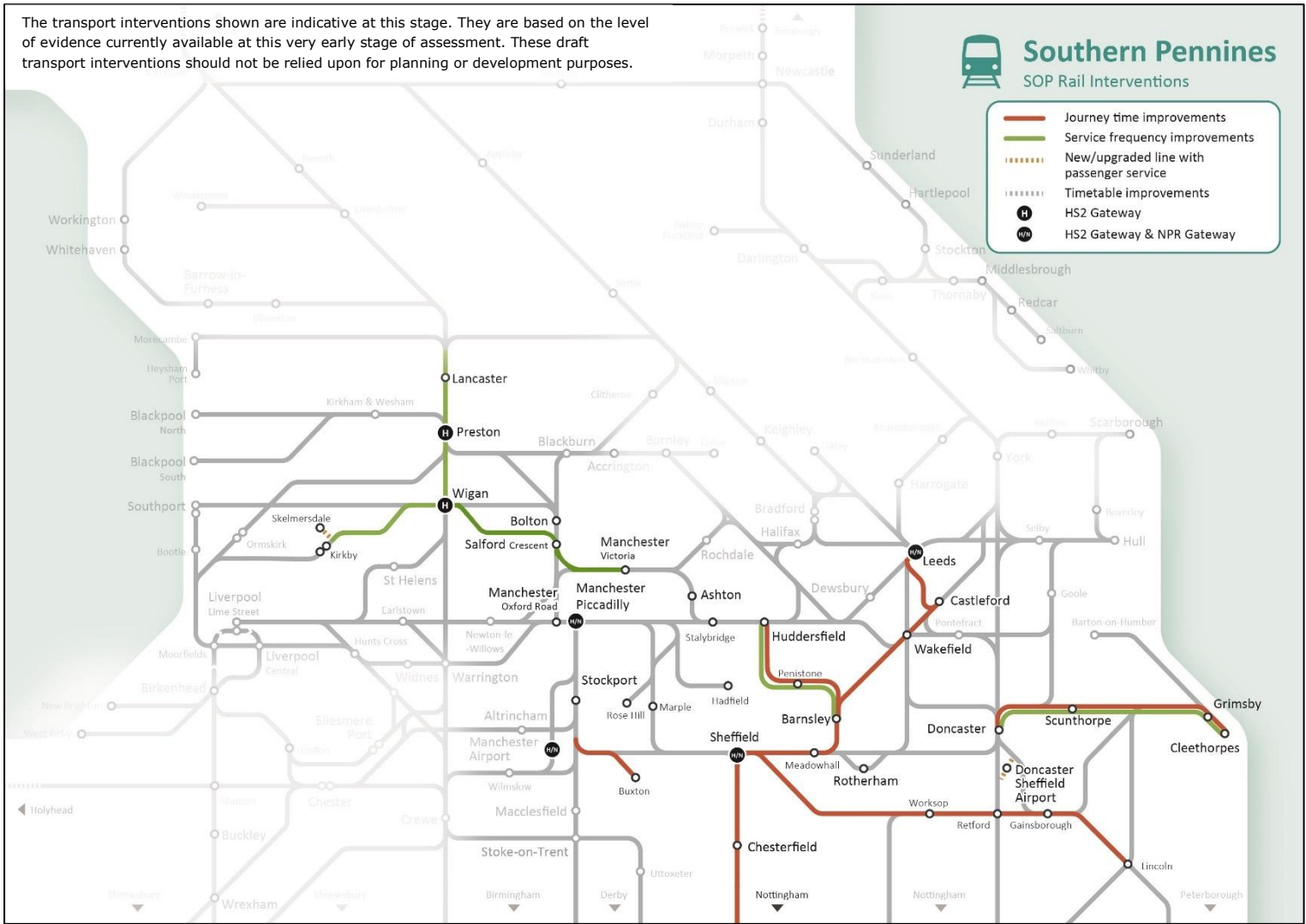


Figure 27: Southern Pennines SDC Passenger Rail SOP Proposals



Multi modal interface

- 6.32 The interventions for road and rail have been developed from the perspective of promoting opportunities for integration between modes and maximising the reach of transformational infrastructure (such as HS2, NPR and International Airports) through strategically placed interface points with the MRN. They have also been considered from the perspective of forecast economic growth, and the means to which connectivity can be improved between residential and employment areas.

Freight and Warehousing

- 6.33 Work has been undertaken to better understand the implications of future growth in freight demand, both to, from and through the North of England, and the demand it might create at a spatial level for new warehousing associated with intermodal terminals and ports.
- 6.34 Table 7 lists the locations of potential warehousing that is assumed to be delivered in the North of England to assess the impact of clustered warehousing growth, with specific relevance to the Southern Pennines geography. The locations shown are indicative at this stage. They are based on the level of evidence currently available at this very early stage of assessment. They should not be relied upon for planning and development purposes.

Table 7 Warehousing growth by region (assumptions made for freight modelling of clustered warehousing)

Location	Local Authority	Region
Appleby	Eden	North West
Northern Gateway	Rochdale	North West
Astley	Manchester	North West
Skelton Jn	Trafford	North West
Trafford Park	Trafford	North West
Carrington	Trafford	North West
Parkside	St. Helens	North West
Bryn	Wigan	North West
Knowsley Industrial Park	Knowsley	North West
Garston	Liverpool	North West
Port of Liverpool	Sefton	North West
3MG	Halton	North West
Runcorn Docks/Port of Weston	Halton	North West
Port of Warrington	Warrington	North West
Selby	Wirral	North West
Stourton	Selby	Yorkshire & Humber
Normanton	Leeds	Yorkshire & Humber
Hull Saltend	East Riding of Yorkshire	Yorkshire & Humber
Hull Dock	East Riding of Yorkshire	Yorkshire & Humber
Goole	East Riding of Yorkshire	Yorkshire & Humber
Immingham Dock	North East Lincolnshire	Yorkshire & Humber
Doncaster Up Decoy	Doncaster	Yorkshire & Humber
Tinsley	Sheffield	Yorkshire & Humber

Anticipated impacts of the programme

- 6.35 As outlined in chapter 3, the economic performance of the Southern Pennines SDC suffers from several economic shortcomings and has been experiencing a significant performance gap with the rest of the UK. Low levels of productivity, poor connectivity and low levels of agglomeration have caused an under developed economy with respect to the UK's national performance. The implementation of the identified programme of interventions will lead to several wide-ranging impacts that aim to tackle some of the economy's shortcomings and stimulate the overall economic development of the region.

Connectivity and economic development

- 6.36 Connectivity improvements with an aim to foster economic activity is to have the most important anticipated impacts through the above list of the programme of interventions. Several interventions aim to create better transport links to facilitate economic collaboration and competition as well as to provide a larger pool of employees and employers.
- 6.37 Critical east - west connectivity across the Southern Pennines area is addressed by proposed major schemes such as the A1-A19 link, the M1-M18 link and the A19-M18 link around Doncaster. These links would enable better connectivity between regions and ease congestion levels on the M62. These links would also improve connectivity between the eastern regions of the Southern Pennines corridor, such as the Humber region, to the Trans-Pennine connections.
- 6.38 The Sheffield / Rotherham area would benefit from economic development due to improved access to the key motorways of M1 and the A1(M). The interventions that improve these accesses include junction improvements and the addition of new junctions on the M1. The connectivity to the Sheffield / Rotherham area would be future proofed by the interventions considering connections to the new HS2 station in South Yorkshire. Other improvement schemes such as the A61 dualling and A635 would ensure efficient connectivity is continued to the west and the Pennines.
- 6.39 Further to the west of the corridor, accessibility would be improved between Manchester Airport, the SRN & Manchester City Centre (M60 / M56). Interventions looking to improve East - West links in addition to the reference case of the Transpennine tunnel and the Northern Powerhouse Rail are all aiming to improve connectivity with the target to increase the region's productivity and its economic performance.

Freight

- 6.40 Freight and logistics plays an important role in the Southern Pennines corridor. It is an area which has experienced significant further growth in recent years, reflecting the rising investment and aspiration of the region's logistics stakeholders. Freight and logistics is also seen as a central enabling capability (as defined by NPIER) for the successful economic development of the North. Several interventions within the SOP are

proposed with the target to ensure and improve the freight infrastructure in the corridor.

- 6.41 Key freight routes connecting the main ports of Immingham, Grimsby and the city of Hull along the eastern side of the SDC would be improved by the A180 upgrade and the A63 technology improvement interventions. The A15 junction upgrades between the A63 and the M180 would also facilitate better freight movements in the area and connect the flow of goods towards the M18 and the A1(M).

Constraints and Wider Considerations

- 6.42 While the proposed programme of interventions demonstrates strong potential and benefits with regards to an improved economic performance and opportunities across the North and increased efficiency and resilience of the transport system, the implementation of the programme would need to carefully consider potential environmental constraints. The Southern Pennines SDC contains the environmentally sensitive area covered by the Peak District National Park.
- 6.43 Improved connectivity and increased road and rail activity might have negative impacts on transport-related greenhouse gases (GHGs), noise pollution, environmentally sensitive areas and local communities. Therefore, the lever 'conserve and enhance the built and natural environment' has played a central role in the sifting process of possible interventions.
- 6.44 While an overall reduction of transport-related greenhouse gases (GHGs) and noise pollution is difficult to achieve by increasing the number of transport links, the programme of interventions covers a set of strategic projects that collectively aim to reduce and limit the overall impact of transport on the environment and local communities. However, it is recommended that the impact on local communities, environmental constraints and the complexity of ecosystems needs to be carefully considered at every stage of scheme development.
- 6.45 It is noted that technology will play a significant role in the delivery of transport improvements across northern England up to 2050, based on the understanding that current levels of congestion (especially in the major city regions) is already reaching unsustainable levels for significant parts of the day, which cannot be addressed solely by adding capacity to the network.
- 6.46 A number of policy interventions were identified in the Option Assessment Report (OAR). These policy interventions have been considered further in the Southern Pennines and Yorkshire to Scotland 'Future Technology Intervention Impacts' Report (Dec 2018).
- 6.47 TfN are committed to reviewing all interventions and investigating how they can be future proofed to accommodate development in technology (such as linked autonomous vehicles) within the context of developing the MRN. Equally, there may be schemes identified within the Long-Term Investment Programme (LTIP) that are ultimately unnecessary as a result of being superseded by changing methods of addressing travel demand.

7 Strategic Dimension Summary

- 7.1 This chapter has set out the case for investing in the proposed programme of interventions in the Southern Pennines SDC. This includes addressing significant transport challenges not covered by interventions contained in the reference case.
- 7.2 To achieve transformational growth across all parts of the North (not just in the large urban conurbations) and realise the necessary rebalancing of the northern and UK economies, it will require further transport intervention.
- 7.3 The Option Assessment Process adopted as part of the Southern Pennines SDC has involved a transparent review of numerous interventions, which were assessed against agreed objectives to identify the preferred multi-modal package of interventions. This process involved two rounds of stakeholder consultation.
- 7.4 Alongside all the technical and financial considerations to be taken in relation to any proposed interventions, it was 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, and where possible to deliver enhancements.
- 7.5 Any early assessments made as part of the development of the Strategic Transport Plan are important steps in protecting and, where possible, enhancing the environment, health and wellbeing of the North. It is important to recognise that in the development of any intervention, further health and social aspects would need to be assessed at an appropriate level for that stage of the design or planning.
- 7.6 The identified package of interventions is closely aligned with the proposed programme of interventions within national, regional and local policies.
- 7.7 Results of the further analysis and evaluation of the list of interventions is presented in the following chapter, the Economic Dimension.

Economic Dimension

The focus of the Economic Dimension is demonstrating that the proposed package represents Value for Money to the UK as a whole, in that:

- It is a justified public sector intervention, with positive impacts outweighing costs and negative impacts
- A process of refinement has been undertaken, working towards a programme which represents the strongest option

8 Introduction

Background

- 8.1 The Economic Dimension sets out the approach taken to quantifying benefits and costs as part of the assessment, and also provides qualitative assessments of impacts which cannot be quantified at this stage of assessment.
- 8.2 The evidence-led process which led to the identification of a programme of interventions for the Southern Pennines Strategic Development Corridor (SDC) is described in Chapter 5, within the Strategic Dimension of this Strategic Programme Outline Case (SPOC). The programme combines road and rail interventions of differing scales and delivery programmes, with beneficial outcomes to individuals and organisations within and beyond the SDC area.
- 8.3 The economic case concludes with a Value for Money (VfM) assessment which draws together the quantified and qualitative factors, the latter including consideration of the programme's alignment with Department for Transport (DfT) and Transport for the North (TfN) strategic objectives as set out in Table 1 and

- 8.4 Table 4 respectively. These matters will be combined with a consideration of strengths and limitations in the level of analysis at SPOC stage, to determine a VfM category for the programme.
- 8.5 The economic appraisal has followed the TfN assurance process which includes:
- TfN's Technical Assurance Group (TAG) Meetings - to agree the appraisal process with partners;
 - Weekly Senior Modelling Group (SMG) meetings across the delivery teams to ensure that a consistent approach is applied to the different SDCs and the different modes; and
 - Technical Assurance 'deep dive' sessions to ensure that the appraisal outputs are robustly checked.
- 8.6 The level of appraisal and assurance undertaken is considered to be greater than what would normally be expected at Strategic Outline Business Case.
- 8.7 The appraisal is documented in detail in the following supporting documents:
- Data Requirements and Model Zoning (July 2018)
 - Local Model Validation Report (LMVR) (October 2018)
 - Combined Transport Forecasting and Economic Appraisal Report (February 2019)
 - Environmental Appraisal Report (EnvAR) (February 2019)
 - Appraisal Summary Table (February 2019)

Rationale for Investment

- 8.8 The appraisal will demonstrate that further investment is required above the reference case in order to achieve transformational growth. The current case is built upon National Trip End Model (NTEM) Core growth only. Transformational growth would generate a larger demand and greater benefits. However, transformational growth scenarios have not been assessed at this stage.

Approach to Value for Money Appraisal

- 8.9 The VfM appraisal of the Southern Pennines SDC Programme has been undertaken with reference to DfT's Transport Appraisal Guidance⁵¹ (WebTAG) as current at May 2018. Unless stated otherwise monetised impacts within the Economic Dimension are presented in 2010 Gross Domestic Product (GDP) Deflator Real Market Prices discounted to 2010 present values⁵², as specified by WebTAG.
- 8.10 The proportionate approach to the VfM appraisal of the Southern Pennines SDC Programme was set out in the Stage 1 Appraisal Specification Report⁵³

⁵¹ <https://www.gov.uk/guidance/transport-analysis-guidance-webtag>

⁵² For further details, see paragraph 10.1 onwards

⁵³ Product 04: Appraisal Specification Report (June 2018)

(ASR) for the study. The ASR set out how the economic, environmental and operational assessments for the project would be undertaken, and how they would be supported by traffic modelling, whilst taking into consideration budgetary, programme, political, environmental and spatial constraints. It is noted that the approach evolved over the course of the study (as is to be expected); nonetheless the ASR remains a useful reference document in support of this SPOC.

- 8.11 The Economic Dimension for each of the Central Pennines; Energy Coasts; Southern Pennines; and West and Wales corridors, sets out the approach taken to forecasting the demand and economic impacts resulting from the programme of highway interventions within a modelling framework which represents the specific corridor. Passenger rail interventions, which in many cases have impacts which are not contained within the corridor boundaries, have been represented in a separate exercise resulting in the production of a Pan-Northern Rail Report. Similarly, the highway and rail freight impacts, which are UK-wide, have been separately represented. Changes in travel times and costs resulting from these wider interventions, have been included within the Reference Case for the highway intervention forecasts, to limit the potential double counting of their impacts. Results from the separate analyses are brought together within the VfM statement.
- 8.12 The demand and economic benefits forecasting for the programmes of interventions is based on 'business as usual' travel market growth in line with DfT's NTEM⁵⁴. In contrast, the option identification and selection process was based on the assumption that the transformational economic growth identified in the Northern Powerhouse Independent Economic Review (NPIER) is achieved. On balance, TfN considers the constructed case to be more credible with lower demand growth and less uncertainty, than the alternative with transformational growth at this stage of development. TfN will assess transformational impacts in any further business case development using its Analytical Framework.
- 8.13 Accordingly, the forecast demand and economic benefits presented in this Economic Dimension considers only at this stage those interventions that have both a strong strategic case and are supported by the NTEM Core model outputs⁵⁵.

⁵⁴ For the programmes of highway interventions, NTEM modal growth assumptions are adjusted for network conditions within the variable demand modelling approach applied. For rail intervention, equivalent adjustments are made to forecast rail mode share by application of the rail industry's Exogenous Demand Growth Estimation (EDGE) process.

