TRANSPORT FOR THE NORTH

West and Wales: Strategic Development Corridor

Strategic Programme Outline Case

February 2019

Contents

Figures

Tables

Appendices

Supporting Documents

A standalone Executive Summary has been published separately in February 2019. Further detailed evidence is available on Transport for the North's website at **www.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.

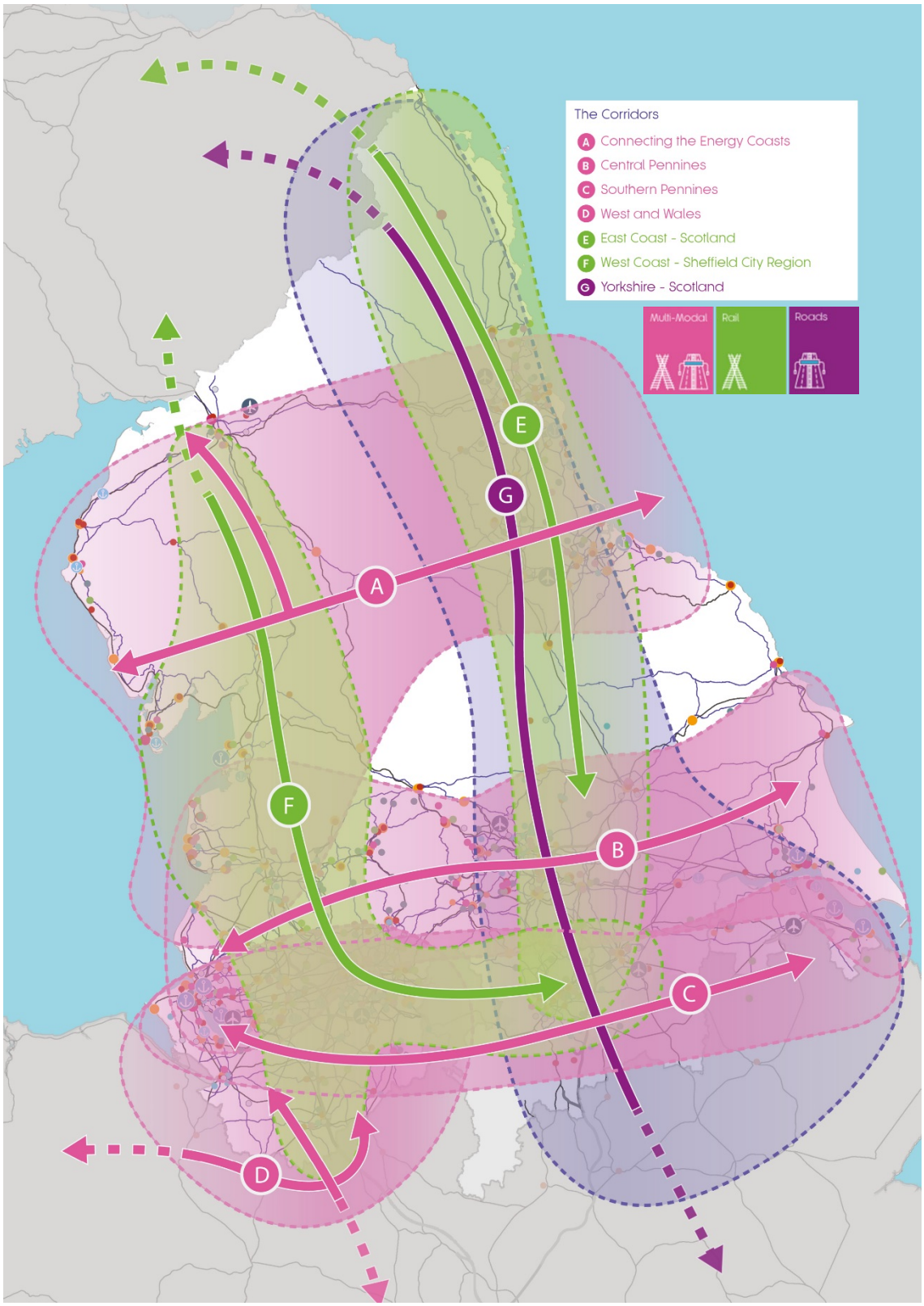
1.4 These corridors complement Northern Powerhouse Rail (NPR), Integrated and Smart Travel and three Strategic Road studies[3], which form part of the reference case for this study. This study specifically seeks to explore the West and Wales Strategic Development Corridor (SDC).

[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 – February 2019

1.5 The SDCs do not represent where all future investment should be concentrated, but rather where the largest gaps between demand and

performance currently exist, and where there is likely to be the greatest potential to improve connectivity and the economic interaction between the existing key economic clusters and assets of the North 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, and TfN 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 supporting the built 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 schemes that naturally fit within TfN's remit.

The rationale for Strategic Development Corridors

1.16 Interventions considered within the SDC programmes are complementary to the two Strategic Road projects, one ongoing Strategic Road Study, NPR, and other committed improvements, which are included within the

'reference case' for this study. Ultimately all schemes 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 schemes included in the reference case, is required to:

- Maximise/enhance the benefits of reference case schemes
- Distribute the benefits of the North's 'major transformational-infrastructure projects[4]' 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 West and Wales SDC

1.18 The West and Wales SDC is one of the four multi-modal corridors covering the area of the Liverpool and Manchester city regions as well as Cheshire and North Wales. This corridor links densely populated economic centres and assets, including some of the North's largest cities such as Liverpool and Manchester and encompasses 25 local authority areas[5].

1.19 The West and Wales SDC has a scope of interest that is defined by three areas within the core TfN geography. They each have representation from political leaders on TfN's Partnership Board, though it should be noted that their roles and responsibilities differ with respect to devolved powers for transport. They are:

- The Liverpool City Region Combined Authority
- The Greater Manchester Combined Authority
- The Cheshire & Warrington Local Economic Partnership (LEP) - encompassing a voluntary partnership between the individual Unitary Authorities of Cheshire West and Chester (CW&C), Warrington and Cheshire East Council (CEC).

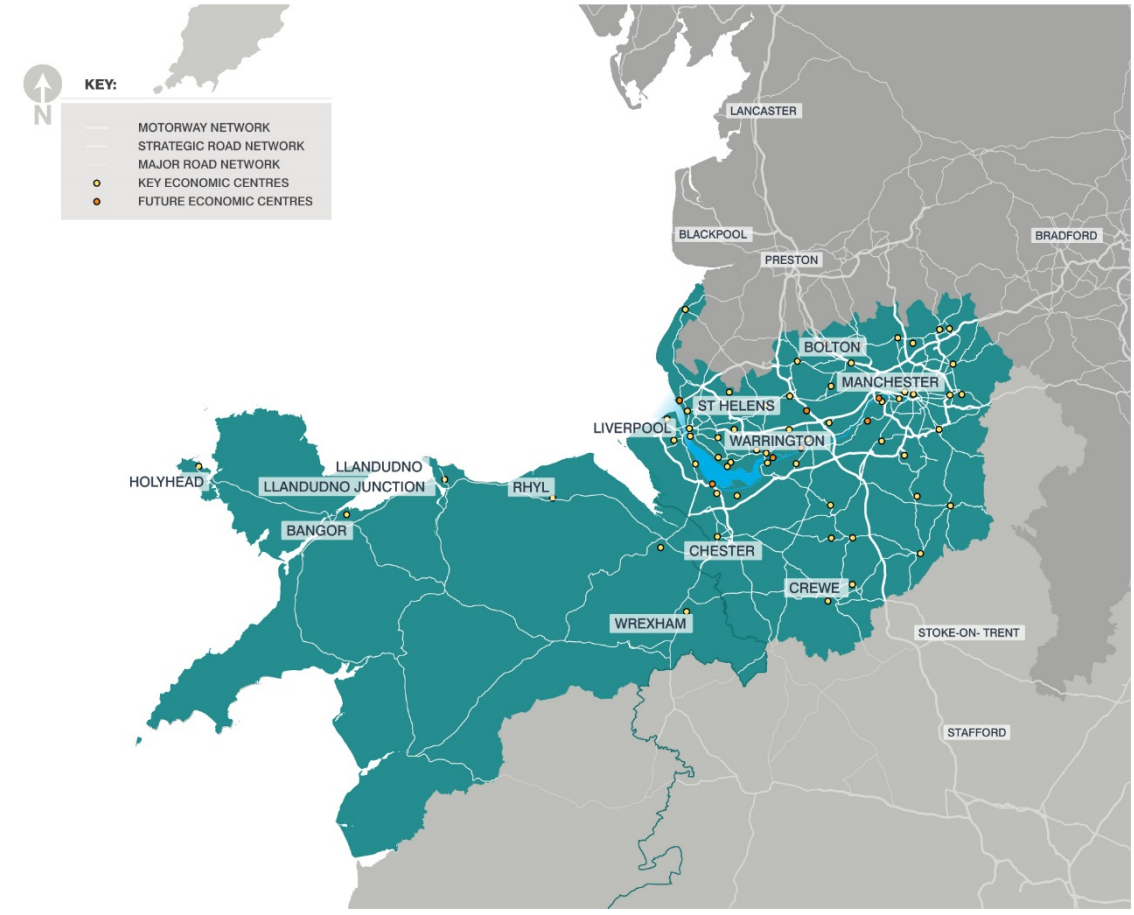
[4] The three ongoing Strategic Road Studies, Northern Powerhouse Rail