⁵⁵ TfN is developing the transport modelling tools plan to take forward further analysis and appraisal of the Strategic Outline Programme of transport interventions, including economic appraisal of schemes not adequately represented by the NTEM Core travel market scenario.

- 8.14 Table 8 and Table 9⁵⁶ below list the final Strategic Outline Programme (SOP) of road and rail interventions respectively that have been appraised at this very early stage of programme development for the Southern Pennines SDC, alongside those interventions that have a strong strategic case but are not adequately represented by the NTEM Core travel market scenario, and requiring further development and analysis at the next stage of work which will include transformational growth scenarios.

⁵⁶ Table 9 includes all Pan-Northern rail interventions, not only those specific to the Southern Pennines Corridor.

Table 8 Appraisal of Strategic Outline Programme of Road Interventions

Road Interventions Appraised within the Economic Dimension
<ul style="list-style-type: none"> • A6 Disley and High Lane Bypass • M60 J21 Mainline Capacity Improvements • A1 widening between J34 and Winthorpe/A46 junction • A15 route upgrade from J4 on M180 to A46 Lincoln Bypass • Grimsby Western Relief Road • A15 junction upgrades between A63 and M180 • South Anston bypass • M1 junction 37a • M1 to HS2 link in South Yorkshire • A1 to HS2 link in South Yorkshire • A61 dualling between A616 and Grenoside, Sheffield • M1-M18 Link with additional capacity on the M18 between new link and A1(M) • M18 widening between the M180 and A1(M) • M18 J4 Connection to Doncaster Sheffield Airport • A635 improvements • Marr / Hickleton Bypass • A1-A19 Link • A19-M18 Link • Wakefield to A1(M) via A638 Crofton • M1 J43 to Hook Moor • M1 J46 Improvements
Road Interventions Not Appraised within the Economic Dimension at this stage ¹
<ul style="list-style-type: none"> • Manchester Airport - improved vehicle access from south and west • Birchwood (Woolston) Park & Ride for trains services and P&R bus service to/from Warrington • Bus Rapid Transit Schemes connecting Wigan Borough and Salford City • A180 upgrade • A63/A1033 junction improvements • New Junctions on M62 between Selby and Goole • A63 technology Improvements • M1 New Junction between junction 33-34 • Sheffield/Rotherham Innovation corridor • A61 Penistone Road and Shalesmoor • Dewsbury to M1 J40 Improvements

Table 9: Appraisal of Strategic Outline Programme of Rail Interventions

Rail Interventions Appraised within the Economic Dimension
<ul style="list-style-type: none"> • Journey time improvements Preston to Blackpool North • Skelmersdale rail link • East Lancashire Line (journey time and capacity improvements) • Burnley to Manchester journey time and service improvements • Preston to York (journey time improvements) • Crewe – Stoke - Derby (journey time improvements) • Extension of North Staffordshire services to Nottingham and Manchester Airport • Manchester – Skelmersdale (via Wigan) service frequency enhancement • New stations at Droylsden/Littlemoss (Eastern Gateway) and Stoke park and ride • Buxton Line (journey time improvements)
Rail Interventions Not Appraised within the Economic Dimension at this stage:
<ul style="list-style-type: none"> • South Fylde Line (journey time and capacity improvements) • Service frequency enhancements between Ormskirk and Preston • Liverpool to Preston (journey time and service improvements) • Southport to Wigan (journey time improvements) • Colne to Accrington (journey time and service improvements) • York to East Coast journey time improvement • Skipton – Colne reopening • Bradford to Leeds (journey time improvements) • Harrogate Line (journey time improvements) • Blackburn to Manchester Victoria (journey time improvements) • Rossendale to Manchester public transport connectivity • New stations at LBA Parkway, East Leeds Parkway and Cottam Parkway • Rapid transit link between Liverpool South Parkway station and LJA Airport • York to Hull (service improvements) • Hull to Scarborough (journey time and frequency improvements) • Cumbrian Coast Line – journey time and capacity improvements • Whitehaven to Newcastle (frequency improvements) • Furness Line – Journey time and reliability improvements • Windermere to West Yorkshire (service improvements) • Tyne Valley Line – route upgrade and service improvements • Durham Coast Line – route upgrade and service improvements • Middlesbrough to York journey time and service improvements • Bishop Auckland to Saltburn Line journey time improvements • Increased service calls at Hartford and other WCML stations • Mid-Cheshire Line (journey time and capacity improvements) • Northwich to Sandbach reopening and new stations • Knutsford to Manchester Airport (Western Link connection) • Extension of Leeds – Chester service to Llandudno Junction • New station at Broughton • Direct connectivity between Preston/Bolton and Sheffield • Rail connection and station for Doncaster Sheffield Airport • New station between Barnetby and Habrough • South TransPennine Line – journey time and capacity improvements between Doncaster and Cleethorpes • Sheffield to Lincoln (journey time improvements and service frequency enhancements) • Penistone Line (journey time improvements and service frequency enhancements) • Hallam Line (journey time improvements) • Barnsley – Doncaster direct services • Sheffield – Nottingham (journey time improvements)

Distributional Impacts

- 8.15 Distributional Impacts (DI) consider the variance of transport intervention impacts across different social groups. DfT guidance on Distributional Impact Appraisal⁵⁷ identifies the eight indicators where DI may apply, beneficially or adversely: user benefits, noise, air quality, accidents, security, severance, accessibility and personal affordability. Step 1 in a DI appraisal is a screening process, identifying whether any impacts which remain after mitigation actions are either significant or concentrated and therefore whether progressing DI appraisal through subsequent steps in the process is necessary.
- 8.16 A DI Screening Pro-Forma has been completed and is included within the Transport Forecasting and Economic Appraisal Report. At the programme level, the following impacts are identified through the screening process as having the potential for significant or concentrated consumer (non-business) impacts during the operational phase⁵⁸:
- **User benefits:** changes in consumer (non-business) journey times, including from improved reliability and punctuality. This impact area has the closest match with the rationale underlying the SDC programme, with the expected outcomes being in terms of journey time savings which effectively improve connectivity between residents and opportunities and improve accessibility by offering greater choice of in-scope destinations
 - **Personal Affordability:** changes in consumer (non-business) journey costs considering highway impacts (vehicle operating costs)

The potential for the above two indicators to have a material DI impacts has been appraised within this SPOC, and can be found in Chapter 13 described under the relevant social impacts indicators. Both areas are fundamental to the strategic objectives which underpin the SDC programme in support of TfN's STP (see

⁵⁷

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/638644/TAG_unit_a4.2_distrib_imp_app_dec2015.pdf
(December 2015)

⁵⁸ DfT DI Guidance excludes employers' business trips and impacts during construction

- 8.17 Table 4), together representing the improvement in connectivity from a more efficient transport system and resulting gain in productivity.
- 8.18 The screening process should not be interpreted as a suggestion that TfN does not consider the remaining DI impacts as unimportant or unaffected. As business cases for interventions within the SDC individually or in packages come forward, the DI screening process will be repeated. At a more local scale it is likely that the screening process will identify a different group of indicators to take to DI appraisal.
- 8.19 It is further noted that the impacts identified for consideration above, are simply where material impacts of the programme overlap with indicators which DfT has identified for their Distributional Impact potential. Elsewhere in the Economic Dimension, the material impacts of the programme are considered – with particular attention given where these align with the underpinning strategic rationale.

Structure of Economic Dimension

- 8.20 The remainder of the Economic Dimension of this SPOC is structured as follows:
- Chapter 9 describes the approach to costing interventions, including the treatment of optimism bias, and summarises the overall cost of the programme
 - Chapter 10 outlines the approach to quantifying the impacts of the programme, including the forecasting of demand impacts and the processes of economic appraisal
 - Chapters 11 to 14 follow the format of DfT's Appraisal Summary Table introducing the SDC Programme's: **Economy** impacts (11); **Environment** impacts (12); **Social** impacts (13); and **Public Accounts** impacts (14)
 - Chapter 15 brings the various impacts together, with a consideration of the robustness of the analyses completed, as a **Value for Money** statement for the programme

9 Approach to Cost Estimation

Introduction

- 9.1 This chapter sets out the derivation of the implementation costs of delivering the Southern Pennines SDC programme and the lifecycle costs, comprising maintenance, operating costs (for rail only) and renewals costs for the interventions delivered.
- 9.2 The monetised Economic Appraisal, which forms the foundation of the VfM Appraisal, represents the difference between a Reference Case⁵⁹ and the interventions of the SDC programme.

⁵⁹ For further details, see paragraph 2.25 onwards

- 9.3 Subsequent text describes the approaches to cost risk and uncertainty, including the treatment of Optimism Bias. This chapter concludes by presenting the net costs which are compared against monetised benefits within the Economic Appraisal.

Approach to Intervention Sequencing

- 9.4 For reasons of practicality, the approach to quantifying the impacts of the Southern Pennines SDC programme adopts a proportionate approach of assuming a single opening year for all interventions. For internal consistency, within the Economic Dimension the same approach has been taken with implementation costs, represented up to a 2035 assumed opening year and lifecycle costs from then onwards (over a 60 year appraisal period (2035-2094).
- 9.5 It is noted that this approach does not have any material effect on the results of the economic appraisal, or the robustness of any conclusions based on that appraisal. In terms of implementation costs, this approach effectively assumes that the discounted cost would not change if it was assumed to be incurred in a different year, that is that the downward effect of discounting and the upward effect of real terms inflation and increasing uncertainty would tend to cancel each other out.

SDC Programme

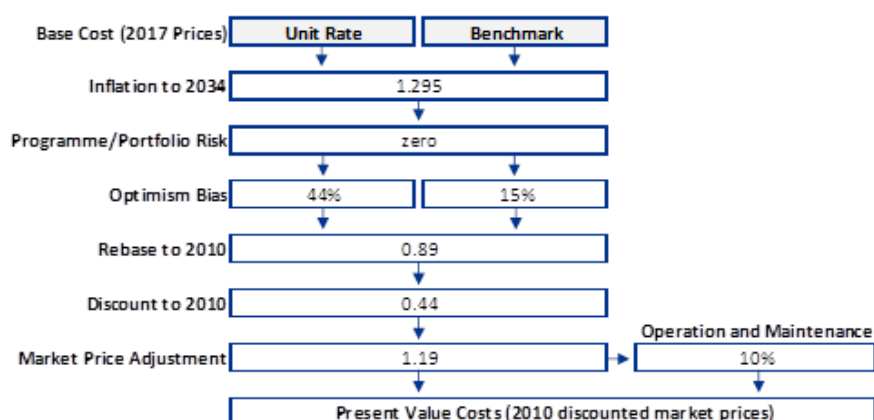
Implementation Costs

- 9.6 The Southern Pennines economic appraisal considers the capital cost of the SOP itself, together with any changes in the capital cost of operation and maintenance in future years. Only those schemes presented in Table 8 and Table 9 are considered within this economic appraisal.
- 9.7 It should be noted that the costs used in economic appraisal differ from the outturn costs used for funding decisions and to those presented within the Financial Case. For the economic appraisal of the Southern Pennines SDC, all monetary units are presented in 2010 discounted market prices.
- 9.8 As part of the SDC programme, two sources of deriving representative base scheme costs have been used:
- Unit Rates – a series of rates per km or per intervention type provided by Benchmark which drew upon their industry knowledge and database which contained scheme cost information which was not publicly available. These unit rates include all construction costs, design and preparation, lands costs, enabling works, supervision, statutory undertakers and third party infrastructure costs before risk and inflation.
 - Benchmark – Some schemes within the Southern Pennines SDC SOP were not considered suitable to be costed via the unit rate methodology due to their complexity (e.g. schemes with complex structures, bridges or known engineering challenges) or anticipated high value. Benchmark prepared base costs for these interventions based upon the Highways England Major Projects standard cost estimate structure and Association for the Advancement of Cost and Engineering International (AACEI)

Class 5, given the early concept stage which the SDC SOP is currently at.

- 9.9 It should be noted that the process described in this section refers to highway capital costs. The approach to developing passenger rail costs is set out in the Passenger Rail SPOC.
- 9.10 These two sources of costs provide values scheme base costs in 2017 prices. The process to convert 2017 scheme base costs to 2010 discounted market prices to be used in appraisal is presented within Figure 28. Further details are provided below and in the Economic Appraisal Report.

Figure 28: Estimation of Costs for Appraisal



- 9.11 Table 21 (in Chapter 14) presents the Southern Pennines SOP scheme costs in the format of the DfT's CPSS Cost Proforma Summary Sheet. This shows the build-up of the scheme costs from 2017 Base Costs through to 2010 discounted market prices representing the SOP investment costs. Section 14 also presents the Present Value Costs of the Southern Pennines SOP.
- 9.12 Although a cost allowance has been made for Operation and Maintenance, at this early stage of appraisal the expected benefits generated by net savings from construction and future year maintenance have not been captured.

Lifecycle Costs

- 9.13 Given the early stage of scheme development, a full assessment of expected operating and maintenance costs has not been undertaken. For the purposes of the economic appraisal, operation and maintenance costs equivalent to 10% of the Present Value (PV) of total capital costs has been included.
- 9.14 These costs have been assumed to all be incurred within the single year of 2035.

Cost Risk and Uncertainty

- 9.15 Given the early stage of cost development, no risk or contingency has been included.

- 9.16 The 44% Optimism Bias applied to schemes costed through the unit rate methodology is in line with WebTAG guidance for Road schemes at Stage 1 of scheme development.
- 9.17 The SDC programme cost estimate is based upon the assumption that the full package of measures associated with the programme will be delivered by 2035. At this stage of scheme development, it has been assumed that all costs will be incurred in the single year of 2034.

10 Quantified SDC Programme Impacts

Introduction

- 10.1 This chapter summarises the quantification of the impacts of the Southern Pennines SDC programme including the approach to and results of the demand forecasting undertaken and of the monetised Economic Appraisal. It describes how the transport models used to represent the impacts of the Reference Case and SDC Programme fit within TfN's wider analytical framework.

Approach to Demand Forecasting

- 10.2 This section sets out the approach to:
- Highway demand modelling;
 - Passenger rail demand modelling; and
 - Freight and logistics modelling.

Highway Demand Modelling

- 10.3 Highway forecasting was undertaken using a modified version of the Highways England 2015 Trans-Pennine South (TPS) Regional Transport Model (RTM). The model zoning was reviewed and disaggregated where appropriate in areas where SOP interventions are likely to be located. The assignment model is for the average hours of AM Peak (07:00 to 10:00), Inter Peak (10:00 to 16:00) and the PM Peak (16:00 to 19:00).
- 10.4 Future year forecasts have been developed for 2035 and 2050 using DfT standard forecasts. The full forecasting process is described in detail in the Combined Transport Forecasting and Economic Appraisal Report.
- 10.5 Generalised Costs for Value of Time (VoT) and Vehicle Operating Costs have been included from TAG Databook December 2017.

Passenger Rail Demand Modelling

- 10.6 Rail passenger forecasting was undertaken using the NoRMS Phase 2 model, which was developed by TfN and is a Cube-based rail assignment model of the North of England, including all rail stations. The model includes a simplified representation of the network outside of the North, providing access to external destinations, and is combined with an endogenous impact model to provide elasticity-based changes in demand based on

changes in service provision. Further details are available within the Rail SPOC.

Freight and Logistics Modelling

- 10.7 The Freight and Logistics Market is modelled using the Great Britain Freight Model (GBFM) managed and owned by MDS Transmodal (MDST). The inputs to the model come from standard DfT statistics for Ports and Maritime, road data collected through the Continuing Survey of Roads Goods Transport (CSRGT) and private sector intelligence. MDST also utilise Network Rail data which although highly sensitive, is presented in such a way so individual rail flows cannot be identified. The Heavy Goods Vehicle and Van data that is used to model the road freight impacts can be aggregated in terms of benefits. The other freight scenarios that have been used include looking at the impact of larger ships, warehouse clustering and rail capacity that is both constrained and unconstrained. These scenarios cannot be aggregated together as they rely on very different economic conditions and private sector investment to grow.

Forecast Impact of the SDC Programme

- 10.8 The forecast impact on traffic flows of the SDC programme is shown in Figure 29 below. The flow difference plot shows increase in flows on the A1(M) between Newark and Doncaster as a result of reassignment to make use of the additional capacity due to the widening of the motorway on that section and the additional induced demand. Increased flows are also observed on the Trans Pennine Tunnel (reference case intervention) between Manchester and Sheffield as well as from North Lincolnshire and Humberside to the Doncaster area (and vice versa). Substantial traffic flows are observed on the M1 to M18 link north of Rotherham, a proposal that relieves congestion on the M1 and M18 junctions around Sheffield and Rotherham. Likewise, the new highway links providing improved east to west connectivity between the M1, A1, A19 and M18 north of Barnsley and Doncaster constitute an alternative to the M62 between the M1 and the M18 and thus, help to relieve pressure on that section of the motorway.
- 10.9 Figure 30 provides a spatial summary of the economic benefits. This shows that benefits are generated across the Southern Pennines SDC area due to the Southern Pennines SOP interventions only. The largest benefits are generated in areas in and surrounding Doncaster and Barnsley. Benefits are also generated in areas in and surrounding Sheffield, Bradford and Leeds as well as Scunthorpe and Grimsby. Minor disbenefits are generated in Manchester, which is due to the increases in demand caused by the Southern Pennines SOP highways interventions outside of this area. It is expected that further refinement of the SOP and local improvements would mitigate this disbenefit. It should be noted that this disbenefit is only minor in value. Furthermore, it should be acknowledged that the SOP interventions included in other SDCs (e.g. Wales & West SDC) will generate additional benefits.

Figure 29: 2050 Daily (AADT) Flow Difference ('Do Something' Strategic Outline Programme minus Reference Case)

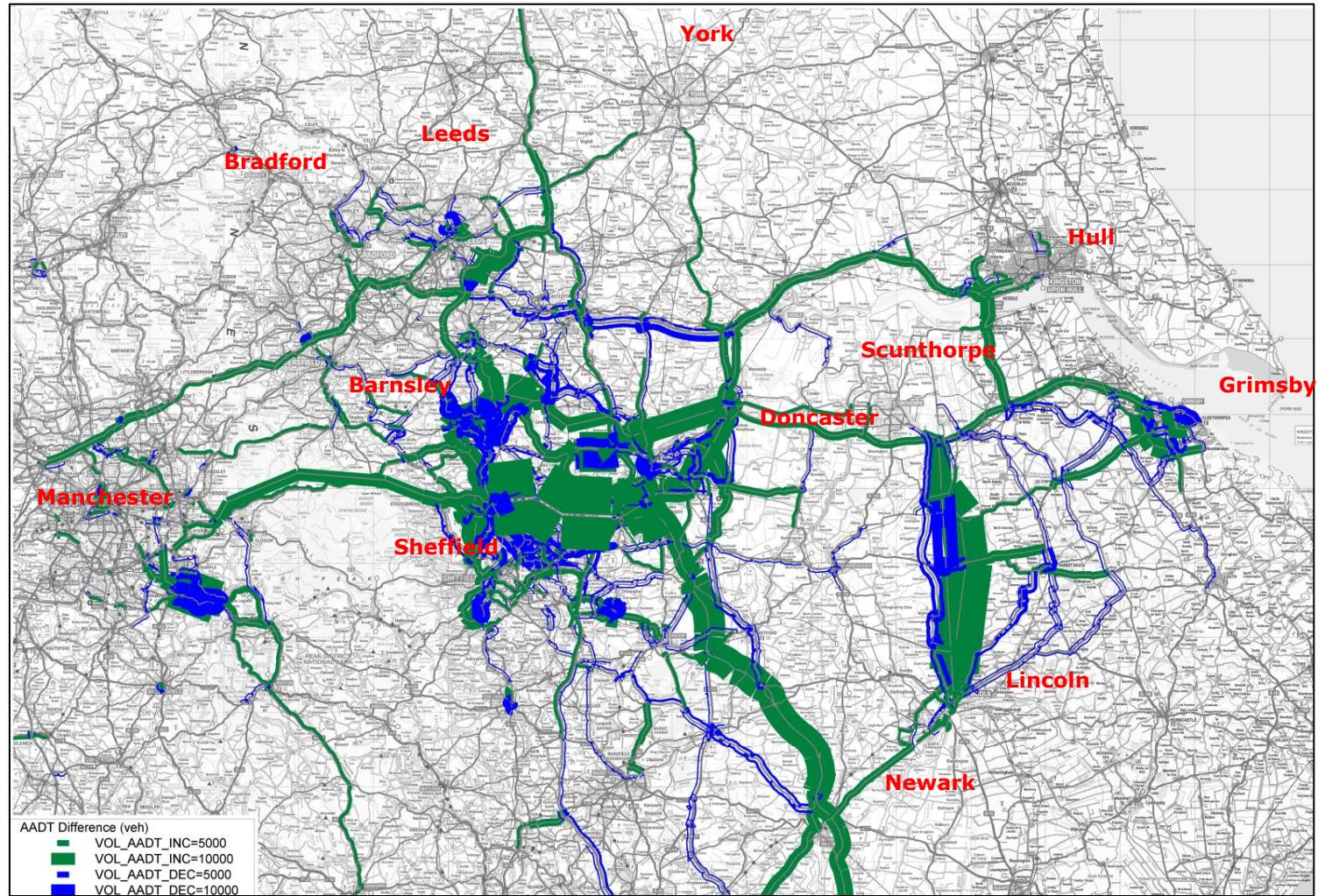
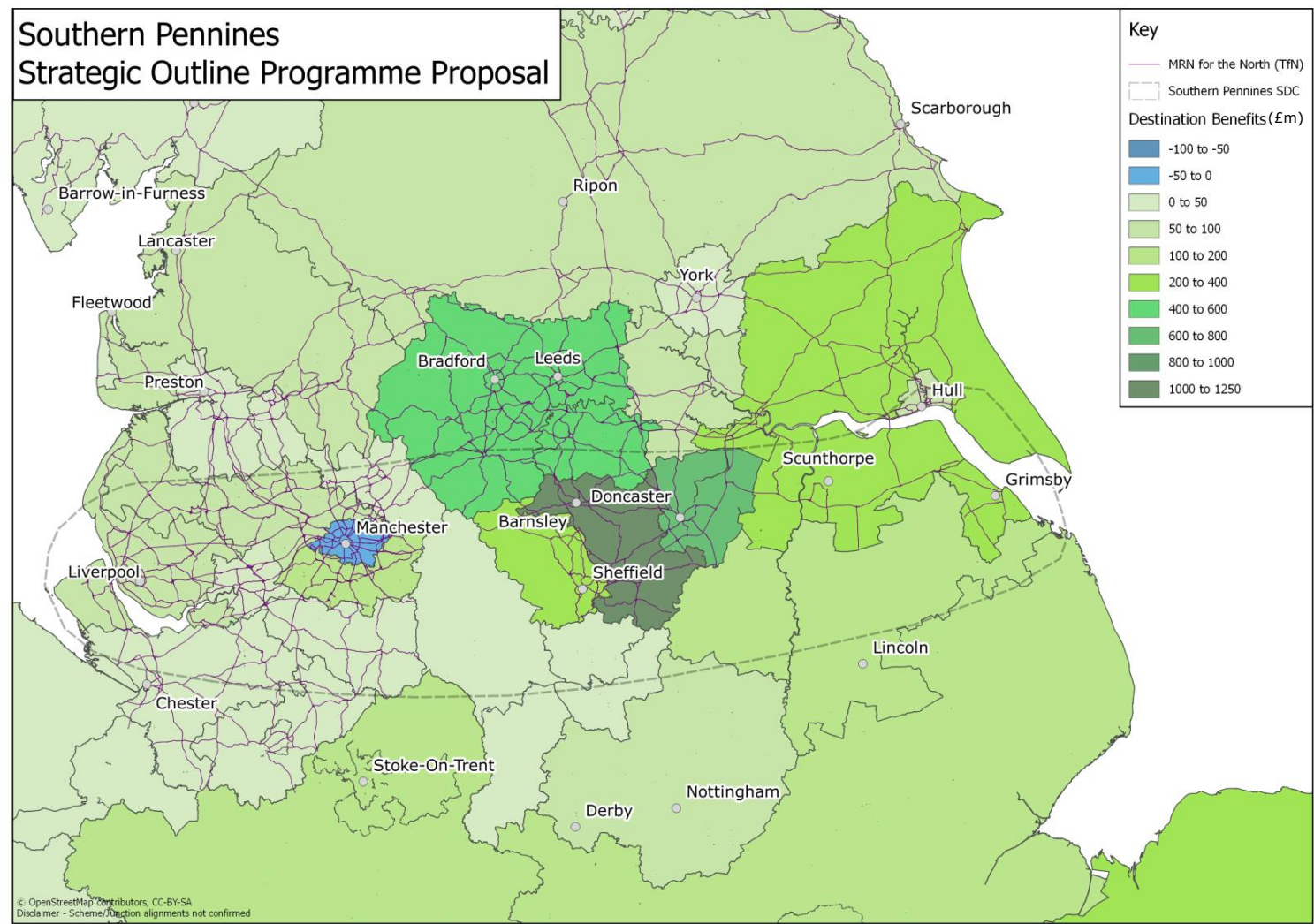


Figure 30: Distribution of Benefits



Approach to Economic Appraisal

10.10 The Economic Appraisal approach has been agreed through TAG and SMG and follows WebTAG guidelines.

Level 1 Established Monetised Impacts

10.11 Level 1 user benefits have been appraised using TUBA 1.9.10 software. This uses the values based on DfT WebTAG economic databook from December 2017. It includes data on the following:

- Values of time and growth in VoT;
- Fuel costs, rates of fuel consumption and changes in vehicle efficiency over time;
- Vehicle occupancies;
- Journey purpose splits;
- Rates of taxation; and
- Carbon values for assessing the impact of the schemes on CO2 emissions

10.12 The Level 1 monetised impacts include:

- Journey time savings;
- Vehicle operating costs;
- Greenhouse gases; and
- Indirect tax revenues.

10.13 For this stage of study, Level 1 economic benefits have not been quantified for accidents, physical activity, journey quality, noise and air quality.

Level 2 Evolving Monetised Impacts

10.14 Level 2 benefits have been used to generate an adjusted VfM metric. This seeks to assess the following elements:

- Reliability benefits;
- Static clustering – specific reference to NPIER prime / enabling capabilities;
- Output in imperfectly competitive markets; and
- Labour supply impacts

10.15 Level 2 static Wider Economic Benefits (WEBs) have been assessed using WITA and is based on agglomeration and decay parameters, incorporating the impacts of WEBs described in WebTAG unit A2.1. This approach to assessing Static WEBs uses WSP's WITA emulation tool which was previously been approved for use on the Trans-Pennine Tunnel Study Stage 0 by Highways England and DfT. This approach has been agreed through TAG and SMG. A full breakdown of the appraisal parameters is documents in the combined economic and forecasting report.

Level 3 Indicative Monetised Impacts

10.16 Level 3 benefits have not been quantified as part of the appraisal for this stage of work.

Non-Monetised Impacts

10.17 Non-monetised impacts form a key component of assessing the overall value for money of a scheme. For the Southern Pennines SDC, the following non-monetised assessments have been undertaken:

- Regeneration
- Landscape
- Townscape
- Historic environment
- Biodiversity
- Water environment
- Affordability

Scope of Economic Appraisal

10.18 The scope of Economic Appraisal has been agreed through TAG and SMG and seeks to provide a robust, yet proportionate, appraisal of the Southern Pennines SOP given the current stage of scheme development. This is in line with WebTAG guidelines.

10.19 As presented in Chapter 15, the overall Value for Money of the Southern Pennines SOP will be determined through a consideration of both monetised and non-monetised benefits which fall across the three levels of benefits detailed in preceding section.

For clarity as to the scope of economic appraisal, Table 10 sets out the monetised and non-monetised assessments undertaken across the three level of benefits.

Table 10: Scope of Economic Assessment for Southern Pennines SDC SOP

	Established Monetised Impacts	Evolving Monetised Impacts	Indicative Monetised Impacts	Non-Monetised Impacts
	<i>Included in initial and adjusted metrics</i>	<i>Included in adjusted metric</i>	<i>Considered after metric using switching values approach</i>	
Level	1	2	3	Qualitative
Included in appraisal at this stage	Journey time savings Vehicle operating costs Greenhouse gases Cost to Broad Transport Budget Indirect Tax	Reliability Static clustering Output in imperfectly competitive markets Labour supply		Regeneration Landscape Townscape Historic environment Biodiversity Water environment Affordability
Not included in appraisal	Noise Air Quality Accidents Physical activity Journey quality		Move to more / less productive jobs Dynamic clustering Induced investment Supplementary economy modelling	Security Severance Access to services Option and non-use values

11 Economy Impacts

Introduction

- 11.1 Following the structure of DfT's standard AST, this chapter sets out the economic impacts on business users of the SDC Programme, including the Transport Economic Efficiency (TEE) impacts which are represented within the Economic Appraisal. This chapter also contains an assessment of Regeneration and Wider Impacts. The impacts on non-business users (consumers) form part of the social impacts and are covered in chapter 13.
- 11.2 The impact of the Southern Pennines SDC programme on the Northern Economy is of particular importance to the VfM case presented in this SPOC given that it is based on identifying the interventions which will unlock delivery of the transformational growth set out within NPIER. However, as

set out in paragraph 8.11 the economic appraisal is based on 'business as usual' growth as represented in DfT's NTEM.

Business Users & Transport Providers

- 11.3 A summary of the business user impacts calculated by TUBA is provided in Table 11. Although business users represent a small proportion of the overall trips their high VoT means that they are a large proportion of the overall benefits generated.

Table 11: Business User Impact

Business	ALL MODES	ROAD	
<i>User benefits</i>	TOTAL	Good Vehicles	Business Cars/LGVs
Travel time	3,456	1,530	1,927
Vehicle operating costs	142	39	104
User charges	-18	-13	-4
Subtotal	3,581	1,555	2,026

**Discounted present values, in 2010 prices and values (£m)*

- 11.4 As this SPOC considers the highway impact, the appraisal does not monetise the impact upon Transport Providers and therefore this has not been reported.

Reliability Impact on Business Users

- 11.5 It is expected that the SDC programme will have a positive impact on reliability due to the improved level of capacity and the provision of alternative routes such as improvements to east-west connectivity providing an alternative to the M62.
- 11.6 Table 12 provides a summary of the estimated reliability impacts on Business Users. Using an approach applied on previous projects and with reference to DfT guidance⁶⁰, reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA.

Table 12 Business Users Reliability Impacts

	Total
Reliability Impact on Business Users	346

**Discounted present values, in 2010 prices and values (£m)*

Regeneration

- 11.7 With reference to TAG Unit A2.2, the schemes included in the Southern Pennines SDC programme represent a substantial investment in transport provision across the corridor, which are designed to improve connectivity which in turn will support land use development and redevelopment. Thus,

⁶⁰ DfT, 2013. Value for Money Assessment: Advice Note for Local Transport Decision Makers

it is considered likely that the Southern Pennines SDC programme will generate **strong beneficial** regeneration impacts.

Wider Impacts

- 11.8 It is expected that the SDC programme will generate strong wider impacts due to improved connectivity linking businesses. Due to the absence of active travel and bus costs in the model the WITA agglomeration impacts and labour supply impacts have been reduced by 30%. The output change in imperfectly competitive market is derived from TUBA and therefore not affected by the absent modes. This reduction produces the upper bound wider benefits as reported in Table 13.
- 11.9 The lower bound benefits have been estimated by applying weighted average 'distance decay' and agglomeration elasticity' parameters following WebTAG guidance. This is to test the impact of the large proportion of 'other' employment across the Local Authorities in the SDC area on the wider benefits.
- 11.10 This sensitivity test produces the lower bound wider benefits as reported in Table 13.

Table 13 Level 2 Wider Impacts Summary

WI1: Agglomeration impacts

	Lower Bound	Upper Bound
Manufacturing	424	130
Construction	116	86
Consumer Services	611	371
Producer Services	852	1,695
Sub-Total	2,004	2,282

WI2: Output change in imperfectly competitive market

Sub-Total	203	203
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WI3: Tax revenues arising from labour market impacts

Labour supply impacts	29	29
Move to more / less productive jobs	0	0
Sub-Total	29	29

Total Wider Benefits	2,235	2,514
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**Discounted present values, in 2010 prices and values (£m)*

Summary

11.11 **Table 14** below summarises the Economy impacts:

Table 14 Summary of SDC Programme Economy Impacts

Economy Impacts	
Business user benefits	3,581
Reliability impacts on business users	346
Regeneration	Strong beneficial
Wider Benefits (Level 2)	2,235 - 2,514

**Discounted present values, in 2010 prices and values (£m)*

12 Environment Impacts

Introduction

- 12.1 One of Transport for the North's Pan-Northern transport objectives is "promoting and enhancing the built, historic and natural environment". Environmental objectives of the STP have been influenced by an Integrated Sustainability Appraisal (ISA) to ensure that environmental considerations, and sustainability more widely, are embedded throughout the STP. This approach supports TfN in developing and delivering a sustainable Investment Programme that promotes and where possible enhances the environment of the North.
- 12.2 To inform appraisal at the SDC Programme level, an environmental appraisal of the SOP interventions has been undertaken. Following the structure of DfT's standard Appraisal Summary Table (AST), this chapter sets out the potential impacts to the environment of the SDC Programme, particularly noting any disbenefits that may occur.
- 12.3 The potential environmental impacts of the Southern Pennines SDC Programme are set out as an Environmental Appraisal⁶¹ report, which takes a relatively high-level view – appropriate to the impacts anticipated from a geographically and temporally dispersed programme of interventions of varying scale and type.
- 12.4 Traffic related environmental topics (i.e. Noise, Air Quality and Greenhouse Gases) have been appraised and scored as part of the development of interventions identified by this SPOC using a high-level, qualitative approach informed by traffic modelling. Environmental impact appraisal scores are provided using WebTAG scoring categories. Given uncertainty in scheme characteristics, the environmental baseline and future trends quantitative appraisal was not considered proportionate or to provide

⁶¹ Product 17: Environmental Appraisal Report (February 2019)

meaningful appraisal at this stage. Quantitative appraisal would be conducted at later stages of scheme development.