[5] Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, Wigan, Halton, Knowsley, Liverpool, St. Helens, Sefton, Wirral, Isle of Anglesey, Gwynedd, Conwy, Denbighshire, Flintshire, Wrexham, Warrington, Cheshire East, Cheshire West and Chester

1.20 The economic relationships of the West and Wales SDC extend beyond the core geography of TfN. In recognition of the travel demands that are generated across boundaries, the following additional national and sub-national bodies have membership of the Project Board for the commission:

- Welsh Government, accounting for movements to/from England to/from North Wales.
- Midlands Connect, accounting for movements to/from the south and east of Crewe.

Figure 2 West and Wales Geography



1.21 Within the West & Wales SDC, 51 Important Economic Centres (IECs) key to developing the NPIER prime and enabling capabilities have been identified to better understand the need for improved connectivity. These are presented in Figure 2 and listed in Table 1. The concept of IECs has been developed to reflect the symbiotic economic relationships that exist within the TfN geography and North Wales (Welsh Government) and the

Midlands (Midlands Connect). The existing IECs have been identified during 2017 based on the STP evidence base (Major Road and Integrated Rail Reports).

Table 1: Important Economic Centres within the West and Wales SDC

Important Economic Centres (North West)	
Altrincham	Middlewich
Ashton Moss Business Park	Nantwich
Ashton-under-Lyne	Northwich
Birchwood	Oldham
Birkenhead	Macclesfield
Bolton	Manchester
Bootle	Manchester Airport
Bury	Middlebrook & Parklands
Central Salford	Omega South, Warrington
Chester	Port of Garston
Congleton	Port of Liverpool
Crewe	Rochdale
Ditton	Runcorn
Ellesmere Port	Salford Quays: Media City
Greater Manchester Life Science	Sci-Tech Daresbury
Haydock Industrial Area	Speke
Heywood Distribution Park	St Helens
Huyton	Stockport
Kingsway Business Park	Thornton Science Park
Knowsley Industrial Park	Trafford Park
Leigh	Wallasey
Liverpool	Warrington
Liverpool Hope University	Widnes
Liverpool John Lennon Airport	Wigan
Logistics North, Bolton	Winsford
	Wirral International Business Park
Important Economic Centres (North Wales)	
Within North Wales	Wrexham (encompassing Wrexham Industrial Estate)
Deeside (encompassing Airbus at Broughton, Deeside Industrial Park & Mostyn Dock)	Menai (encompassing Bangor (and University), Caernarfon and Menai Bridge
Colwyn Bay / Prestatyn	Port of Holyhead
Conwy / Llandudno (inc. Llandudno Junction)	Wylfa "Horizon" National Infrastructure Project
Within North Wales	Wrexham (encompassing Wrexham Industrial Estate)

1.22 Significant economic and population growth is forecast within this corridor which will increase demand on transport infrastructure. Connectivity improvements can support the growth of key economic assets such as Manchester Airport, Liverpool John Lennon Airport, Cheshire Science

Corridor Enterprise Zones, Atlantic Gateway, North Wales Arc, Port of Liverpool, Holyhead Port and Crewe HS2 Hub.

Scope of Strategic Development Corridor SPOC

1.23 The TfN SDC business cases have been developed to a level of detail approaching a conventional 'single-scheme' Strategic Outline Business Case (SOBC)[6], 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).

1.24 HMT public sector business case guidance[7] 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.

1.25 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.

1.26 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.

1.27 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.

[6] 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

[7] 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)

Figure 3: The Three Phases of the Decision Making Process

Source: DfT Transport Business Cases

1.28 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

1.29 The TfN SPOCs have been developed with reference to the HMT Green Book[8] best practice and DfT transport analysis guidance: WebTAG. The 2018 update to the HMT Green Book has moved to describing the five main content sections of a public-sector business case as 'dimensions'; previously these were known as cases. 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:

- 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 28

1.30 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 Framework[9] document. Each SPOC is accompanied by a standalone non-technical summary document.

[9] **DfT,** **Strategic Case Supplementary Guidance** (December 2017)

Supporting Documents[10]

1.31 A standalone Executive Summary has been published separately.

1.32 The following documents, developed during the SDC study programme, provide additional detail in support of this SPOC:

- Stage 1 Appraisal Specification Report
- Option Assessment Report
- Transport Forecasting and Economic Appraisal Report
- Environmental Appraisal Report

[10] Further detailed evidence is available on TfN's website at **www.transportforthenorth.com**

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 West and Wales Strategic Development Corridor (SDC), and how it fits with wider policy objectives. It goes on to summarise the **need for intervention**, which justifies 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)[11] and Department for Transport (DfT)[12] business case guidance. It has drawn on DfT Supplementary Strategic Case Guidance, with respect to

[11] **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)

[12] DfT: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf (January 2013)

its *Transport Investment Strategy*[13] and Rebalancing Toolkit[14]. In addition, Network Rail's *Enhancement Delivery Plan*[15] has also been considered.

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. This need 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 West and Wales SDC needs to consider these policies to ensure consistency with the wider national framework and other infrastructure initiatives.

National Policy

2.5 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[16,17].

2.6 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'

---

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

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

15 Network Rail, Enhancements Delivery Plan, Dec 2018

16 HM Government, *UK Industrial Strategy*

17 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

2.7 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.

2.8 DfT's *Transport Investment Strategy*[18] is closely aligned with the Industrial Strategy. The key objectives of the Transport Investment Strategy are shown in Table 2.

Table 2 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.

2.9 The necessity for improved transport links is also highlighted in the '*Making our Economy Work for Everyone'* report by the Inclusive Growth Commission[19]. 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

[18] 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

[19] 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

economic connectivity for regions and places which were previously disadvantaged due to poor transport links.

2.10 The DfT's Local Transport White Paper: *Creating Growth, Cutting Carbon: Making Sustainable Transport Happen*[20] 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.

2.11 The Ministry of Housing, Communities and Local Government's 2018 draft *National Planning and Policy Framework*[21] 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.