- 12.5 Environmental impact appraisal scores for other environmental topics have been appraised using a risk-based approach as it is considered there is too great an uncertainty of the characteristics and environmental impacts of these interventions at this stage to provide a more precise appraisal for these topics. A summary of the potential risks related to these topics is provided below. This has been developed using a precautionary approach, that is the programme as a whole has been assessed according to the most likely risk of potential adverse impacts on the key environmental resources. As business cases for interventions within the SDC individually or in packages come forward, additional environmental appraisal would be undertaken for all topics.

Noise

- 12.6 The SOP includes a variety of transport interventions with the potential to alter noise levels experienced by sensitive receptors. Offline interventions would expose new receptors to road or rail noise, although there would be positive effects on road noise where traffic is alleviated on existing routes. Online improvements to existing infrastructure have the potential to increase noise levels at receptors through increased traffic flows and speeds. With further scheme development and mitigation such as low-noise surfacing and noise barriers, it is anticipated that effects can be reduced. Increasing adoption of electric-propulsion vehicles and modal-shift to rail, encouraged by rail improvements, would also lessen the effects of road noise. Overall however an adverse impact is anticipated due to the likely effects of road interventions included in the SOP.

Score: Moderate Adverse

Air Quality

Transport interventions included within the SOP have the potential to influence air quality concentrations experienced by sensitive receptors. Offline interventions would expose new receptors to potential exceedances in Air Quality Standards, although there would be positive effects on air pollutant concentrations where traffic is alleviated on existing routes. Online improvements to existing infrastructure have the potential to increase air pollutant concentrations at receptors through increased traffic flow and speeds, including within Air Quality Management Areas, although this would also have positive effects through reducing congestion. Increasing adoption of ultra-low and zero emission vehicles and modal-shift to rail, encouraged by rail improvements, would also lessen the effects of air pollutant emissions. Overall however an adverse impact is anticipated due to the likely effects of road interventions included in the SOP.

Score: Moderate Adverse

Greenhouse Gases

- 12.7 The SOP has the potential to influence greenhouse gas emissions of transportation, which accounts for approximately a quarter of the UK's

carbon dioxide (CO₂) emissions. Increased traffic flows from road interventions would have a negative effect on greenhouse gas emissions, and construction would involve large amounts of embodied carbon. Reduced congestion, improvements to certain journey times and modal-shift to rail, encouraged by rail improvements, would have positive effects. Increasing adoption of ultra-low and zero emission vehicles would lessen the negative impacts of road traffic over time. However, despite WebTAG assumptions for changing fleet composition of fuel types and increasing fuel efficiency, the SOP is predicted to result in approximately 7.2 million tonnes of CO₂ emissions over a 60-year period due to increasing vehicle flows. As such, overall an adverse impact is anticipated.

- 12.8 An adverse impact in greenhouse gas emissions as a result of the increase in vehicle kilometres is also supported by the estimation of the monetised impact of greenhouse gases using TUBA. The results are shown in Table 15.

Table 15 Greenhouse Gases Monetised Impact

	Total
Greenhouse Gases	-303

**Discounted present values, in 2010 prices and values (£m)*

Score: Moderate Adverse

Landscape and Townscape

Landscape

- 12.9 The SOP includes interventions that fall in proximity to National Parks and Areas of Outstanding Natural Beauty (AONB), which are landscapes of the highest national value. SOP interventions also have the potential to have a negative impact on local landscape designations and degrade the character of landscapes within the SDC. With mitigation, it is anticipated that many of these impacts would be minimised but considering the inclusion in the SOP of offline schemes within sensitive NCAs such as the Yorkshire Southern Pennine Fringe (NCA37) and Manchester Pennine Fringe (NCA54), some adverse impacts are considered likely.

Risk appraisal – likely to have significant adverse effects.

Townscape

- 12.10 SOP interventions also fall within settlements and as such have the potential to have an impact on the physical and social characteristics of the urban environment that comprise townscapes. However, the SOP also includes interventions such as bypasses and new links that are anticipated to draw traffic from existing settlements, thereby improving townscape characteristics such as appearance and human interaction

Risk appraisal – potential to have significant adverse effects.

Historic Environment

- 12.11 The SOP interventions fall within proximity to a large number of designated heritage assets. The SOP is therefore anticipated to have both direct and setting impacts on heritage assets of both national and local value. With

appropriate consultation and mitigation many of the impacts can likely be avoided or minimised, but the SOP is anticipated to have some residual impacts on heritage assets. However, the SOP does improve access to certain historic and culturally significant sites, including Saltaire and Liverpool Maritime Mercantile City World Heritage Sites. There may also be opportunities to work with partners and stakeholders to improve the condition and management of heritage assets.

Risk appraisal – likely to have significant adverse effects.

Biodiversity

- 12.12 The SOP comprises infrastructure development that has the potential to adversely affect the integrity of local, national and international (European) designated sites, and the status and distribution of priority habitats and species. However, it is assumed that TfN's programme of interventions would be delivered in accordance with commitments to no net biodiversity loss. Furthermore, there is the potential to deliver any necessary biodiversity mitigation or compensation to contribute to strategic local and national biodiversity priorities and protect and enhance biodiversity through green infrastructure. The SOP comprises many improvements to existing highways and rail infrastructure, of which the proposed works undertaken through the SOP may present opportunities to enhance the environmental performance of this infrastructure.

Risk appraisal – likely to have significant adverse effects.

Water Environment

- 12.13 Both offline and online SOP schemes risk exposing watercourses to increased risk of transport related pollution. While it is considered that these impacts can likely be mitigated, the SOP would present increased risk of adverse impacts to the inland water environment. There may however also be opportunities to enhance the water environment, although these cannot be identified at this stage.

Risk appraisal – potential to have significant adverse effects.

Summary

- 12.14 The SOP includes road and rail improvements and new infrastructure that would change noise levels and air pollutant concentrations at sensitive receptors, increase emissions of greenhouse gases and risk impacts on environmental assets. This includes potential adverse indirect impacts on the Peak District National Park, potential direct and indirect effects on European designated wildlife sites and the risk of direct impacts to several heritage assets of national value. The SOP has the potential for impacts on other designations of national and local value, and adverse impacts to environmental resources such as landscape character, ecological networks and the setting of cultural heritage assets.
- 12.15 With further environmental assessment and option development, and where necessary mitigation and compensation, it is anticipated that these environmental impacts can be minimised or avoided through careful design and appropriate mitigation, and in some cases, opportunities identified for

environmental enhancements. Following this process, the majority of the SOP interventions are likely to comply with relevant policy and contribute to the objective of the STP to 'promote and enhance the built, historic and natural environment', and further objectives established in the Integrated Sustainability Appraisal (ISA). However, as a result of their nature and location, some interventions present a high risk of significant environmental impacts and therefore a risk of failing to comply with policy, legislation and STP objectives. These interventions have been identified in the Environmental Appraisal Report.

- 12.16 Interventions proposed through this study would be taken forward through other separate commissions to Strategic Outline Business Case (SOBC) in line with the Department for Transport's Transport Business Case approach. This would include more detailed consideration of individual interventions or groups of interventions, for which appropriate environmental appraisal would take place. Subsequently, schemes would undergo further environmental assessment through the Highways England Project Control Framework (PCF) process, Network Rail Governance for Railway Investment Projects (GRIP) process or local authority or Nationally Significant Infrastructure planning consent processes. This is likely to include an Environmental Impact Assessment (EIA) for many of these schemes, a process that would lead to production of an Environmental Statement (ES) to be submitted with any application for development consent. The environmental impacts of these schemes would inform the consenting authority's decision.

- 12.17 Table 16 below summarises the Environment impacts:

Table 16 Summary of Environment Impacts

	Scenario X
Noise	Moderate Adverse
Air Quality	Moderate Adverse
Greenhouse Gases <i>Monetised Impact from TUBA</i>	Moderate Adverse <i>-£303m PV</i>
Landscape	Likely to have significant adverse effects
Townscape	Potential to have significant adverse effects
Historic Environment	Likely to have significant adverse effects
Biodiversity	Likely to have significant adverse effects
Water Environment	Potential to have significant adverse effects

13 Social Impacts

Introduction

- 13.1 Following the structure of DfT's standard AST, this chapter sets out the potential impacts to the social impacts of the SDC Programme, including the TEE impacts (Commuting and Other Users, and Personal Affordability) which are represented within the Economic Appraisal.

Commuting and Other Users (Travel Time)

- 13.2 Table 17 provides a summary of the impacts on consumer users (time only) as calculated by TUBA. A full set of impacts on commuting and other users is reported in the personal affordability section and the TEE table.

Table 17 Summary of Consumer User Impacts (Travel Time)

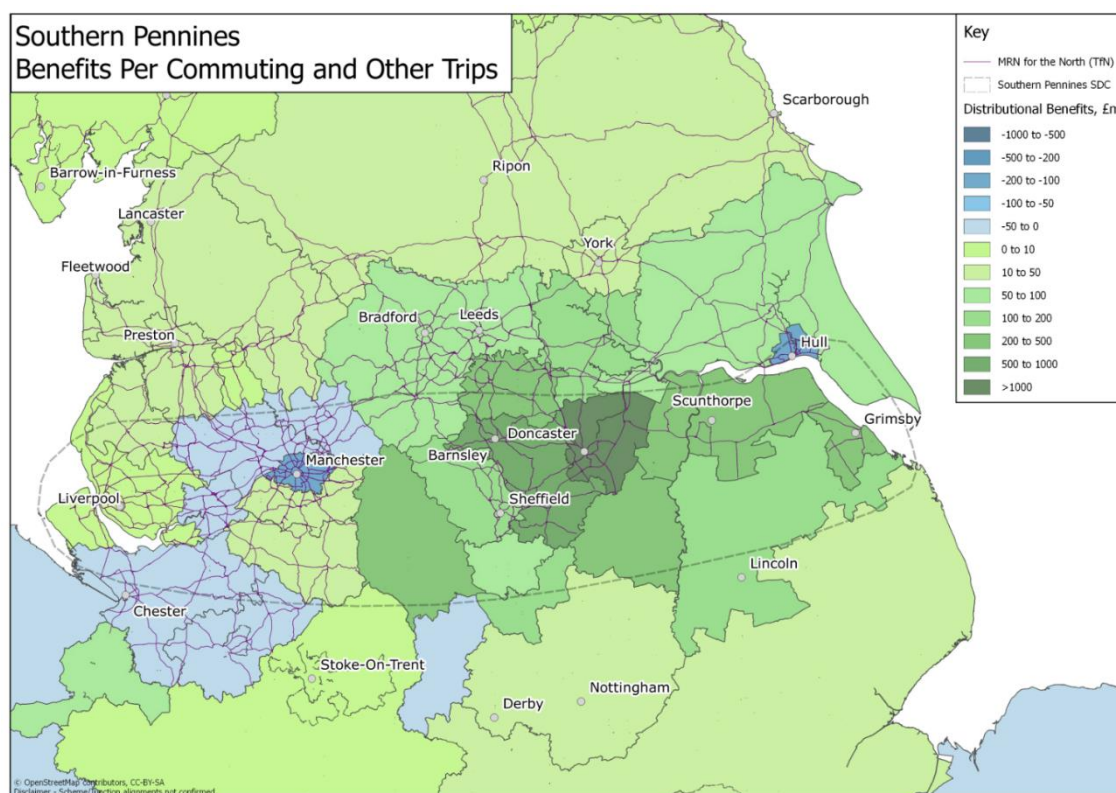
Consumer Users	Private Cars / LGVs
Non-Business Commuting Travel time	1,040
Non-Business Other Travel time	1,238
Subtotal	2,279

**Discounted present values, in 2010 prices and values (£m)*

Distributional Impacts

- 13.3 Figure 31 provides a spatial summary of the economic benefits on a per trip basis. This shows the benefits that are generated across the Southern Pennines SDC area due to the Southern Pennines SOP interventions only. It considers the distribution of commuting and other benefits divided by the total number of commuting and other trips. Please note that this does not include business trips or their associated benefits.
- 13.4 The greatest level of benefits is located in and around Barnsley and Doncaster. There are also benefits observed in and around Sheffield, Scunthorpe and Grimsby, as well as Braford and Leeds. Small per trip disbenefits are generated towards the west such as in and around Manchester. However, this will be offset by SOP highways interventions in the Southern Pennines SDC.

Figure 31: Distributional Impacts



Reliability impact on Commuting and Other Users

- 13.5 Using an approach applied on previous projects and with reference to DfT guidance⁶², reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA.
- 13.6 Table 18 provides a summary of the reliability benefits for commuting and other users.

Table 18: Commuting and Other Users Reliability Impacts

Reliability Benefits	Total
Non-Business Users Commuting	104
Non-Business Users Other	124
Sub-Total	228

**Discounted present values, in 2010 prices and values (£m)*

⁶² DfT, 2013. Value for Money Assessment: Advice Note for Local Transport Decision Makers

Personal Affordability

- 13.7 At this early stage of appraisal, and for the purposes of this SPOC, an indication of the impact on Personal Affordability has been quantified using the TUBA outputs for vehicle operating costs and user charges for non-business users. The results calculated by TUBA are shown in Table 19.

Table 19: Commuting and Others Affordability

Non-Business: Commuting	
Vehicle Operating Costs	-59
User Charges	-2
Sub-Total	-61
Non-Business: Other	
Vehicle Operating Costs	-330
User Charges	-3
Sub-Total	-334
Commuting and Other Total	-395

**Discounted present values, in 2010 prices and values (£m)*

- 13.8 The results show an aggregate increase in vehicle operating costs over the 60-year appraisal period with a Southern Pennines SDC programme of investment in place compared to the Reference case. This is attributable to an increase in total vehicle kilometres travelled and as a result higher fuel consumption and vehicle maintenance costs. The increase in vehicle kilometres travelled is a reflection of the improved connectivity brought about by the SOP highway interventions and an increase to travel to work catchment areas. In doing so the SOP provides the North's residents with increased opportunities to travel for work, leisure and other interests which in qualitative terms is considered to be beneficial from a personal affordability perspective.
- 13.9 Figure 31 shows the distribution of non-business benefits across the SDC area and demonstrates the benefits gained across the corridor. It is noteworthy, that the predicted benefits shown relate to the appraised highway SOP interventions in the Southern Pennines alone, and do not reflect the distribution of benefits attributable to the Reference Case interventions and TfN's full programme of proposed interventions.

Summary

13.10 Table 20 below summarises the Social impacts:

Table 20 Summary of Social Impacts

Commuting and Other Users	2,279
Reliability impact (Commuting & Other Users)	228
Physical Activity	Not Assessed
Journey Quality	Not Assessed
Accidents <i>MEC Derived Impact</i>	Not Assessed
Security	Not Assessed
Access to Services	Not Assessed
Personal Affordability	-395
Severance	Not Assessed
Option and Non-use values	Not Assessed

**Discounted present values, in 2010 prices and values (£m)*

14 Public Accounts Impacts

Introduction

- 14.1 This chapter outlines the impact of the Southern Pennines SDC programme on public accounts. These form the derivation of two key outputs described below: the impact on the Broad Transport Budget (which forms the **cost** represented within the Benefit Cost Ratio, BCR), and the indirect taxation impact on Wider Public Finances (HM Treasury (HMT), represented as an adjustment to the benefits within the BCR).

Cost to Broad Transport Budget

- 14.2 As set out within the Financial Dimension and Chapter 9, the construction, operation and maintenance costs associated with the Southern Pennines SOP have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.
- 14.3 For the Southern Pennines SOP, all Investment Costs have been assumed to be incurred in 2034, with all Operating Costs assumed to be incurred in 2035. No profiling of either Investment Costs or Operating Costs has been assumed within the Southern Pennines economic appraisal.
- 14.4 With reference to the process set out Figure 28, Table 21 presents the Southern Pennines SOP highways interventions costs in the format of the DfT's CPSS Cost Proforma Summary Sheet. This shows the build-up of the scheme costs from 2017 Base Costs through to 2010 discounted market prices representing the SOP investment costs.

Table 21 DfT's CPSS Cost Proforma Summary Sheet

Item	£m	Unit
Base Cost	3,115	2017 prices
Risk	3,115	2017 prices
OB	4,486	2017 prices
Inflation	8,183	2017 prices inflated to 2034
GDP Deflator	5,170	2010 prices
Market Prices	6,152	2010 market prices
Discounting	2,694	2010 discounted market prices
O+M Uplift (10%)	£269	2010 discounted market prices
PVC	2,964	2010 discounted market prices

Indirect Tax Revenues

- 14.5 Implementation of transport interventions can result in an impact on HM Treasury tax receipts. This results from changes in fuel consumption, from changes in travel distance and/or speed of mode shift to public transport, affecting the fuel duty received by HM Treasury. Table 22 provides a summary of the Indirect Tax Revenues as estimated by TUBA.

Table 22 Indirect Tax Revenue Benefits

Indirect Tax Revenues	ALL MODES
Wider Public Finances	-539

**Discounted present values, in 2010 prices and values (£m)*

Summary

- 14.6 The relevant impacts are summarised in the form of standard DfT 'Public Accounts' tables for the SDC Programme (Table 23) under NTEM growth.

Table 23 Public Accounts Table for the SDC Programme (£m)

	ALL MODES
Local Government Funding	TOTAL
Revenue	0
Operating Costs	0
Investment Costs	0
Developer and Other Contributions	0
Grant/Subsidy Payments	0
NET IMPACT	0
Central Government Funding: Transport	
Revenue	0
Operating Costs	269
Investment Costs	2,694
Developer and Other Contributions	0
Grant/Subsidy Payments	0
NET IMPACT	2,964
Central Government Funding: Non-Transport	
Indirect Tax Revenues	-539
TOTALS	
Broad Transport Budget	2,964
Wider Public Finances	-539

15 Value for Money

Introduction

- 15.1 A VfM appraisal of the Southern Pennines SDC Programme has been undertaken with reference to DfT's Transport Appraisal Guidance⁶³ as current at May 2018.
- 15.2 This chapter brings together the economic appraisal results presented in the preceding sections and considers their inherent uncertainty, other quantified and qualitative impacts, and distributional impacts. The Value for Money (VfM) assessment summarises the monetised and non-monetised impacts of the appraised corridor interventions with; highways, passenger rail and road & rail freight considered separately.
- 15.3 The chapter concludes by summarising the next steps for appraising the programme level impacts.

Economic Appraisal

- 15.4 Monetised analyses from the economic, environmental, social and public accounts impacts, from the preceding chapters come together as the Economic Appraisal of the SDC Programme. DfT's BCR represents the ratio:

net-non-transport-budget impacts: net-transport-budget impacts

The latter being represented by the cost to broad transport budget and the former by the sum of all other impacts, as set out in the following text. DfT's second VfM indicator is the Net Present Value (NPV); the sum of all monetised impacts.

Transport Economic Efficiency

- 15.5 The travel time, cost and financial impacts on consumers and the private sector are summarised in the form of standard DfT 'TEE' tables for the SDC Programme (Table 24) under NTEM growth. This table combines the impacts on *Commuting and Other Users* (Social impacts, from Chapter 13) and on Business Users and Transport Providers (Economic impacts, from Chapter 11).

⁶³ <https://www.gov.uk/guidance/transport-analysis-guidance-webtag>

Table 24: TEE Table for the SDC Programme (£m)

Non-business: Commuting	
<i>User benefits</i>	
Travel Time	1,040
Vehicle operating costs	-59
User charges	-2
During Construction & Maintenance	0
NET NON-BUSINESS BENEFITS: COMMUTING	979

Non-business: Other	
<i>User benefits</i>	
Travel time	1,238
Vehicle operating costs	-330
User charges	-3
During Construction & Maintenance	0
NET NON-BUSINESS BENEFITS: OTHER	905

Business	
<i>User benefits</i>	
Travel time	3,456
Vehicle operating costs	142
User charges	-18
During Construction & Maintenance	0
Subtotal	3,581
<i>Local Authority provider impacts</i>	
Revenue	70
Operating costs	0
Investment costs	0
Grant/subsidy	0
Subtotal	70
<i>Other business impacts</i>	
Developer contributions	0
NET BUSINESS IMPACT	3,651

TOTAL	
Present Value of Transport Economic Efficiency Benefits (TEE)	5,535

Initial DfT Economic Appraisal

15.6 A standard DfT 'Analysis of Monetised Costs and Benefits' (AMCB) table is presented below for the SDC Programme (Table 25) under NTEM growth. The AMCB table illustrates the calculation of the initial (Level 1) BCR:

- The Present Value of Benefits (PVB) equals:
 - TEE Impacts (from Table 24)
 - Monetised Environmental Impacts (Greenhouse Gases from TUBA)
 - Indirect Tax Revenues (from Table 22)
- The Present Value of Costs (PVC) equals:
 - Cost to Broad Transport Budget (from Table 21)

Table 25: AMCB Table for the SDC Programme (£m)

Noise	Not Monetised
Local Air Quality	Not Monetised
Greenhouse Gases	-303
Journey Quality	Not Monetised
Physical Quality	Not Monetised
Accidents	Not Monetised
Economic Efficiency: Consumer Users (Commuting)	979
Economic Efficiency: Consumer Users (Other)	905
Economic Efficiency: Business Users and Providers	3,651
Wider Public Finances (Indirect Taxation Revenues)	539
Present Value of Benefits (PVB)	5,771
Present Value of Costs (PVC)	2,964
OVERALL IMPACTS	
Net Present Value (NPV)	2,807
Benefit to Cost Ratio (BCR)	1.95

**Discounted present values, in 2010 prices and values (£m)*

Adjusted (Level 2) Appraisal

15.7 The initial (Level 1) BCR presented above does not include monetised Wider Economic Impacts, see **Table 14**; DfT's guidance includes Level 2 impacts⁶⁴ within an 'Adjusted' BCR. DfT's VfM guidance sets out VfM categories ranges as follows:

- Very Poor Adjusted BCR less than or equal to 0.00
- Poor Adjusted BCR between 0.00 and 1.00
- Low Adjusted BCR between 1.00 and 1.50
- Medium Adjusted BCR between 1.50 and 2.00
- High Adjusted BCR between 2.00 and 4.00
- Very High Adjusted BCR greater than or equal to 4.00

15.8 Table 26 sets out the derivation of Initial and Adjusted BCRs for the Southern Pennines SDC Programme under the NTEM Scenario.

Table 26 Southern Pennines SDC Programme: Initial and Adjusted BCRs

	Initial BCR (Level 1)	Adjusted BCR (Level 2) Lower Bound	Adjusted BCR (Level 2) Upper Bound
AMCB PVB	£5,771	£5,771	£5,771
Static clustering	NA	£2,004	£2,282
Dynamic clustering	NA	NA	NA
Imperfect competition	NA	£203	£203
Labour supply impacts	NA	£29	£29
Reliability	NA	£573	£573
Present Value of Benefits (PVB)	£5,771	£8,580	£8,858
Present Value of Costs (PVC)	£2,964	£2,964	£2,964
Net Present Value	£2,807	£5,616	£5,894
Benefit Cost Ratio	1.95	2.89	2.99
VfM Category	Medium	High	High

**Discounted present values, in 2010 prices and values (£m)*

⁶⁴ Chapter 10 – paragraphs 10.10-10.16

Appraisal Summary Table

- 15.9 An AST, which allows comparison of the impacts of the SDC programmes under different growth scenarios, is presented as Table 27.
- 15.10 DfT standard ASTs include a summary justification for the scoring of each impact. The Southern Pennines AST is provided as Appendix 0 to this SPOC.

Table 27: Comparative Appraisal Summary Table

Economy Impacts	
Business user benefits	£3,581m
Reliability impacts on business users	£346m
Regeneration	Strong beneficial
Wider Benefits (Level 2)	£2,235m-£2,514m
Environment Impacts	
Noise	Moderate Adverse
Air Quality	Moderate Adverse
Greenhouse Gases <i>Monetised Impact from TUBA</i>	Moderate Adverse -£303m
Landscape	Likely to have significant adverse effects
Townscape	Potential to have significant adverse effects
Historic Environment	Likely to have significant adverse effects
Biodiversity	Likely to have significant adverse effects
Water Environment	Potential to have significant adverse effects
Social Impacts	
Commuting and Other Users	£2,279m
Reliability impact (Commuting & Other Users)	£228m
Physical Activity	Not Assessed
Journey Quality	Not Assessed
Accidents <i>MEC Derived Impact</i>	Not Assessed
Security	Not Assessed
Access to Services	Not Assessed
Personal Affordability	-£395m
Severance	Not Assessed
Option and Non-use values	Not Assessed
Public Accounts	
Cost to the Broad Transport Budget	-2,964
Indirect Tax Revenues	539

**Discounted present values, in 2010 prices and values (£m)*

Value for Money Statement

- 15.11 The Value for Money (VfM) Assessment summarises the monetised and non-monetised impacts of the appraised corridor interventions. Highways, passenger rail and road & rail freight are shown separately.
- 15.12 The assessment appraisal undertaken is WebTAG based, utilises industry standard appraisal methodologies and uses DfT traffic forecasts. However, the Reference Case includes scheme which are not committed.

Appraisal of Highway Interventions

- 15.13 The appraisal of highway interventions in the Southern Pennines SDC is set out below in Table 28. These are initial results, which will be re-evaluated as TfN take forward further work on modelling and appraising the SDC programme.

Table 28 Summary of highway appraisal

Value for Money Assessment		
Established Monetised Impacts (journey times/operating costs):		
Established Monetised Impacts of appraised highway interventions £5,771m	Net Cost to the Transport Budget of appraised highway interventions £2,964m	Initial Ratio of Benefits to Costs 1.95
Initial Value for Money Category		Medium
Evolving Monetised Impacts (plus wider economic impacts/reliability):		
Established + Evolving Monetised Impacts £8,580m-£8,858m	Net Cost to the Transport Budget £2,964m	Provisional Ratio of Benefits to Costs 2.89-2.99
Provisional Value for Money Category		High
<p>Non-monetised Impacts conclusion:</p> <p>A fundamental aim of TfN and Partners is to protect and enhance, where possible, the built, historic and natural assets in the North. The Southern Pennines SDC programme includes interventions which have potential for negative environmental impacts within or close to National Parks, Areas of Outstanding Natural Beauty or designated heritage assets. These impacts will be carefully considered in subsequent stages of work and TfN and partners will seek to protect and enhance natural and historic assets, where possible, through the individual scheme development process.</p> <p>The programme is forecast to increase the number of trips made in the North by road and rail, the former in particular will have negative impacts on noise and air quality, in addition to additional Greenhouse Gases</p>		

Value for Money Assessment

emissions (which have been monetised). At programme level, the overall net impact is expected to be adverse, but comfortably offset by the benefits to the Northern, and UK, economy.

Non-monetised impacts have not yet been assessed directly, but there is sufficient risk to suggest that they have the potential to be moderate at a programme level. However, whilst the assessment approach is deemed to be proportionate to the detail required at this stage of programme development, it is concluded that there is currently insufficient assessment undertaken to inform altering the overall Value for Money categorisation. In addition, given that the provisional Value for Money range is quite central in the High Value for Money category threshold, the overall categorisation has been retained as **High Value for Money**.

Adjusted Value for Money Category

High

Appraisal of Passenger Rail Interventions

- 15.14 The Rail SOP has been developed around TfN's objectives to develop and enhance connectivity and accessibility in the North, whilst promoting sustainable growth. Interventions were defined in accordance with the Desirable Minimum Standards in the draft Long Term Rail Strategy, which have demonstrable alignment to the pan-Northern transport objectives set out in the STP. The SOP has been designed to improve rail connectivity across the North of England.
- 15.15 The passenger rail economic appraisal is at a northern level, so includes costs and benefits of appraised rail interventions within the Southern Pennines and within the other Strategic Development Corridors. Table 29 summarises the results of the rail appraisal.
- 15.16 In addition to the monetised wider impacts in Table 29, the Rail SDC programme has been assessed as having strong beneficial regeneration impacts. It is anticipated that investment in transport infrastructure will result in significant benefits to the North's economy, accelerating, maximising and more-widely distributing the transformational growth and benefits of the major infrastructure investment projects within the reference case. Further detailed evidence on the Appraisal of Rail Passenger interventions is available on TfN's website at:
www.transportforthenorth.com

Table 29: Summary of passenger rail economic appraisal

Established Monetised Impacts of appraised rail interventions	Net Cost to the Transport Budget of appraised rail interventions	Initial Ratio of Benefits to Costs
£464m	£424m	1.10 ⁶⁵
Initial Value for Money Category		Low

- 15.17 The figures in Table 29 above only cover the rail interventions included in the rail economic appraisal (as outlined in Table 9). Table 31 in the Financial Case provides an estimate of the funding requirement of all rail interventions (appraised and not appraised).

Freight Benefits

- 15.18 The benefits of the SOP interventions for road and rail freight have been appraised using the Great Britain Freight Model and are reported at a GB and a Northern Level. The results, summarised in Table 30, provide a strong indication of the economic benefit of supporting freight growth in the North of England.
- 15.19 The freight scenarios that have been used include looking at the impact of larger ships, warehouse clustering and rail capacity. These scenarios cannot be aggregated together as they rely on particular economic conditions and private sector investment.

Table 30: Summary of Freight Benefits of the Strategic Outline Programme

Freight scenario	Present Value Benefits (£m 2010 prices) ⁶⁶		
	Allocated to the North	Allocated elsewhere	Total
Benefit of Highways SOP for the North (freight vans)	3,020	170	3,190
Benefit of Highways SOP for the North (HGVs)	844	195	1,039
Benefit of re-routing interventions (Based on 3 alternative rail freight routes)	2,213	3,789	6,002
Benefit of removing all other rail freight capacity limits	1,683	4,080	5,763

⁶⁵ Based on established monetised impacts only, which focuses on journey time savings to rail passengers, and evaluated using values from the May 2018 WebTAG databook.

⁶⁶ Benefits cannot be treated as cumulative or added directly to the assessment of highway and rail benefits

Freight scenario	Present Value Benefits (£m 2010 prices) ⁶⁶		
Benefit of warehouse clustering	1,886	3,731	5,597
Benefit of Port measures (larger ferries)	761	1,929	2,690

- 15.20 The approach to assessing freight interventions is detailed further in a separate report available on TfN's website at:
www.transportforthenorth.com.

Analytical Certainty

- 15.21 Transport for the North's Technical Assurance Group (TAG) has reviewed and approved all methodologies employed within the Southern Pennines economic appraisal and derivation of benefits. Highway and passenger rail scheme costs have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.
- 15.22 The appraisal methodology is therefore considered sound and reasonable for this very early stage of scheme development.

Summary of VfM

- 15.23 The costs and benefits demonstrated above show that the transport interventions appraised in our SOP represent value for money based on the evidence currently available, giving a justified basis for progressing the case for investment in this corridor.

Next Steps

- 15.24 In the next year, TfN plans to update the Strategic Programme Outline Cases to inform an update of the Investment Programme. This will include work on reviewing the current SDCs and Investment Programme, including the sequencing of schemes. The next stage of modelling will include transformational NPIER⁶⁷ forecasts and the latest spatial planning information.
- 15.25 The appraisal will move to a single assessment tool for the North, able to report at pan-Northern and corridor levels, so removing of the issues of double counting of benefits. This approach will also better incorporate the multi-modal impacts of passenger rail and freight.
- 15.26 The reference case assumptions will be updated, to reflect the latest plans for the schemes such as NPR and Trans-Pennine tunnel.
- 15.27 The initial work on the wider economic benefits (WITA) will be progressed, moving from Level 2 (static assessment) to Level 3 (dynamic assessment), and include the updates in WebTAG.
- 15.28 As more definitive scheme definitions emerge, scheme costings will be reviewed, and the environmental appraisal will adopt the more detailed WebTAG methodologies.

⁶⁷ Northern Powerhouse Independent Economic Review

Financial Dimension

The Financial Dimension of a business case sets out to demonstrate is to set out the impact of the proposal on public sector capital and revenue budgets.

16 Introduction

- 16.1 The Financial Dimension sets out the approach to estimating implementation costs for the Southern Pennines SDC programme of interventions. 'Whole life' costs are estimated, including ongoing maintenance, periodic renewals and - for Rail Passenger and applicable Freight Road and Rail only - operating costs. These costs, converted into suitable appraisal values, form a key input into the cost benefit appraisal, described in the preceding Economic Dimension.
- 16.2 The programme-level cost estimating process is necessarily high-level at this time; combining interventions of different scales, natures and complexities. The approach taken has built-in consistency across the programme, effectively implicitly assuming reasonable balance in the variation above/below estimate. There are further advantages of programme delivery at this scale in respect of cost estimates; principally in terms of the ability to refine the programme as experience is accumulated and lessons are learnt, for example improving the efficiency of procurement and adjusting intervention delivery timings and specifications to maximise value for money.