Regional Policy

2.12 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 STP[22] 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:

- Increasing efficiency, reliability, integration and resilience in the transport system
- Transforming economic performance
- Improving inclusivity, health and access to opportunities for all
- Promoting and enhancing the built, historic and natural environment

[20] 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

[21] 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

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

Figure 4: TfN's key Pan-Northern Objectives

2.13 The STP identifies seven SDCs (based on the 2017 Integrated Rail and Major Roads Reports), including the West and Wales 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.

2.14 Through the 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.
- Moving goods - supporting businesses to move freight and goods in efficient, multi-modal ways.

2.15 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.

2.16 The STP is closely aligned with the "*One North*" report published in 2014[23], 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.

2.17 The need for better connectivity and closer collaboration in the North is also demonstrated by the NPIER[24] 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

2.18 The NPIER sets 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:

- £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.

2.19 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 DfT[25]. This toolkit is designed to help authors of

[23]Transport for the North, *The Northern Powerhouse: One Agenda, One Economy, One North* (2015) https://www.transportforthenorth.com/wp-content/uploads/A-report-on-the-Northern-Transport-Strategy-1.pdf

[24] Transport for the North, *The Northern Powerhouse Independent Economic Review* (2016) https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf

[25] Department for Transport, *Strategic Case Supplementary Guidance Rebalancing Toolkit* (2017)

strategic cases assess how a project fits with the objective of spreading growth across the whole country.

2.20 The Northern Freight and Logistics Report[26] identifies the need for better connectivity with respect to freight and logistics. The report sets 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"*.

West and Wales SDC Specific Policy

2.21 The development of the STP and the supporting evidence base (such as NPIER) involved a rigorous consultation exercise with the LEP and City Regions. As such the principles and aspirations of each organisation are encompassed within the strategic policy direction of TfN, which in turn forms the core objectives of the SDCs.

2.22 At a local level, several strategies and policies have also been developed within the study area that support the overall goal of improving transport infrastructure and stimulating economic growth. The *Greater Manchester Transport Strategy 2040*[27] highlights the need for high class connections that support long-term, sustainable economic growth and access to opportunity for all. In line with this, the *'Greater Manchester Strategy'*[28] considers the provision of "world-class" connectivity that connects people with jobs as a priority.

2.23 *A Transport Plan for Growth*[29] by the Liverpool City Region Combined Authority has also set out the strategic direction for increased transport investments to support economic growth, regeneration and air quality improvements. Freight and logistics, employment and skills, as well as strengthening the visitor economy are key elements of the strategy.

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

[26] Transport for the North, *Northern Freight and Logistics Report* (201X) https://www.transportforthenorth.com/wp-content/uploads/TfN-Freight-and-Logistics-Report.pdf

[27]Transport for Greater Manchester, *GREATER MANCHESTER TRANSPORT STRATEGY 2040* (2017) https://assets.ctfassets.net/nv7y93idf4jq/5NBNSoWRZS8AkcGkAU4CEg/f2dfea7defcc0699b2a11c7219b5254d/17-0663_GM_2040_Exec_summary.pdf

[28] GMCA, *The Greater Manchester Strategy*, https://www.greatermanchester-ca.gov.uk/ourpeopleourplace

[29] Liverpool City Region Combined Authority, *A Transport Plan for Growth* (2015) https://www.merseytravel.gov.uk/about-us/local-transport-delivery/Documents/8375%20Plan%20for%20growth%20WEB%20FINAL.pdf

2.24 The *Local Transport Strategy*[30] by the Cheshire West & Chester Council, the '*Growth Vision for the Economy of North Wales*'[31] by the North Wales Economic Ambition Board, and the policy document '*Moving North Wales Forward*'[32] by the Welsh Government and the North East Wales Metro are also in accordance with other national, regional and local transport policies and strategies.

2.25 The *Strategic Economic Plan (SEP)*[33], produced by the Cheshire and Warrington Local Enterprise Partnership (CWLEP) is also in line with other policies highlighting the need to improve connections to other sub-regions and international gateways as well as to support the development of priority employment sites. Finally, the *Economic Development Strategy for Cheshire East*[34] also emphasises the need for a better-connected economy through enhancing transport connections to other areas and increasing integration with the cities of Manchester and Liverpool. Investments in key transport initiatives are aimed at achieving a thriving economy that improves the wellbeing of communities and residents.

The Reference Case

2.26 The Government is already funding a significant programme of transport interventions across the North. In addition, further investment is being planned by both central Government and local bodies. This includes road investment schemes put forward by Highways England, transport schemes developed by combined authorities across the North, Pan-Northern schemes such as Northern Powerhouse Rail (NPR) being developed by TfN and DfT, and HS2, led by Central Government as well as Welsh Government where applicable. It is therefore expected that significant investment in new transport infrastructure will be delivered in the next decades to address significant connectivity challenges of the current transport system.

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.

---

[30] Cheshire West & Chester council, *Local Transport Strategy* (2017) http://consult.cheshirewestandchester.gov.uk/file/4848344

[31] North Wales Economic Ambition Board, *A Growth Vision for the Economy of North Wales* (2016) http://www.flintshire.gov.uk/en/PDFFiles/Planning/LDP-evidence-base/2016-08-Vision-for-North-Wales-Economy.pdf

[32] Welsh Government & North East Wales Metro, Moving North Wales Forward – Our Vision for North Wales and the North East Wales Metro (2017) https://beta.gov.wales/sites/default/files/publications/2017-09/north-east-wales-metro-moving-north-wales-forward.pdf

[33] Cheshire and Warrington Local Enterprise Partnership (CWLEP), *Strategic Economic Plan (2017).* http://www.871candwep.co.uk/resources/draft-transport-strategy/

[34] Cheshire East Council, *Economic Development Strategy for Cheshire East* (2011) http://moderngov.cheshireeast.gov.uk/ecminutes/mgConvert2PDF.aspx?ID=12766

2.28 In this context, a reference case as 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 2025 the reference case includes other work programmes identified by the STP as necessary to achieve the North's economic growth aspirations.

Figure 5: Emerging vision for the Northern Powerhouse Rail Network

Table 3 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, DfT and Welsh Government as committed).	Reference Case includes other work programmes identified by the STP as necessary to achieve the North's economic growth aspirations; HS2, Northern Powerhouse Rail, Northern Trans-Pennine Routes, Trans Pennine Tunnel & Wider Transport Connectivity Assessment and Manchester North West Quadrant (including public transport elements).
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	

2.30 For a full list of interventions covered by the reference case for the West and Wales SDC, see Table 4.

Table 4 Reference Case: List of interventions (Road/Rail)

Road	Rail
• Crewe HS2 Hub – Access package and depot access improvements • A500 dualling – Crewe to M6 • A6 to M60 Relief Road • Port Salford Western Gateway Infrastructure Scheme • 15 schemes, including international gateway improvements such as A63 Castle Street and A5036 Princess Way, north – south improvements on the M6, the A1 and the A19 and east – west improvements on the M62 • East – west improvements on the M62 • Middlewich Eastern Bypass • Congleton Bypass • Warrington Waterfront Western Link • Poynton Relief Road • A55 Northop to A494 Shotwick improvement	• HS2 Phase 2a • HS2 Phase 2b • Crewe Hub • Wigan North Western station (or integrated station at Wigan) - Stockport Capacity Improvements • Northern Powerhouse Rail • Interventions at the major hubs necessary to realise the benefits of improved connectivity along the NPR corridors, including, within the West & Wales SDC: Warrington, Stockport, Manchester Piccadilly, Liverpool Lime Street • Transpennine Route Upgrade (including Intermediate Interventions) • Northern, Transpennine Express and Wales and Borders rail franchise commitments • Liverpool Central Station • Manchester - Preston improvements • Liverpool City Region upgrades • Cross Manchester Capacity and Reliability

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

Structure of Strategic Dimension

2.32 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 West and Wales development corridor. Fundamentally, transport infrastructure investment 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 Capabilities[35]; ** 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.

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.

West and Wales SDC's contribution to the North's Economy

Current economic contribution

3.7 The West and Wales SDC is home to 6 million people and 2.7 million jobs, 9% of UK population and 8% of UK jobs respectively.

Table 5 Population and jobs in the West and Wales SDC

West and Wales Local Authority District	Population (Mid-year population estimates 2017, ONS[36])	Jobs (2017 (BRES[37])
Greater Manchester	2,799,000	1,295,000

[35] 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)

[36] Office of National Statistics (UK)

[37] Business Register and Employment Survey, sourced from www.nomisweb.co.uk

West and Wales Local Authority District	Population (Mid-year population estimates 2017, ONS[36])	Jobs (2017 (BRES[37])
Liverpool City Region	1,544,000	626,000
North Wales	696,000	277,000
Cheshire and Warrington	927,000	494,000
Total West and Wales	5,966,000	2,692,000
Total North	15,353,000	6,699,000
UK	66,040,000	32,100,000

3.8 This SDC contains highly productive areas such as Cheshire and Warrington, which shows higher productivity than the UK average, as well as Liverpool and Manchester, and Flintshire and Wrexham, which show a productivity of around 90% of UK average, higher than other areas in the North of England. Cheshire East, specifically, shows the highest productivity of the North, with a productivity 17% higher than the UK average.

Table 6 Productivity in the West and Wales SDC

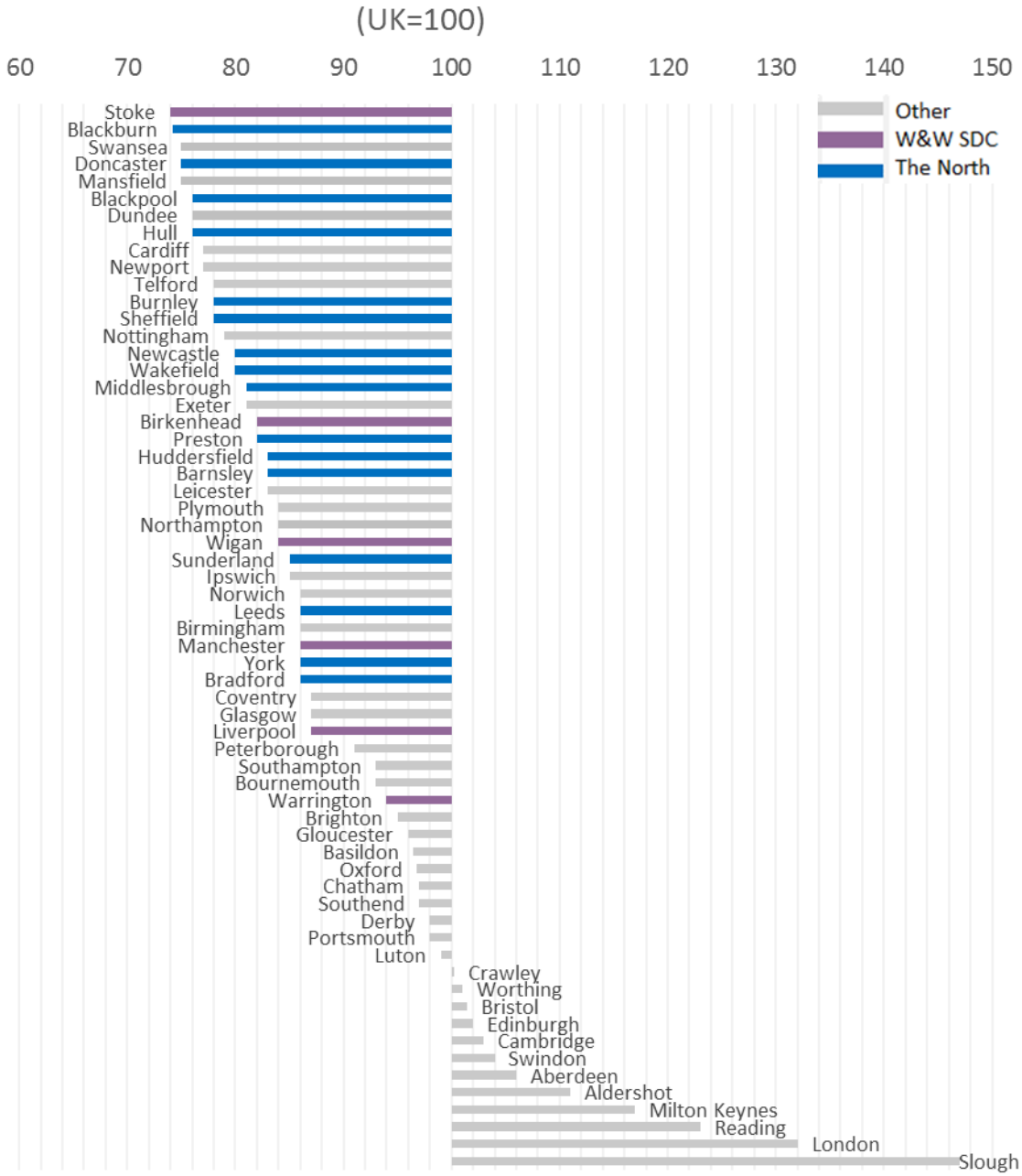
Productivity (Ratio of UK Average GVA per job in 2016) by NUTS 2 and 3 region (ONS)	
Greater Manchester	89.8
Liverpool City Region	92.1
North West Wales:	
• Isle of Anglesey	72.2
• Gwynedd	71.4
• Conwy and Denbighshire	72.4
• Flintshire and Wrexham	91.9
Cheshire and Warrington	104.1
UK	**100**

3.9 In order to improve productivity and economic growth in this SDC, it is important that areas like Cheshire and Warrington, already showing high levels of productivity, are well connected to other areas in the region to build on current economic capabilities.

GVA – The Performance Gap

3.10 The NPIER 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 6 that there are several underperforming economic centres which are located in the West and Wales SDC.

Figure 6: Relative Productivity of major centres within the West and Wales SDC, North of England and other parts of the UK (GVA per head index 2015)



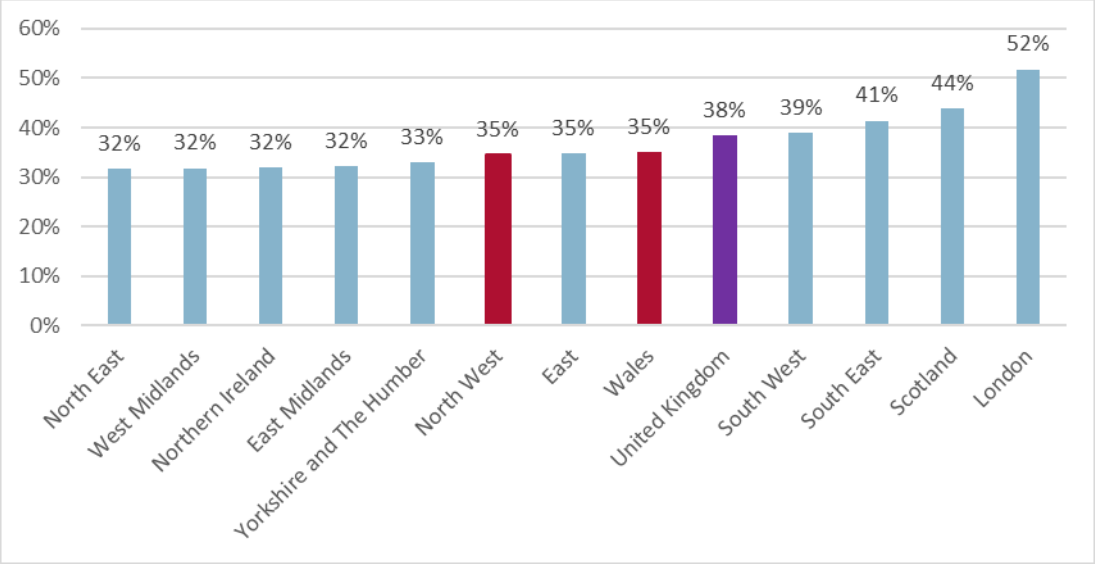
Employment Rate – The Employment and Skills Gap

3.11 The consequence of this long-term imbalance is that London and the South East have become a magnet for investment, business and skilled workers. Meanwhile much of the rest of the country (including the North) lags behind, with the former industrial powerhouses of the North among the worst performers. With a higher share of people with lower skills (a problem which has worsened in the post-recession period), the North has suffered from a range of inter-related issues which can also be used to indicate the significance of the performance gap in the North.