Approach to Financial Appraisal

Highway Intervention Costs

- 16.3 Initially, the unit rate-based approach developed for the Major Road Network report was adopted. This methodology was reviewed and approved by both TAG and the Department for Transport (DfT). Notwithstanding, it was decided that owing to the complexity of some of the SDC SOP schemes there would be benefit from additional external assurance. Accordingly, TfN commissioned an independent review of the unit rates alongside a more detailed costing exercise for a small number of schemes across each of the SDCs.
- 16.4 This review concluded that the unit rate methodology was sound and provided updated unit rates, drawn from industry knowledge and records of scheme cost information, including some which was not publicly available. The updated unit rates were accepted by TfN for use in this SPOC.
- 16.5 The sample SDC schemes were costed using a methodology consistent with Highways England's strategic-level estimating process which incorporated all construction costs, design and preparation, land costs, enabling works, supervision, statutory undertakers and third-party infrastructure costs. This provided a 2017 'scheme base cost' on top of which factors were applied to

represent Project Risk and Uncertainty. The risk allowances applied are consistent with Highways England submissions.

Rail Intervention Costs

- 16.6 A similar 'unit cost' based approach was adopted for rail schemes, with unit rates in this case based initially on publicly available data. For route improvements, unit rates per mile were derived for bands based on the journey time saving, as a proportion, identified. Costs for new or substantially upgraded intermediate stations were also derived. Network Rail and DfT Rail were consulted about these rates, the cost per intermediate station being increased as a result. No other amendments to the rates were suggested, or alternative evidence provided; it is therefore assumed that cost estimates based on these rates are appropriate for the current stage of delivery.

Freight Intervention Costs

- 16.7 Freight intervention costs have not been developed at this very early stage of work⁶⁸.

Inflation

- 16.8 Convention for the Financial Dimension is to present costs in nominal terms (sometimes referred to as outturn or cash terms), that is inclusive of all inflation. Intervention cost estimates have been inflated to 2035 using BCIS cost inflation indices, for the purposes of the Economic Dimension - where interventions have been represented as being implemented in a single year. Further inflation has been applied to costs presented within this Financial Dimension, to represent in broad terms the anticipated phasing of intervention delivery.

17 Implementation Funding Requirement

Funding Requirement

- 17.1 The illustrative Strategic Development Corridor funding requirement for appraised (within the economic appraisal) and non-appraised interventions is shown in Table 31. The indicative costs which underline the funding requirements are based on high level benchmarked unit rate cost estimates appropriate to this early stage in the business case development cycle.
- 17.2 This represents an ambitious but realistic funding requirement for a long term programme of transport investment, building upon the reference case schemes, to be delivered over the period up to 2050.
- 17.3 Following the structure of the SPOC documentation, costs for highway interventions are provided for the four separated SDC corridors, whereas

⁶⁸ Other general highway intervention costs that would benefit road freight traffic are included within the highway cost assumptions

passenger rail intervention costs are presented at a combined northern level.

Table 31: Illustrative Funding Requirement (£m in 2017 prices)

SPOC	Appraised Programme	Non-Appraised Programme	Full Programme
Highway: Central Pennines	£7,144	£334	£7,478
Highway: Energy Coasts	£2,158	£170	£2,328
Highway: Southern Pennines	£3,115	£583	£3,698
Highway: West and Wales	£3,281	£1,578	£4,859
Passenger Rail: North	£505	£6,100	£6,605
Sub-Total ⁶⁹	£14,896	£8,575	£23,471
TfN Programme Level Contingency (5%)			£1,174
Total Base Cost (including programme contingency)			£24,645
Illustrative Funding Requirement (allowing for inflation)	£40,000 to £50,000		

Funding Arrangements

- 17.38 A key element of the STP will be how the infrastructure proposed by TfN, as set out in the Long Term Investment Programme (LTIP), will be funded over the period until 2050. TfN has therefore developed a Funding Framework that will form the basis of the funding section of the STP as well as informing the business cases for Northern Powerhouse Rail (NPR) and the interventions arising from the work on the SDCs.
- 17.39 The approach that TfN has adopted to the development of the Funding Framework has been grounded in the fundamental principles that were agreed by the Partnership Board in December 2016. KPMG was appointed in June 2017 to support TfN in this work.

⁶⁹ Double counting of interventions in more than one SDC removed.

- 17.40 The TfN Funding Framework was discussed at the Partnership Board on 31 July 2018 and amended to reflect the comments made by the members. In addition, it was presented to the Scrutiny Committee meeting on 30 August 2018, where it was endorsed and recommended for approval by the TfN Board (noting that it will need to consider the more detailed proposals as and when these are developed).
- 17.41 The TfN Funding Framework includes the following elements:
- The Principles – which underpin a deliverable and appropriate funding arrangement
 - The Potential Funding Sources – demonstrating that TfN’s funding requirement is reasonable
 - The Governance Arrangements that will enable funding allocated for strategic transport infrastructure in the North to be directed to TfN programmes
 - How Financial Risk is managed.
- 17.42 The Funding Framework also sets out the parameters within which the allocation and management of the financial resources required to deliver the objectives of the STP will be undertaken.
- 17.43 The key points to note within the TfN Funding Framework are as follows:
- The total funding envelope identified by TfN is deliverable within the context of a reasonable expectation of what funding might be made available. This is consistent with the National Infrastructure Commission’s position as set out in the National Infrastructure Assessment. TfN is therefore not making unreasonable financial demands on central government – the decision to fund TfN is a choice that can be made by government within existing paradigms, based on robust programmes.
 - TfN does not have the power to capture value created by its promoted interventions – where these powers do not sit nationally, they sit locally with TfN’s Constituent Authorities or other local authorities. These local authority powers have principally been granted to fund activity on a local rather than a regional basis. Where local plans are sufficiently developed, it is likely that those local powers will be fully utilised funding transport infrastructure within authorities and cannot be relied on to fund strategic (i.e. national) infrastructure.
 - The TfN Funding Framework will be integrated with the pipeline of programmes and projects that is presented by TfN in the STP and the accompanying LTIP. Further work is required to understand the impact of the timing of those projects and the resultant profile of proposed funding through to 2050, although there has been some initial work done for the pre-2027 period.
 - The TfN Funding Framework also identifies where residual risks sit in relation to the funding of TfN promoted interventions and how this will be managed. Neither TfN nor its Constituent Authorities are in a position to backstop the risks associated with TfN’s proposals and therefore as things stand this role will need to be taken on by central government.

However, TfN could become the owner of programme risks, which would mirror some of the effects of financial risk taking.

17.44 In the longer term, the TfN Funding Framework will provide the basis for further detailed work that will include the following activity:

- Engage with DfT, HMT and central government more widely to agree and define exactly what form the proposed budgetary decision-making control would take and demonstrate how it would enhance delivery of infrastructure in the North.
- Engage with Members and other stakeholders to further understand their ambition and consider any consequential impacts on TfN governance arrangements.
- Develop the detail of the proposed funding powers and associated risk management mechanisms and how these might be delivered.
- Consider how these powers and responsibilities would impact on TfN and its Constituent Authorities (including an assessment of potential financial impacts) and in particular, any additional resources that might be required to discharge them.
- Consider how the proposed changes would impact on DfT, partner bodies (including delivery agencies), and identify how new processes could be adopted (including the transition to the proposed arrangements).

18 Operational Life Funding Requirement

Introduction

18.1 In addition to the implementation costs (above) cost benefit appraisal takes account of future costs for maintenance and renewal, for example the delivery of additional infrastructure may place additional liabilities on the public sector to keep it in operational condition.

Maintenance and Renewal

18.2 A present value equivalent to 10% of the implementation costs is applied, to represent highway maintenance and renewal costs, based on experience from across the project team. This assumption is to be appropriate given the current stage of delivery.

18.3 The same adjustment, equivalent to 10% of implementation costs in present value terms, was made to represent passenger rail and freight intervention maintenance and renewal costs for consistency with highway schemes.

Operating Costs and Revenue

18.4 A high-level estimate of rail operating costs was made based on changes in service km, noting that neither operating costs nor passenger revenues were included in the rail economic appraisal. This represents a prudent assumption, based on the constraint that revenue from any rail interventions must exceed service operating costs.

Commercial Dimension

The Commercial Dimension of a business case sets out to demonstrate that the proposals are commercially viable, outlines the applicable procurement options and introduces the approach for engaging with the market.

19 Introduction

- 19.1 The Commercial Dimension sets out the procurement strategy to engage the market and the proposed approach to risk allocation. Given the programme is at a relatively early stage, this Commercial Dimension seeks to further clarify Transport for the North's (TfN's) role in procurement and risk acceptance, demonstrate that the various procurement options available and market capability are being considered, and establish that there is a clear procurement approach in place to deliver, as a minimum, the next phase of the study. The Commercial Dimension will be developed in further detail at Strategic Outline Business Case (SOBC) and Outline Business Case (OBC) stage.
- 19.2 The shortlist of interventions in the Southern Pennines Strategic Development Corridor (SDC) forms a divisible programme of works. This provides flexibility in the scale and timing of delivery of the interventions. Given this flexibility, many routes to market are available. Due to the programme being both multi-modal and structured around a series of packages, it is likely that a number of separate scheme promoters and delivery contracts will be required, including both engineering contracts and franchise commitments for rail. Given the anticipated timescales for delivering such significant interventions, it is likely that the procurement options available to the scheme promoters, particularly in terms of specific contracts, will change during the lifecycle of the project. Therefore, the commercial and procurement strategy will evolve as the scheme design/scope develops.

20 Approach to Procurement

Procurement Regulations Context

- 20.1 Department for Transport (DfT), TfN and the delivery partners procure works and services in compliance with EU Procurement Directives and UK Regulations. DfT, TfN, Highways England and HS2 Ltd procure through the Public Contract Regulations whilst Network Rail qualifies as a Utility Company under the EU Utility Directive and procures works and services through the Utilities Contract Regulations.
- 20.2 For bespoke procurements, where the requirements are out of the scope of the frameworks, TfN and delivery partners undertake discrete Official Journal of the European Union (OJEU) compliant procurements.

- 20.3 Looking ahead, future work and services with respect to the SDCs will be procured by the agreed delivery body. TfN will lead on further business case development at the Pan-Northern / SDC level. Beyond that stage works and services will be agreed and taken forward by the appropriate delivery entity, yet to be determined. For example this could include Highways England for Strategic Road Network (SRN) schemes, Network Rail and Local Transport Authority partners.

Market Assessment

- 20.4 This section provides an overview of the capabilities and capacity of the supplier market, any gaps which exist between current capabilities and those likely to be required to deliver the programme, and considerations for engaging with the market prior to procurement. Market analysis is a key aspect, both in terms of informing the scheme design, operational/ maintenance requirements and the route to procurement. As the study moves forward, it will be critical to remain at the forefront of market developments, understanding lessons learnt from other major schemes as well as gaining an appreciation of who in the market has the capability to deliver the interventions and packages. The skillsets required to implement the schemes are similar to those required for other regional and national highway and rail projects.
- 20.5 The divisible nature of the programme provides flexibility if necessary to fit supplier availability. However, it is noted that TfN's wider programme is large and includes many interventions that will need to be delivered contemporaneously, including with large committed investments promoted and delivered nationally or otherwise outside TfN. TfN will work closely with delivery agencies as well as the broader transport industry to ensure a joined-up approach to skills. In delivering the Investment Programme, the focus will be on maximising social value for local areas, a sustainable pipeline of skills, and diversity within the workforce.
- 20.6 Where capability or capacity gaps are identified, options will be suggested for addressing them. These options could take broadly two forms:
- Increasing capability/capacity to close any gaps, including;
 - Working alongside the market and further education establishments to address skills gaps and release new capacity into the market.
 - Collaborating with the private sector to enhance innovation.
 - Reducing/reprofiling the requirement to be deliverable by the existing market; including;
 - Working with infrastructure owners to identify more efficient way of working (for example enabling lengthier access to rail infrastructure or combining enhancement work with routine maintenance/renewal activity.)
- 20.7 It is likely that a combination of these actions will be necessary.
- 20.8 The timing of the interventions (see Management Case) provides an opportunity for scheme promoters to ensure suppliers offer the correct skillsets as new framework and term maintenance contracts are let. More detailed market analysis will be undertaken as part of the next stage and

updated as technologies in construction and within the complementary industries develop.

Sponsorship/Procurement Options Available

20.9 The multi-modal and divisible nature of the Southern Pennines programme provides an opportunity to select the best sponsorship and delivery model for each intervention/package of interventions.

20.10 Project sponsorship options include:

DfT

20.11 Under this option, DfT would retain sole accountability for the governance of a project and for ensuring that it meets the objectives set out in the Strategic Dimension. A close working relationship with the delivery agent will be required, with clearly defined processes for decision-making, communications and escalation. Dependent on the preferred delivery model (see below), this option would have the advantage of building from prior experience and utilising an existing toolkit of project processes. DfT would require a means of monitoring that the long term critical success factors (that is, making a positive contribution to the economic growth of the North of England).

TfN

20.12 Here, TfN would take sole accountability for the success (in terms of meeting both the short and long-term objectives) of a project, and take on the day-to-day Sponsor role during delivery of the infrastructure elements of the project. The advantages of this option include the geographic proximity of TfN's operations to the project site, the key linkages between the project's objectives and those set out in TfN's [draft] Strategic Transport Plan, and the existing communications processes between TfN and its partner authorities as key stakeholders.

DfT & TfN Joint Sponsorship

20.13 In this option, DfT and TfN would take on a joint Sponsorship role, collectively owning the business case and accountability for delivery of project objectives. This option has the advantage of being able to utilise DfT's organisational experience and tools, and TfN's communications management structures and North of England base. It also provides an opportunity for TfN to gain project Sponsorship experience without taking on sole accountability. A clear plan would be required setting out individual roles within the sponsorship team and lines of decision-making and escalation, to mitigate any risk associated with joint sponsorship.

TfN Local Transport Authority Partner Sponsorship

20.14 Following the principle of subsidiarity, where a TfN Local Transport Authority partner is best placed to act as Sponsor TfN will work with that Local Transport Authority to support further business case development, management of and delivery of an intervention or package of interventions. This approach is most likely to be a preferred option for interventions on local transport / highway authority managed roads.

Private Sector Sponsorship

- 20.15 There could also be opportunities for private sector investment within the Programme, such as market-led rail proposals and a number of combined transport and energy proposals. Transport for the North will examine each of these proposals closely as and when the necessary information is available.
- 20.16 Delivery options include:
- Commissioning via agencies (Network Rail, HS2 Ltd and Highways England);
 - Direct contractor appointment;
 - Alternative mechanisms (franchising, alliancing, ODP)
 - Commissioning via TfN's Partner Authorities

Design, Build & Maintain (Network Rail/HS2 Ltd/Highways England)

- 20.17 Under the Design, Build & Maintain model, the Sponsor would appoint an agent responsible for completing [detailed] scheme design and subsequent construction. Traditionally, Network Rail has undertaken this role for DfT, utilising [sub-]contractors where required. In this respect this option has the advantage of utilising a 'tried and tested' method, without the risks associated with a more innovative approach. It would also enable the 'lessons learned' from the delivery of recent enhancement projects to be embedded within the process for planning and delivering this scheme.
- 20.18 It is anticipated that many of the interventions will be delivered through framework and term maintenance contracts held by Network Rail, local authorities and Highways England.
- 20.19 It is likely that the schemes within the Southern Pennines programme would not fall within the extant CP5 process for managing the delivery of enhancements. This creates a number of options for allocating key roles of project sponsor and delivery agent. A brief description of each option is set out below to inform further discussion.

Assurance

- 20.20 While not all interventions within the programme fall within the remit of Highways England and Network Rail, at this stage it is assumed that assurance stages will be consistent with the Highways England's Project Controls Framework (PCF)⁷⁰ and Network Rail's Rail Network Enhancement Pipeline (RNEP) processes, as relevant by intervention/ package. These frameworks set out how Highways England and Network Rail, together with the DfT, manage and deliver major projects in phases/stages and are described in more detail in the Management Case. Both processes require a phased approach to procurement and approval, which can be applied

⁷⁰ <https://s3.eu-west-2.amazonaws.com/assets.highwaysengland.co.uk/roads/road-projects/A12+Chelmsford+to+A120/The+Project+Control+Framework+Quick+Reference+Guide+v1+February+2017.pdf>

separately by intervention/package as the programme moves through to later stages.