3.12 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 them[38], 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.

3.13 This is reflected in the proportion of working age population with high levels of qualifications, which is below the UK average in the North West and Wales and significantly below London, the South East and Scotland (Figure 7). All these factors play a key role in the development of the labour market[39].

Figure 7. Proportion of working age population with NVQ4+ qualifications in 2017[40]



3.14 An analysis of UK skills demand (Figure 8) 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 NPIER. 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 and attracting

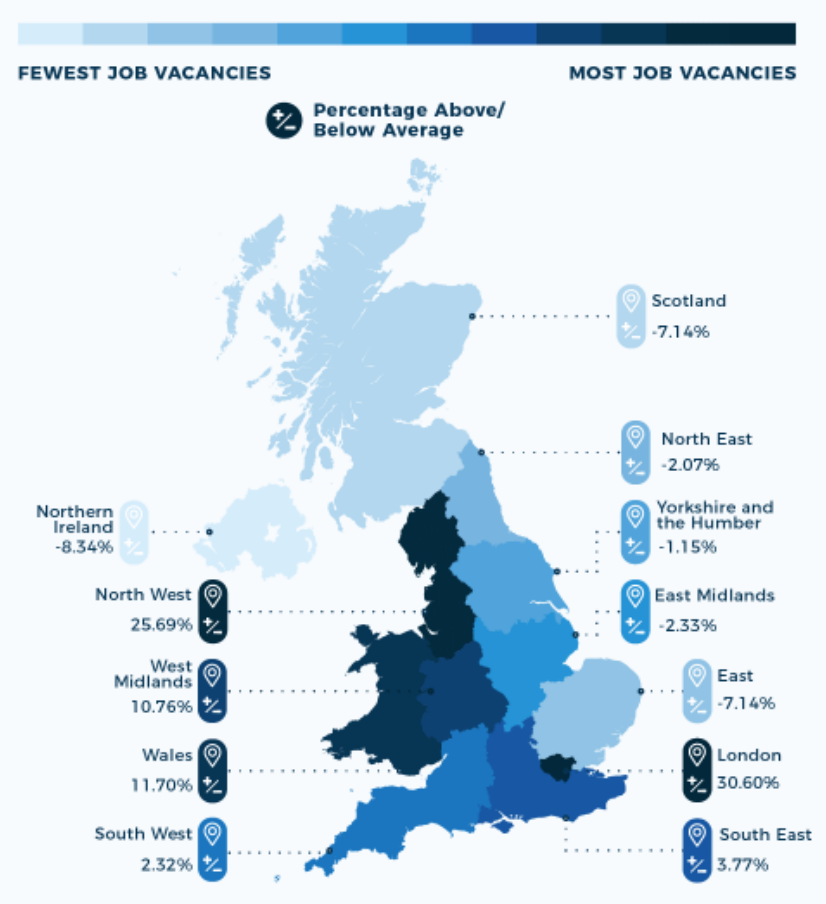
[38] Transport for the North, the Northern Powerhouse Economic Review (2016)

[39] Transport for the North, the Northern Powerhouse Economic Review (2016)

[40] Annual Population Survey (December 2017 data)

talent are key priority areas to improve the functioning of labour markets across the West and Wales SDC.

Figure 8. Skills demand UK by region[41]



Labour Productivity – Investing in Northern Powerhouse Cluster Industries

3.15 The NPIER 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%

[41] Source: **http://smallbusinessprices.co.uk/uk-skills-shortages/**

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.

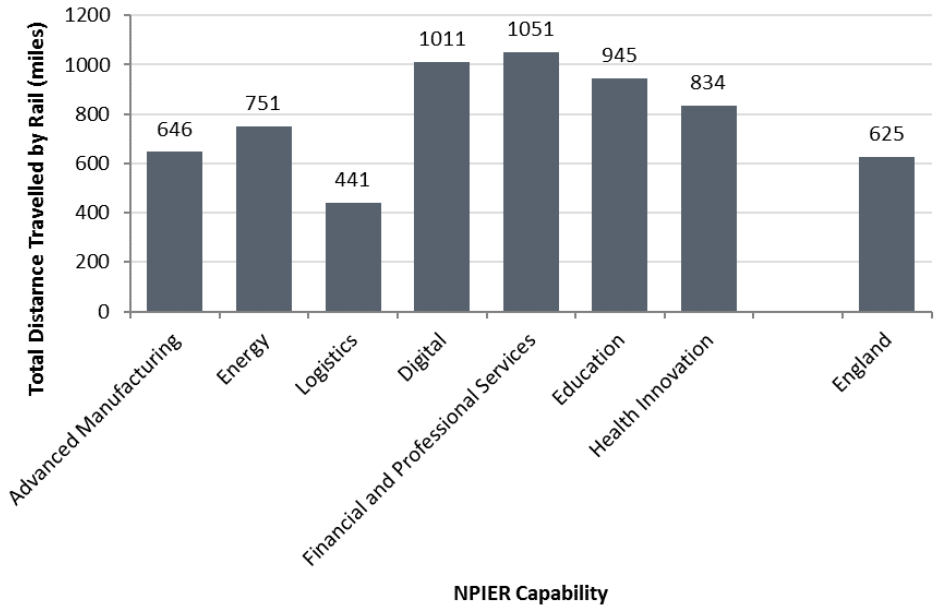
3.16 The prime capabilities are supported by three 'enabling capabilities':

- **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**.

3.17 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.
- With reference to Figure 9, since those employed in the four prime and three enabling NPIER capabilities are typically more highly skilled, better qualified and in higher occupational groups, they would be expected to have a greater propensity to travel.
- Similar trends can be observed in terms of total distance travelled. Workers within all NPIER capabilities travel greater distances than the 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 9. Weighted average total distance travelled by rail per person per year by NPIER Capability in England[42]



3.18 The four "Prime" capabilities and three "Enabling" capabilities, collectively represent approximately 30% of all jobs in the North and over 35% of GVA.

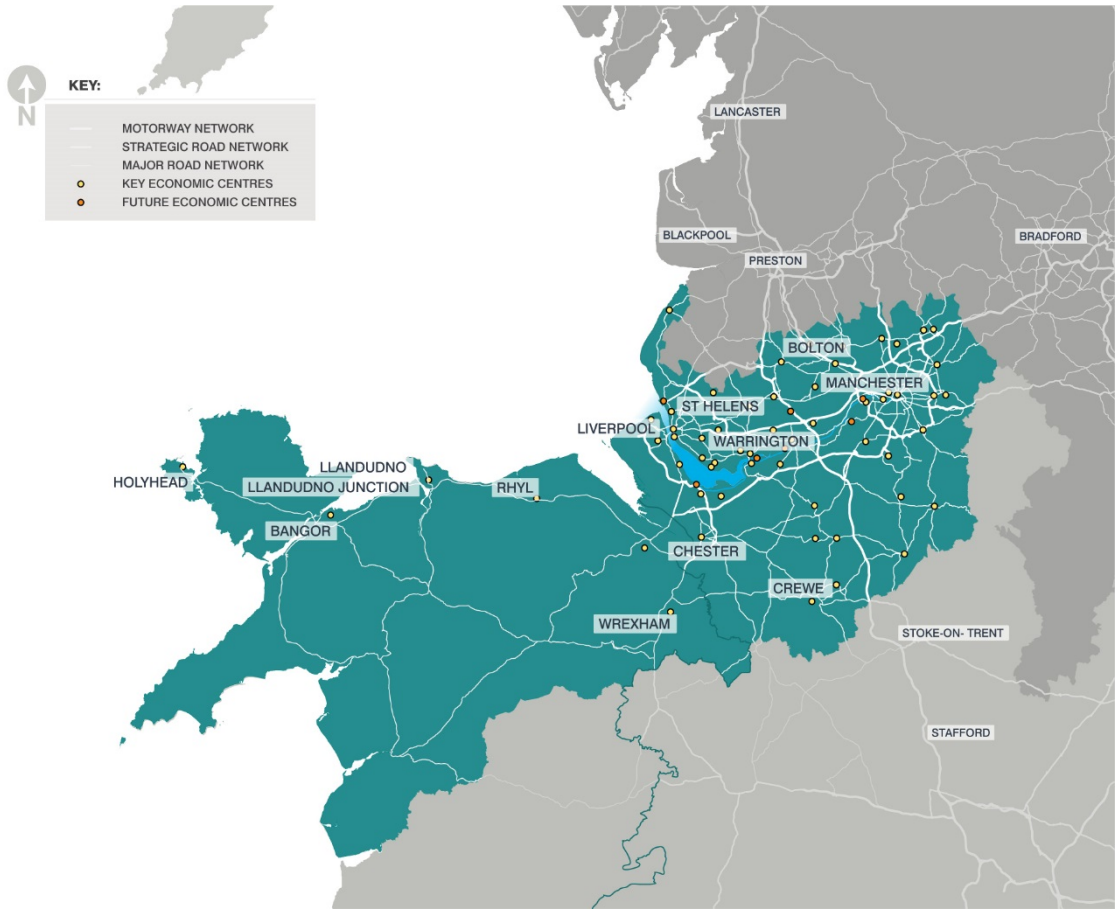
3.19 In a 'transformed future' scenario, the Northern economy would become more productive, partly through increasing the skills of its workforce and lowering levels of economic inactivity - both these factors are associated with an increased propensity to travel. All other things being equal, increased productivity would therefore be expected to lead to marked changes in both the travel patterns of individuals and aggregate patterns across the entire North.

3.20 The West and Wales SDC is a major economic area of the North, and is home to globally significant businesses, supply chains and economic assets across all the North's prime and enabling capabilities. Figure 10 shows that existing IECs are spread geographically across the corridor. This highlights the need for connectivity to facilitate competition, collaboration and specialisation. In addition, a further seven IECs have been identified where significant future growth is planned. These future IECs are:

- Carrington, Trafford
- Mersey Gateway Bridge
- Parkside
- Port Cheshire
- Port Salford
- Seaforth
- Warrington Waters

[42] Analysis of National Travel Survey (2013) and Business Register and Employment Survey (2015) data

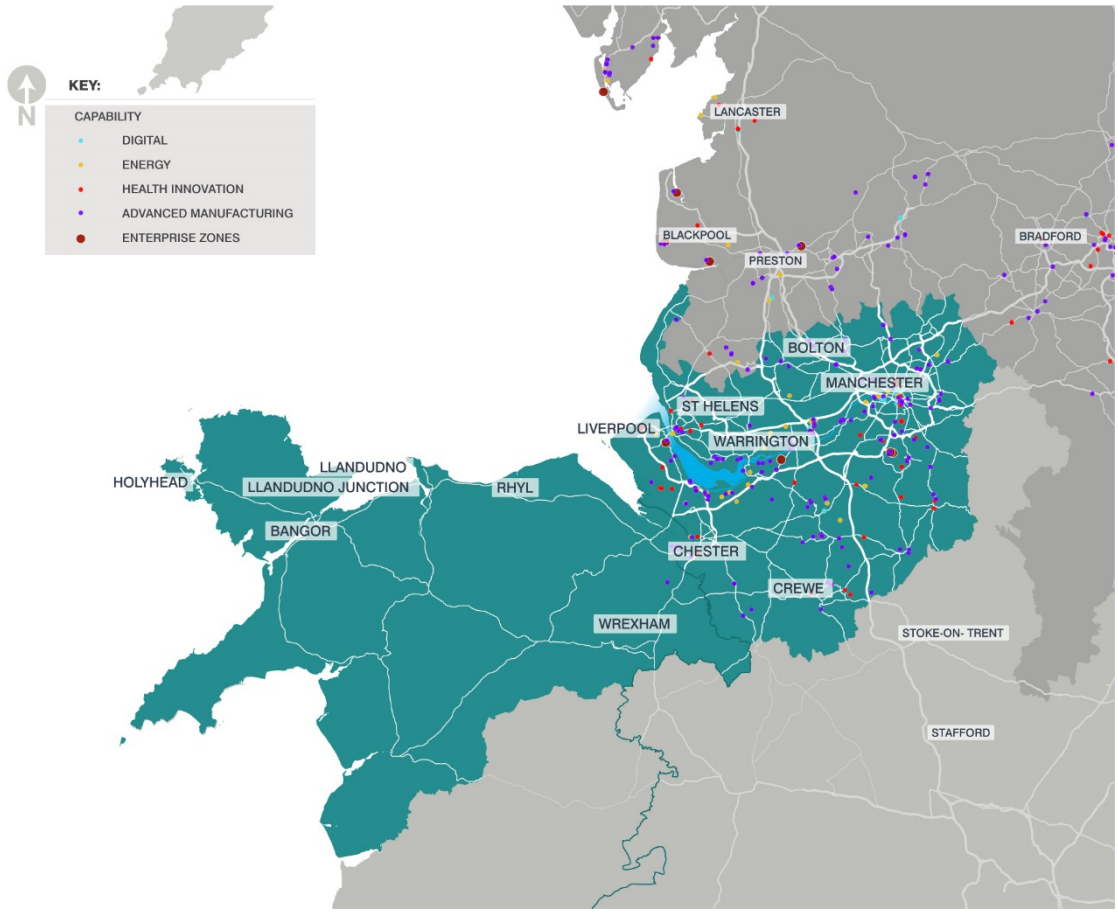
Figure 10: Future IECs in the West and Wales SDC



3.21 Delivering transformational growth is dependent on focussed investment in these prime capabilities and infrastructure. Figure 11 shows how economic activity across the four NPIER capabilities is geographically spread across the West & Wales SDC, providing further evidence for the importance of needing connectivity to facilitate competition, collaboration and specialisation.

Changes in investment or economic agglomeration could be expected to lead to greater employment within higher-level occupations and higher incomes, and potentially different lifestyles, leading to further changes in travel patterns. Currently, poor and inconsistent transport links are limiting agglomeration and constraining growth.

Figure 11: NPIER Capabilities within the West and Wales SDC



Transport's influence on economic growth

3.22 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.