- 20.21 The process map below shows how the Strategic Transport Plan will provide the multi-modal, strategic outline programme for the interventions that feature in the Investment Programme in line with current industry and regulatory processes:

Figure 32: Investment programme development process



Next Phase

- 20.22 The work on the Strategic Development Corridors is providing enhanced analysis and strategic programme cases for investment for each corridor, as well as an initial value for money assessment for the preferred package of interventions.
- 20.23 The interventions listed will then need to be subject to their own assessment and business case developments, either as individual schemes

or, in the case of the rail journey time improvement programme, as a sub-programme, by the relevant Delivery Partner or scheme promoter, following the Rail Network Enhancement Pipeline or Highways England's Project Control Framework processes. These will all then align with the steps required for a HM Treasury compliant business case.

- 20.24 The new evidence, analysis and appraisal tools will be made available for scheme promoters to support the development of interventions, ensuring that Transport for the North is adding value to the process.
- 20.25 Transport for the North will work closely and collaboratively with Government and all Delivery Partners to ensure that this Investment Programme is delivered.
- 20.26 Transport for the North co-manages the Northern and TransPennine Express rail franchises, ensuring that the provisions of the two franchise agreements are delivered. Transport for the North is also delivering the Integrated and Smart Travel programme over the coming years.

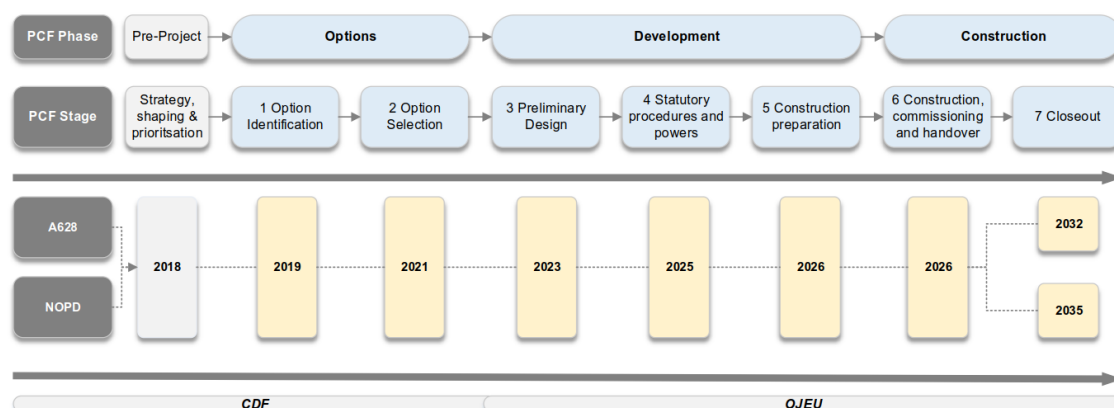
Market Engagement

- 20.27 DfT, TfN and delivery partners have established procurement frameworks and, as mature clients, have long term relationships with their suppliers. Each organisation uses its market intelligence to inform their strategy for procuring works and services.
- 20.28 TfN encourages potential suppliers to register their interest using a form on the TfN website. TfN retains these contacts so that when projects are ready for launch, a potential supply chain is already in place.
- 20.29 For complex tenders, TfN regularly invites bidders to Supplier Engagement meetings at which bidders learn about what TfN is trying to achieve and is also an opportunity for bidders to input into the Specification and the Procurement tender plan.

Procurement timelines

- 20.30 Figure 33 illustrates the anticipated procurement timeframes, commencing with further programme refinement and SOBC development.

Figure 33: Example from Trans-Pennine Tunnel Study (HE/TfN/DfT)



21 Next Steps

- 21.1 TfN will lead on further business case development at the Pan-Northern/Strategic Development Corridor level, including seeking and prioritising funding for schemes. Beyond that stage, works and services will be procured by the appropriate delivery entity, yet to be determined. For example, this could include Highways England (for Strategic Road Network schemes), Network Rail and local transport authority partners.

Management Dimension

The Management Dimension of a business case sets out to demonstrate that the proposals are deliverable, including describing proposals for:

- Programme governance
- Stakeholder engagement
- Risk and opportunities management
- Monitoring and evaluation

22 Introduction

- 22.1 The Management Dimension assesses whether a proposed intervention is deliverable. It provides a clear understanding of what needs to be done, why, when and how, with measures in place to identify and mitigate any risks⁷¹.
- 22.2 This section provides a high-level outline of the programme governance and the management systems put in place to oversee the development phase of the programme of investments. Additionally, this dimension presents an overview of the programme and the approach to stakeholder engagement, risk management and monitoring and evaluation to ensure the successful delivery of the programme.
- 22.3 As illustrated in the Strategic Dimension, the proposed programme will be a large range of multi-modal interventions varying in scale and scope distributed along the Southern Pennines corridor. Therefore, the programme will most likely be delivered in distinct phases. This approach will include a number of early 'priorities for delivery'.

23 Programme Governance

Introduction

- 23.1 This section describes the governance arrangements necessary to oversee the Strategic Development Corridor (SDC) programme at various stages in its lifecycle.

Governance Structure

- 23.2 As the body responsible for managing issues at a strategic level across the North, Transport for the North (TfN) is leading the development of a

⁷¹ DfT. (2013). The Transport Business Cases. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf [Accessed: 26/09/2018]

multimodal package of schemes to implement in the Southern Pennines corridor. The Strategic Programme Outline Cases (SPOC) for the SDCs provide a key part of the evidence base for TfN's Strategic Transport Plan (STP) and Long Term Investment Plan (LTIP). This sets out TfN's proposals for investment in transport across the North.

- 23.3 TfN, as the statutory transport body for the North, is the voice of the North of England for transport - a partnership of elected and business leaders from across the whole of the North of England who collectively represent all of the region's 16 million citizens.
- 23.4 An overview of the governance structure is shown below in Figure 34.

Figure 34: SDC Governance Structure



- 23.5 Reflecting TfN's governance arrangements, partners have been engaged and have contributed to the development of the Strategic Outline Programme (SOP) for this corridor throughout its lifecycle. This includes participation and approvals during scheme identification, objective setting, sifting, option refinement and economic appraisal processes.
- 23.6 The Partnership Board has agreed on the governance structure for TfN including the establishment of an Executive Board including TfN and DfT to oversee the work of individual work streams. Programme boards and delivery groups have also been created to advise and support the work of the Partnership Board and its Committees.
- 23.7 The Programme Board includes representatives from the following organisations: Combined Authorities, Local Transport Authorities and Local Enterprise Partnerships in the North, Department for Transport, Network Rail, Highways England, High Speed 2 Ltd. This board has provided direction, technical scrutiny and oversight throughout the development of the proposed set of interventions.

Roles & Responsibilities

- 23.8 The SPOC for the corridor provides a key part of the evidence base for TfN's Strategic Transport Plan and Long-Term Investment Plan, which sets out TfN's proposals for investment in transport across the North.
- 23.9 Setting clear roles and responsibilities and single point accountability for different areas of work is vital to supporting effective project planning, delivery and decision making.
- 23.10 TfN is accountable for owning the vision for the proposed programme and integrating and aligning it with the wider TfN Strategic Transport Plan, the wider Northern Powerhouse agenda and key government strategies.
- 23.11 TfN will provide the overall direction, governance and leadership, including chairing the Programme Board, further developing, refining and sequencing the package of interventions to facilitate the implementation of the proposed programme. TfN's role is overarching, in order to maintain a healthy alignment between the programme and wider Departmental and Government strategies, while engaging with HM Treasury, Cabinet Office, Infrastructure and Projects Authority and other key governmental stakeholders. TfN will also be responsible for managing the key strategic risks facing the programme and ensuring that the views of the local authority partners are represented.

Programme Management Arrangements and Assurance

- 23.12 Within TfN, as the Senior Responsible Officer (SRO), the Major Roads Director is accountable for delivery of the SDC Strategic Outline Programme Case (SOP).
- 23.13 Following completion and TfN Board endorsement of the Strategic Programme Outline Case, TfN will maintain responsibility for owning and promoting the SDC programme. This will include the completion of further development work during 2019/20 to refine, package and sequence the proposed delivery of the Strategic Outline programme.
- 23.14 Through the governance structure TfN will work with partners to review and update the STP LTIP, and to determine which partner organisation will take lead responsibility for progressing business case development for specific interventions or packages of interventions.
- 23.15 As stated in the Commercial Dimension, assurance processes will be consistent with Highways England and Network Rail where relevant. These include Highways England's 'Project Control Framework' (PCF)⁷² and Network Rail's 'Governance for Railway Investment Projects' (GRIP) processes. According to these frameworks, a programme lifecycle needs to be clearly defined, broken into phases and structures around key milestones. Approval to proceed from one stage into the next must be given by the Senior Responsible Owner (SRO) and this is assessed at a stage gate assessment review (SGAR). The application of these proven 'Codes of

⁷² Highways England (2017), The Project Control Framework Quick Reference Guide

practice' will ensure the effective assurance of the proposed programme of interventions.

24 Programme Lifecycle and Sequencing

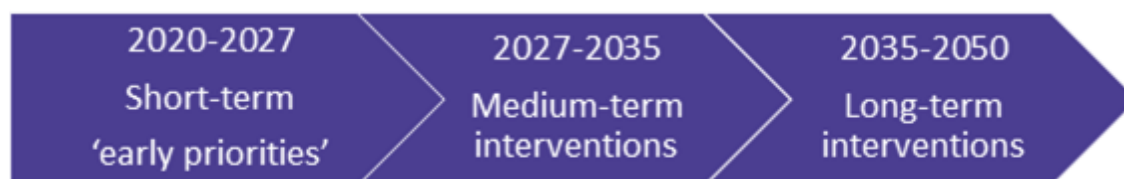
Introduction

- 24.1 The proposed programme of interventions across the Southern Pennines SDC comprises multi-modal investments to be delivered over time. The delivery of these schemes will require a comprehensive plan that carefully phases investment to ensure affordability, whilst balancing disruption, mitigation and enhancement of environmental impact and the realisation of benefits to the residents and businesses of the North of England. The interdependencies with committed schemes such as HS2 and programmed road schemes are also a key factor to consider when developing the delivery plan.
- 24.2 This section presents the emerging delivery programme for the Southern Pennines SDC.

Outline Delivery Programme

- 24.3 The programme of investments proposed for the Southern Pennines corridor includes a large number of schemes, which will likely be delivered over a number of years. This programme is in early stages of development and therefore this Management Dimension focuses on the development phase.
- 24.4 It is envisaged that a number of early 'priorities for delivery' will be taken forward to Strategic Outline Business Case (SOBC) in 2019/2020 to be delivered between 2020-2027. Overall, a programme of short (up to 2027), medium (2027-2035) and long term (post 2035) interventions will be developed.

Figure 35: High-level delivery programme



- 24.5 In the next year, TfN plans to update the Strategic Programme Outline Cases to inform an update of the Investment Programme. This will include work on reviewing the current SDCs and Investment Programme, including the sequencing of schemes. The next stage of modelling will include transformational NPIER forecasts and the latest spatial planning information.
- 24.6 As in the first stage of the development of the SDCs, TfN will fully engage with DfT, local partners, national delivery bodies, transport operators and other key stakeholders. This will ensure that partners and stakeholders contributions inform and help shape our delivery programme.

Interfaces with other schemes

- 24.7 As the programme is further developed, it will be key to consider how the proposed interventions interface with other schemes being planned for this geographical area. Key schemes to consider will include:
- HS2
 - Great North Rail Project
 - Highways England Road Investment Strategy 2 investments (Manchester North-West quadrant, Trans-Pennine Tunnel)
 - Northern Powerhouse Rail
 - Other major developments of national and regional importance
 - Local schemes
- 24.8 The full list of schemes included in the Reference Case is available in the Strategic Dimension.

25 Stakeholder Management and Communications

Introduction

- 25.1 Effective stakeholder management and consultation is fundamental to achieving the objectives of the programme. This section presents an overview of TfN's engagement with key stakeholders so far as well as an overview of TfN's approach to future stakeholder engagement and communications.

Stakeholder Engagement Plan

- 25.2 At the start of the development of the SPOC, a Stakeholder Engagement Plan (SEP) was produced to map stakeholders and agree a communications plan throughout the option development process and preparation of the SPOC.
- 25.3 The SEP included:
- Aims and objectives
 - Situation analysis
 - Stakeholder mapping
 - Engagement methods
- 25.4 Since the start of the development of the programme of investments in the Southern Pennines SDC and following the SEP, TfN has engaged with a significant number of national, regional and local stakeholders. These include:
- Local authorities
 - Local Transport Authorities
 - Local Enterprise Partnerships
 - Combined authorities
 - Highways England
 - Network Rail

- HS2
 - DfT
 - Homes England
 - Large private businesses, including rail and airport operators
 - Railfuture
 - Community Rail Partnerships
 - Historic England
 - Transport Focus
 - Chambers of commerce and other organisations representing businesses
 - Tourism organisations
- 25.5 The purpose of this engagement was to define the outcomes to be achieved through investments in the SDCs and identify which multi-modal solutions are required to deliver these outcomes.
- 25.6 TfN held different stakeholder consultation sessions in the form of workshops and interviews throughout 2018. Details on the specific consultation sessions held to inform the options development and assessment process can be found in the Strategic Dimension. Further rounds of stakeholder engagement are planned in 2019 to share the outcomes of the SPOC.

26 Risk and Opportunities Management

Introduction

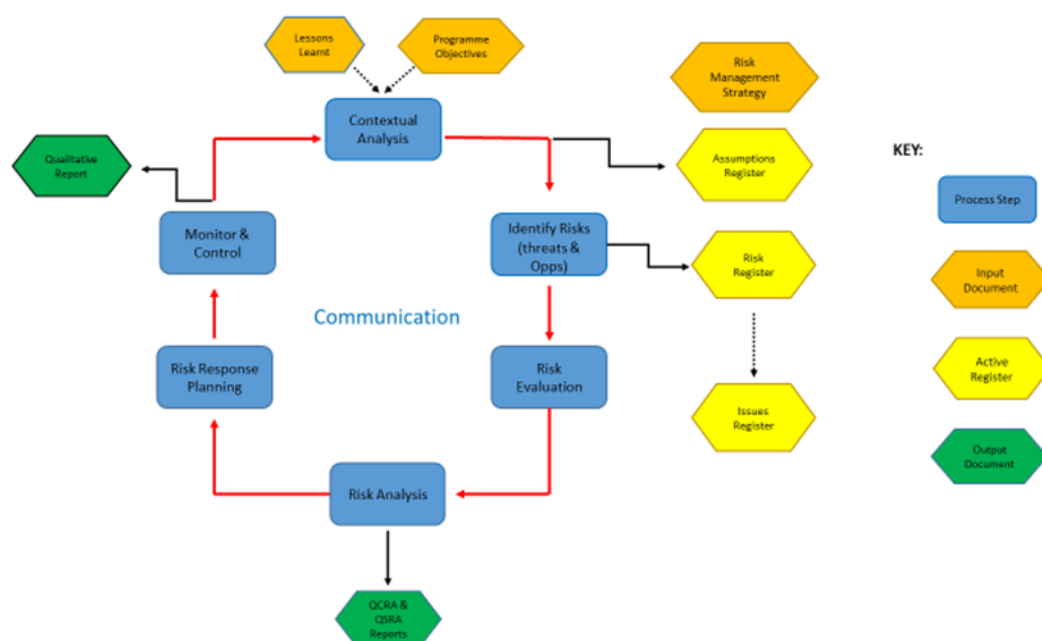
- 26.1 The SDCs' risk management is undertaken in line with TfN's Risk Management Strategy (RMS). The RMS provides a framework for managing risks in a consistent manner by applying systematic methods and practices to the task of identifying and assessing risks and opportunities which in turn allows mitigation measures to be identified and implemented to reduce or optimise the effects. This provides a disciplined environment for proactive decision-making.

Risk Management

- 26.2 The risk management approach is an iterative process through which risks are continually identified, assessed and managed by the programme team. Adopting best practice, TfN's risk management process is sub-divided into six key steps listed below:
- Contextual Analysis
 - Identification of Risk
 - Risk Evaluation
 - Risk Analysis
 - Risk Treatment
 - Monitor & Control
- 26.3 Collectively, these steps form a logical sequence, necessary for the adoption of a robust approach to the implementation of the risk management with the SDC programme.

- 26.4 The SDC team maintain an up-to-date programme risk register, which is reviewed and updated regularly and on an on-going basis by risk and mitigation action owners. The programme has adopted a robust and rigorous bottom-up risk management reporting where emerging risks are proactively captured, existing risks reviewed and re-assessed, and new risks identified.
- 26.5 TfN's efficient and effective risk reporting process allows management to be informed on the key threats and opportunities that require attention at a higher level.
- 26.6 Figure 36 provides an overview of TfN's risk management process. A description of key stages is provided below.

Figure 36: TfN's Risk Management Process



Contextual Analysis

- 26.7 This step requires the manager to collate the maximum amount of information with regard to the scope of the activity, thus enabling the identification of risks that may have an impact upon TfN's objectives. Information collated will assist in defining appropriate probability and impact scoring.