3.23 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

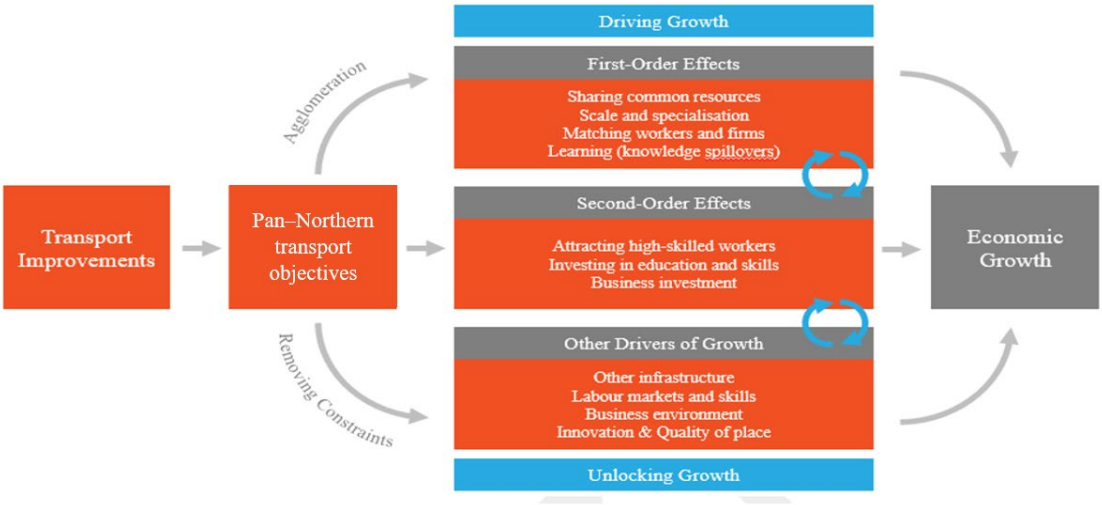
- Firms can start to cluster and agglomerate more effectively

3.24 Overall, the impacts of transport are wide-ranging and can be grouped into three types: user benefits, productivity, and investment and employment impacts[43]. A logic chain showing how investment in transport infrastructure could flow through to wider economic impacts in the North is shown in Figure 12.

3.25 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.

3.26 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 12: 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.

3.27 Markedly improved Pan-Northern connectivity is required to facilitate the development of bigger and more agglomerated labour markets across the

[43] 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

North. Closing the transport investment gap will help to address connectivity issues, especially between cities.

Transport Baseline

3.28 In the West & Wales SDC, the following transport connectivity challenges have been identified.

The Highway Network

3.29 The highway network within the West and Wales SDC largely reflects its central location within north west England, connecting a number of IECs on a north – south and east – west axis. The Strategic Road Network (SRN) performs a number of functions; not only linking the IECs contained within the geography, but also acting as nationally (and internationally) significant trade routes for movement to / from and through the SDC area.

3.30 Manchester and Liverpool are linked by the M62, which forms part of a critical *all-weather* motorway corridor across the Pennine frontier, ultimately linking the North West with Leeds and the North East. The importance of this route is emphasized by the lack of an alternative dual carriageway standard between the A50 in Staffordshire and the M8 in Scotland, noting that the A66 improvement forms part of the reference case. The M62 acts as a land-bridge between the Atlantic-facing Port of Liverpool, which has recently seen substantial private sector investment to accommodate the largest Post-Panamax ships (and is also a substantial Irish Sea Hub), with the North Sea-facing Ports of Immingham and Hull that provide a wide range of links to Europe. It also acts as a local distributor of traffic to Warrington, and around the north of Greater Manchester as part of the M60 orbital motorway.

3.31 The M6 bisects the SDC on a north to south basis, linking Scotland with the West Midlands, and ultimately the South East (via the M40), and the South West (via the M5). The towns of Warrington and Crewe have thrived on their historic proximity to the strategic road and rail networks, and both are served by the M6. This is a significant positive in terms of promoting growth and attracting investment; however, it can also have a detrimental effect in terms of traffic utilising local roads during periods of perturbation on the SRN.

3.32 The M56 provides an east-west motorway standard route between central Manchester (via the A5103) and North Wales, linking significant clusters of economic opportunity in the Energy, Health Innovation, and Advanced Manufacturing Industries on the south bank of the River Mersey. The M56 provides a key link for Chester and Ellesmere Port, interchanging with the M53 for Birkenhead and Liverpool; the A483 for Wrexham, Mid-Wales and the West Midlands; and, the A494 / A55 for the North Wales Coast and the Irish Sea Port of Holyhead. The M56 provides the strategic highway access to Manchester International Airport, which acts as a regional hub for the North of England and is forecasted to grow significantly over the next 30 years. The M56 alongside Mersey Gateway is also a key strategic route for access to Liverpool John Lennon Airport from Cheshire and North Wales.

3.33 The multiplicity of demands for travel on a constrained network create issues of poor performance on SRN corridors such as the M6, M56, the M62 and key radial routes on the Major Route Network (MRN) associated with the conurbations of Liverpool and Manchester. This has led to a widening of the notional peak periods for local movement, and a more sustained level of poor journey reliability for through movement. The physical geography of the West and Wales SDC also contributes to the performance of the network, with limited opportunities to re-route from the SRN during periods of closure, on account of limited high-level crossings of physical barriers such as the Manchester Ship Canal. As such, levels of resilience and recovery to incidents are poor, and currently have a detrimental effect on the economy of the north west.

3.34 The MRN for the north has been defined by TfN to encompass important routes between IECs that do not form part of the SRN. Within the West and Wales SDC, this includes a number of routes where demand regularly exceeds capacity during peak periods, and the design is of an insufficient standard to maintain a reliable and resilient service to the user. Furthermore, these routes often form part of a prescribed diversionary route that is employed during periods of closure on the SRN, which in turn can be of detriment to the core function of the route.

3.35 Figure 13 summarises the extent of the MRN through proximity to IECs, whilst Figure 14 presents the average daily speeds on the MRN within the West and Wales SDC.