Identification of Risks

- 26.8 TfN will undertake a comprehensive contextual analysis to enable the identification of risks that may have an impact upon TfN's objectives. Based on the contextual analysis, threats and opportunities will be identified that inform the risk identification process. Identified risks will be summarised in a risk register which includes risk categories and risk descriptions. TfN will organise a comprehensive programme risk register and regularly update it with emerging risks being proactively captured.

Risk Evaluation

- 26.9 The programme team will utilise designed a qualitative risk scoring criteria to enable the assessment of the risks and opportunities. This will generate a qualitative risk ranking (risk score) by multiplying the probability with the maximum of the impacts for each risk identified in the risk register. The risks with the highest risk scores will be prioritised analysed in more detail and reported for review and decision-making.

Risk Analysis

- 26.10 Risk analysis will be undertaken to determine the aggregated effect of the threats and opportunities on an activity. This will include consideration of any interdependencies or mutual exclusivity between risks.

Risk Treatment

- 26.11 For risk treatment/mitigation, a process for selecting the most suitable response strategy to the management of individual or groups of risks will be chosen. These are applied to both threats and opportunities. Appropriate ownership will be identified in the risk register for all risks, together with the associated mitigating actions.

Risk Monitor and Control Stage

- 26.12 This is an essential process step by which the risk planning measures are monitored and controlled. Usually conducted as part of regular risk reviews. The output of this process step will allow for corrective action to be taken should the risk planning measures be judged as not working effectively and thus further actions may be required.

27 Monitoring and Evaluation

Introduction

- 27.1 The monitoring and evaluation of benefits is required to assess the extent to which the scheme meets its core objectives as set out in the Strategic Dimension. TfN in consultation with partners, will develop a thorough monitoring strategy and evaluation plan complying with DfT (HMT) requirements⁷³. This is an important task to understand the benefits of the programme of interventions, highlighted in DfT and HMT guidance.

Approach to Monitoring and Evaluation

- 27.2 Monitoring is the systematic collection and analysis of data as a project progresses, aimed at improving the efficiency and effectiveness of a project or organisation. This data can be fed back into implementation, current decision making and the appraisal process to improve future decision making. It requires the collection of data before implementation to act as a baseline.

⁷³ HM Treasury. (2018). A short 'plain English' guide to assessing business cases.

- 27.3 The monitoring strategy for this programme will set out data requirements, potential data sources and how the data will be obtained and monitored at the start of the project (baseline) at various intervals during the project (milestones) and at the end of the project (target) to help assess the trajectory of outputs and impacts.
- 27.4 The evaluation plan, to be developed as the programme development progresses, will describe in detail the proposed evaluation approach and how it fits with the existing evidence base and monitoring strategy. The plan will be developed following guidance contained in the Magenta Book⁷⁴, the Government's guidance on evaluation. All interventions will require a decision on whether to carry out a formal independent evaluation or not. This decision will be based on the scale of the investment and the need for evaluation⁷⁵. The evaluation plan may draw on existing evaluation processes where relevant, for example Highways England's Post Opening Project Evaluation (POPE) for road schemes.
- 27.5 To date TfN has undertaken some work into monitoring the current economic baseline across the North as evidenced in the Northern Powerhouse Independent Economic Review (NPIER) and the STP. More work will be undertaken as the programme for investment in the SDCs develops. As TfN develops its process for monitoring and evaluation it is important that an assessment is made against the current metrics available to critically assess measurement validity.

Benefits monitoring and realisation

- 27.6 Transport for the North will also develop a benefits realisation strategy in the next phase. This will ensure that the key objectives for the scheme, as laid out in the Strategic Dimension, are met. An effective benefits realisation strategy will include:
- Creation of a benefits register that links the expected benefits from the programme to the overall strategic goals. This would include identification of the benefit and the proposed metric that will be used to measure it (for example, time savings, overall demand figures, etc).
 - Nomination of the organisation or directorate that is accountable for realising the benefit. In some cases, such as public realm improvements or specific local interventions, this may be an organisation other than TfN such as local authorities.
 - Arrangements for ensuring that benefits monitoring is at the heart of scheme decision-making.
 - Monitoring and updating, to ensure that the benefits are on-course to be realised.
 - Consideration of how benefits from each individual scheme can be isolated and properly evaluated.

⁷⁴ HM Treasury. (2011). The Magenta Book

⁷⁵ DfT. (2013). Monitoring and Evaluation Strategy

28 Management Dimension Summary

- 28.1 This chapter has discussed the deliverability of the proposed programme of interventions for the Southern Pennines corridor. It demonstrated that plans and governance structures are in place, as well as how they might change in future. It has also included a description of the arrangements for engaging with internal and external stakeholders and those for managing risks.
- 28.2 The Management Dimension also highlights the importance for effective risk management and monitoring and evaluation. Finally, the methodology for monitoring and evaluation of benefits was described. This is necessary to assess the extent to which the scheme meets its core objectives as set out in the Strategic Dimension.

Glossary

Term	Acronym	Definition
Benchmark		Benchmark Estimating Ltd : company who undertook the 'benchmarking' exercise on the scheme costs
Concept		High level approach to delivering interventions (for example an offline bypass).
Enabling Capabilities		The capabilities of the North which are additional to the prime capabilities: education; financial and professional services; and logistics.
Garden Village		A self-contained community of between 1,500 and 10,000 homes.
Gross Value Added	GVA	The measure of the value of goods and services produced by an area, industry or sector of an economy.
Intervention		A potential (loosely defined) scheme which would deliver a benefit.
Local Enterprise Partnership	LEP	A voluntary, business-led, strategic partnership between local authorities and businesses, responsible for promoting and developing economic growth.
Major Road Network	MNR	A network of economically important roads vital for transformational growth
Northern Powerhouse Independent Economic Review	NPIER	Outlines the opportunities to transform the North.
Option		A more specific approach to delivering an intervention (for example a three-lane offline bypass to the west of a city). Given our current level of development, we should talk in terms of 'concepts' and not 'options'.
Package		A group of interventions that are linked by geography or technology.
Pan-Northern		Refers to transport schemes which fit within TfN's remit
Phasing		To do with a method of delivery for a package or intervention which sees its delivery staggered to release benefits / cause disruption over a certain timeframe.
Prime Capabilities		The four areas where the North is highly skilled and globally competitive, as identified by the NPIER: advanced manufacturing; health innovation; energy; and digital.
Programme		A large set of projects/packages/interventions, which for the purposes of our work are specific to an SDC.
Project		A project could be an intervention on its own or a package, but in any case would generally be defined in its scope by a decision to procure it from the market – as such, we will not be at a level of development where this is a useful term, and it is proposed not to refer to 'projects' in the SPOCs.
Rail North Partnership		Acts on behalf of TfN and DfT to manage Northern and Trans-Pennine rail franchises
Reference Case		The 'do-minimum' scenario developed by TfN including the likely future interventions that aim to increase connectivity across the region

Term	Acronym	Definition
Sequencing		The process of establishing when packages/interventions should be progressed, and should generally follow the convention of 2020 – 2025, 2025 – 2035, 2035 – 2050.
Strategic Development Corridor	SDC	An area where evidence suggests investment in transport infrastructure will enable transformational economic growth.
Strategic Programme Outline Case	SPOC	Catch-all term to integrate the similar considerations that were to be taken forward as part of the SOP and SOC.
Strategic Road Studies		Northern Trans Pennine Routes; Manchester North-West Quadrant; Trans Pennine Tunnel
Sub-national Transport Body		A formal, legal entity designed to bridge the gap between national and local projects to plan and prioritise long term infrastructure investment in a specific region.
Transport Appraisal Guidance	WebTAG	An online tool which provides information on the role of transport modelling and appraisal, and how the transport appraisal process supports the development of investment decisions and business cases.
Transport for the North	TfN	The sub-national transport body for the North

Term	Acronym
Association for the Advancement of Cost Engineering International	AACEI
Air Quality Management Areas	AQMAs
Appraisal Specification Report	ASR
Appraisal Summary Table	AST
Areas of Outstanding Natural Beauty	AONB
Benefit Cost Ratio	BCR
Distributional Impact	DI
Exogenous Demand Growth Estimation	EDGE
Environmental Appraisal Report	EAR
Environmental Impact Assessment	EIA
Environmental Statement	ES
External Forecast Model	EFM
Full Business Case	FBC
Governance for Railway Investment Projects	GRIP
Great Britain Freight Model	GBFM
Gross Domestic Product	GDP
High Speed 2	HS2
HM Treasury	HMT
Independent Economic Review	IER
Integrated Sustainability Appraisal	ISA

Term	Acronym
Local Enterprise Partnership	LEP
Major Road Network	MRN
Million passengers per annum	mppa
National Character Area	NCA
National Nature Reserve	NNR
National Trip End Model	NTEM
Net Present Value	NPV
North of England Rail Model System	NoRMS
Northern Powerhouse Rail	NPR
Northern Transport Demand Model	NTDM
Official Journal of European Union	OJEU
Option Assessment Report	OAR
Outline Business Case	OBC
Post Opening Project Evaluation	POPE
Present Value	PV
Present Value of Benefits	PVB
Present Value of Costs	PVC
Project Control Framework	PCF
Public Transport	PT
Regional Transport Model	RTM
Sites of Special Scientific Interest	SSSI
Senior Modelling Group	SMG
Small to Medium Enterprise	SME
Special Areas of Conservation	SAC
Special Protection Area	SPA
Stage Gate Assessment Review	SGAR
Stakeholder Engagement Plan	SEP
Strategic Outline Business Case	SOBC / SOC
Strategic Outline Programme	SOP
Strategic Road Network	SRN
Strategic Transport Plan	STP
Trans-Pennine South	TPS
Technical Assurance Group	TAG
Transport Economic Efficiency	TEE
Value for Money	VfM
Value of Time	VoT
Wider Economic Benefits	WEBs

Southern Pennines: Strategic Development Corridor

Appendices

A Appraisal Summary Table

Appraisal Summary Table		Date produced:			Jan-19		Contact:					
Name of scheme:		South Pennines Strategic Development Corridor					Name		Marina Triampela			
Description of scheme:		Strategic Outline Programme (SOP) of highway interventions.					Organisation		Steer			
							Role		Consultant to TfN			
Impacts		Summary of key impacts			Assessment							
					Quantitative		Qualitative		Monetary £m(NPV)		Distributional 7-pt scale/ vulnerable grp	
Economy	Business users & transport providers	As a result of business users having a high VoT, any journey time savings associated with business users have a large influence on the overall time saving benefits generated (60.27%). The assessment shows that there will be monetised benefits resulting from journey time savings and changes in vehicle operating costs for business users amounting to £3,580.8m, with 43% of those benefits related to goods vehicles (OGVs).			Value of journey time changes(£m)		3,456.1		3,580.80	Not Assessed		
					Net journey time changes (£m)							
					0 to 2min		2 to 5min				> 5min	
					654.2		1,108.0				1,694.0	
	Reliability impact on Business users	Reliability impacts have been calculated based upon 10% of the business user travel time savings calculated by TUBA.			10% of journey time changes				345.6			
Regeneration	The schemes included in the South Pennines SDC programme represent a substantial investment in transport provision across the corridor, which are designed to improve connectivity.					Strong Beneficial						
Wider Impacts	The South Pennines SOP will generate between £2,235.4m and £2,513.5m of benefits from labour supply impacts (£28.8), productivity (Static Clustering) (£2,003.9 - 2,282.0m), and output change in imperfectly competitive markets (£202.6m). This benefit is incorporated into the Level 2 adjusted BCR for the South Pennines SOP.							Lower Bound: 2,235.4 Upper Bound: 2,513.5				
Environmental	Noise	The road interventions planned as part of the South Pennines SOP programme are likely to alter noise levels and to influence air quality. Overall, a moderate adverse impact is anticipated due to the increase in traffic flows and speeds in many parts of the road network. However, the impacts will be mitigated to a degree.					Moderate Adverse			Not Assessed		
	Air Quality						Moderate Adverse			Not Assessed		
	Greenhouse gases	The increase in traffic flows as a result of road interventions would have an adverse impact on greenhouse gas emissions. Overall, SOP is predicted to result in approximately 7.2 million tonnes of CO ₂ emissions over a 60-year period. However, these impacts will be mitigated to a degree and the reduction in congestion and journey times would have a positive effect.			Change in non-traded carbon over 60y (CO ₂ e) (million tonnes)		7.284		-302.8			
			Change in traded carbon over 60y (CO ₂ e) (million tonnes)		0.079							
	Landscape	Considering the proximity of the transport interventions to National Parks and Areas of Outstanding Natural Beauty (AONB), SOP is likely to have significant negative effects on local landscape character, although these will be mitigated to a degree.					Likely to have significant adverse effects					
	Townscape	SOP would potentially have significant adverse impacts on the physical and social characteristics of the urban environment as it involves interventions that fall within settlements. However, the new bypass routes will result in the reduction of traffic flows in existing settlements and would therefore have a positive effect.					Potential to have significant adverse effects					
	Historic Environment	As the SOP interventions fall within proximity to a large number of designated heritage assets, SOP is likely to have some residual impact on heritage assets. However, the negative impacts will be mitigated to a degree and the SOP schemes would also improve accessibility to certain historic and culturally significant sites.					Likely to have significant adverse effects					
	Biodiversity	The SOP comprises infrastructure development that has the potential to adversely affect the integrity of local, national and international (European) designated sites, and the status and distribution of priority habitats and species. However, the impacts will be mitigated to a degree.					Likely to have significant adverse effects					
Water Environment	The SOP transport schemes would present increased risk of significant adverse impacts to the inland water environment.					Potential to have significant adverse effects						
Social	Commuting and Other users	Commuting journey time benefits contribute to 18.1% of the overall distribution of travel time benefits, with Other users contributing to 21.6%. The assessment shows that there will be monetised benefits resulting solely from journey time savings of Commuting and Other users amounting to £2,278.6m.			Value of journey time changes(£m)		2,278.6		2,278.60	Not Assessed		
					Net journey time changes (£m)							
					0 to 2min		2 to 5min				> 5min	
					652.7		850.7				775.3	
	Reliability impact on Commuting and	Reliability impacts have been calculated based upon 10% of the commuting and other user travel time savings calculated by TUBA.			10% of journey time changes				227.9			
	Physical activity	The effect of the South Pennines SOP on Physical Activity is not assessed within this SPOC and will be considered at a later stage of scheme development.					Not Assessed					
	Journey quality	The effect of the South Pennines SOP on Journey Quality is not assessed within this SPOC and will be considered at a later stage of scheme development.					Not Assessed					
	Accidents	The effect of the South Pennines SOP on Accidents is not assessed within this SPOC and will be considered at a later stage of scheme development.					Not Assessed			Not Assessed		
	Security	The effect of the South Pennines SOP on Security is not assessed within this SPOC and will be considered at a later stage of scheme development.					Not Assessed			Not Assessed		
	Access to services	The effect of the South Pennines SOP on Access to Services is not assessed within this SPOC and will be considered at a later stage of scheme development.					Not Assessed			Not Assessed		
	Affordability	At this early stage of appraisal, and for the purposes of this SPOC, an indication of the impact on Personal Affordability has been quantified using the TUBA outputs for vehicle operating costs and user charges for non-business users. The results show an aggregate increase in vehicle operating costs over the 60-year appraisal period with a South Pennines SDC programme of investment in place compared to the Reference case. This is attributable to an increase in total vehicle kilometres travelled and as a result higher fuel consumption and vehicle maintenance costs. The increase in vehicle kilometres travelled is a reflection of the improved connectivity brought about by the SOP highway interventions and an increase to travel to work catchment areas. In doing so the SOP provides the North's residents with increased opportunities to travel for work, leisure and other interests which in qualitative terms is considered to be beneficial from a personal affordability perspective.			£m	Commuting	Other		-394.9	Not Assessed		
					VOC	-58.9	-330.3					
				User Charges	-2.4	-3.3						
Severance	The effect of the South Pennines SOP on Severance is not assessed within this SPOC and will be considered at a later stage of scheme development.					Not Assessed			Not Assessed			
Option and non-use values	The effect of the South Pennines SOP on Option and Non-use Values is not assessed within this SPOC and will be considered at a later stage of scheme development.					Not Assessed						
Public Accounts	Cost to Broad Transport Budget	Investment costs of the South Pennines SOP total £2,963.9m. For Operation and Maintenance, a value equivalent to 10% of the Investment Costs has been assumed to be representative of the Operating Costs of the South Pennines SOP (£296.4m).							-2,963.9			
	Indirect Tax Revenues	As the South Pennines SOP only considers highway benefits for the economic appraisal, only fuel duty effects on indirect tax revenues is quantified in this SPOC. The results output from TUBA forecast an increase in indirect tax revenues, representing a benefit of £539.4m.							539.4			