Figure 13: Proximity of IECs to the TfN Major Route Network

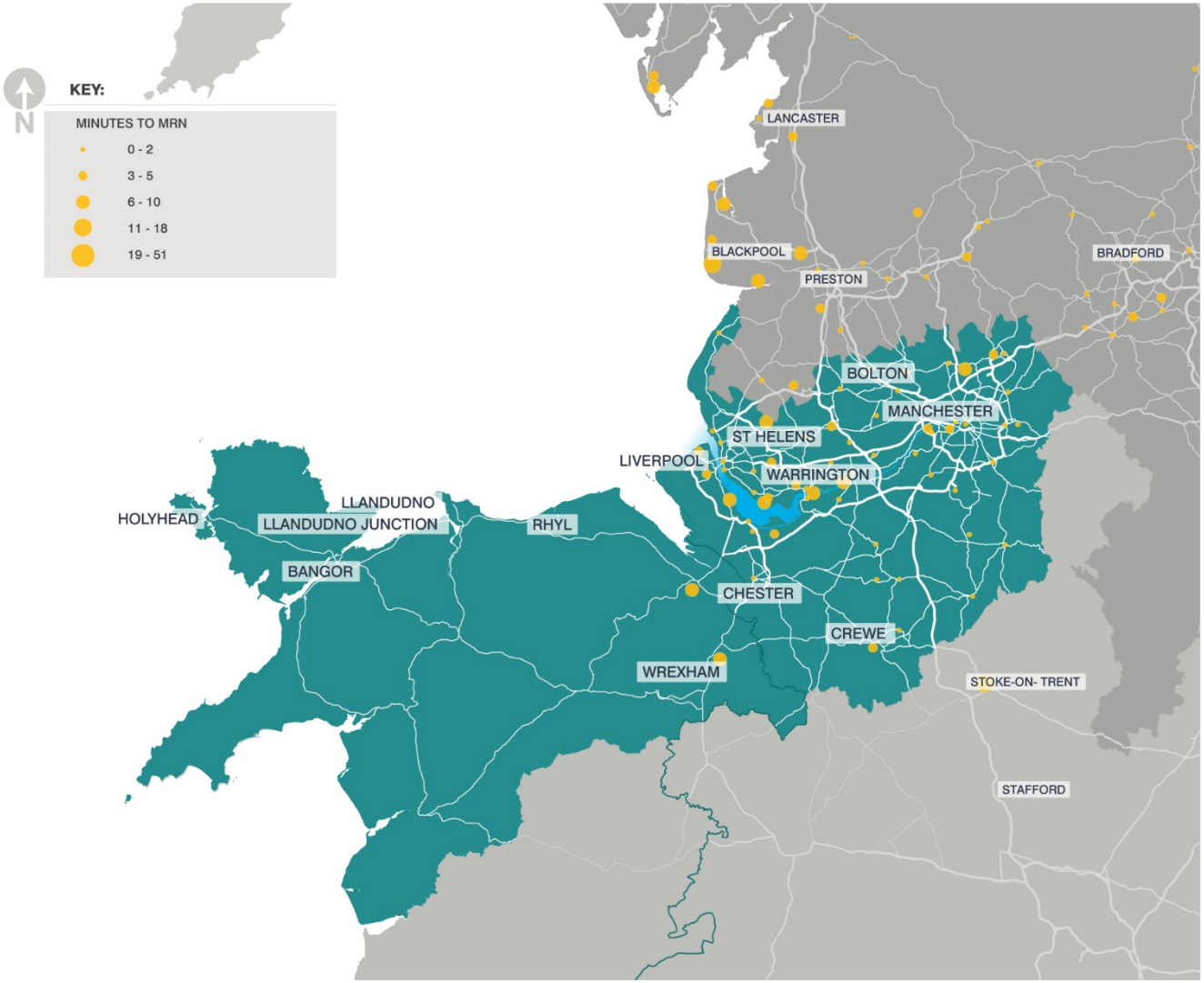
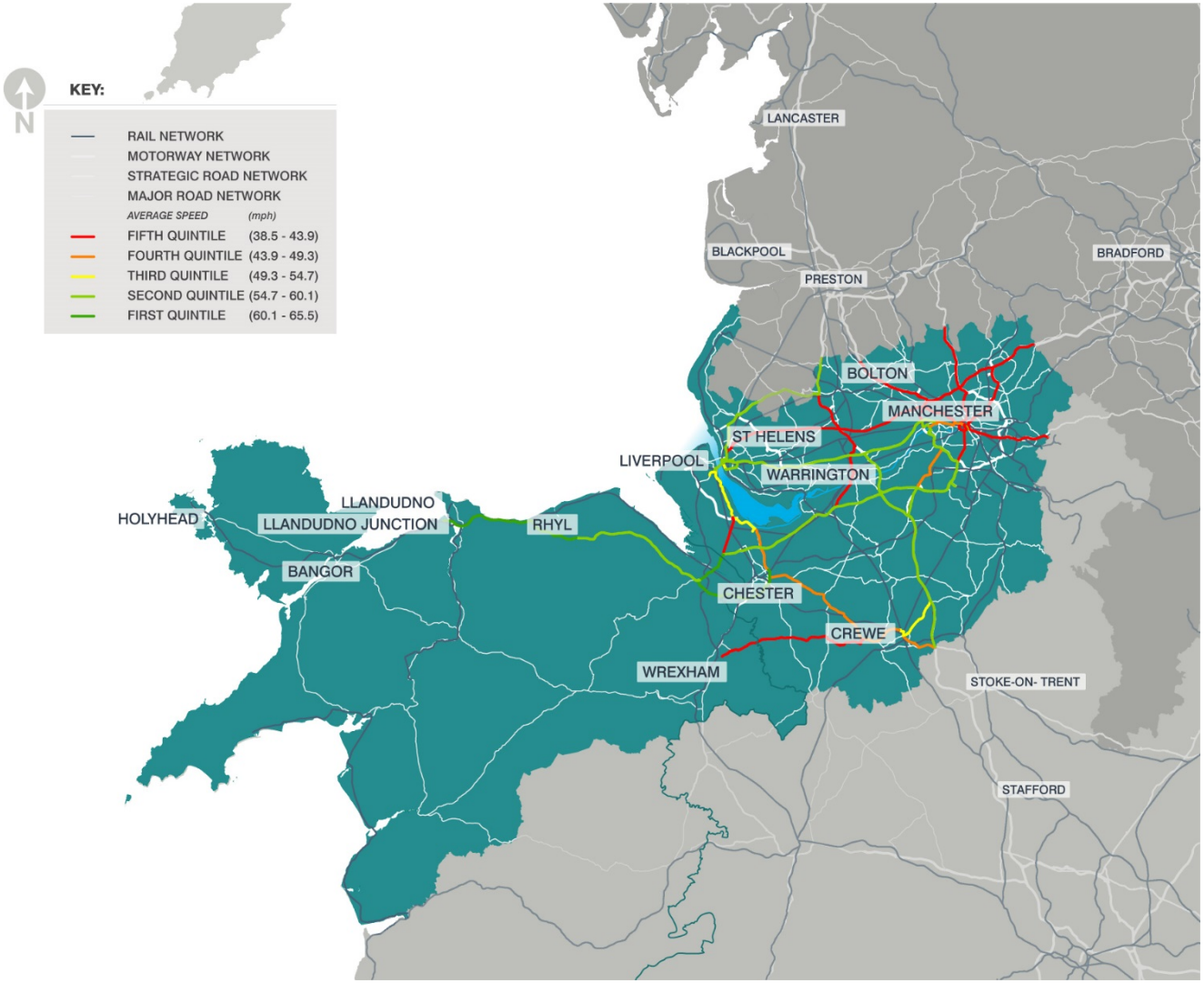


Figure 14: Average Speeds on the MRN within the W&W SDC



3.36 A number of specific highway constraints within the West and Wales SDC are summarised below:

- High levels of congestion coupled with low network resilience and few strategic alternatives during incidents on the north - south M6 corridor through Cheshire
- Poor journey reliability on the key east – west access route (M62 / M60) between Liverpool and Manchester, and on Cross-Pennine routes to the east of the West & Wales SDC area.
- Peak time and seasonal congestion on the M56 affecting journey reliability on the southern approach to Manchester and the International Airport.
- Peak time and seasonal congestion associated with movement between North West England and North Wales, notably on A494 near Queensferry and the A55/A483 junction. There are also significant issues during peak periods due to cross-border commuting and platoons of HGVs associated with Ferry arrivals from Holyhead.
- Poor existing journey times and reliability on the A51 corridor between Crewe and Chester.
- Poor highway access to nationally significant routes from the Port of Liverpool. All traffic leaves and enters to motorway network via Dunningsbridge Road (A5036), which forms part of the Strategic Road Network, but passes through an urban area that is not conducive to significant freight movement.
- Poor connectivity between Crewe and North Wales (Wrexham) via the A534, on account of poor road network quality and slow journey times (less than 40 mph) on the A534 between Crewe & Wrexham corridor

The Rail Network

3.37 The North currently has a modal share for rail commuting of 3.4%, defined both in terms of residence and workplace. This figure is comparable with rail mode share for the rest of England outside of London and the South East; however, it encompasses significant concentrations of activity around major cities such as Manchester, Liverpool and Leeds, where suburban rail networks improve the catchment considerably, as well as significant areas that have limited or no access to a regular service. As such, a relatively small (and geographically concentrated) proportion of the North's population use rail to commute, therefore presenting significant scope to support the growth of the economy.

3.38 There is a current disparity between north-south and east-west passenger rail connectivity in the North of England. Those services which utilise the West Coast Mainline (WCML) for some or all of their journey tend to be significantly quicker than those operating across east-west corridors such as the Cheshire Lines Committee (CLC), Mid Cheshire, or Chat Moss routes.

3.39 North-south passenger rail connectivity, particularly to and from London, has been improved through sustained periods of investment to the West Coast Main Line. However, despite these improvements there are historic connectivity gaps between the North and some other areas of the UK where

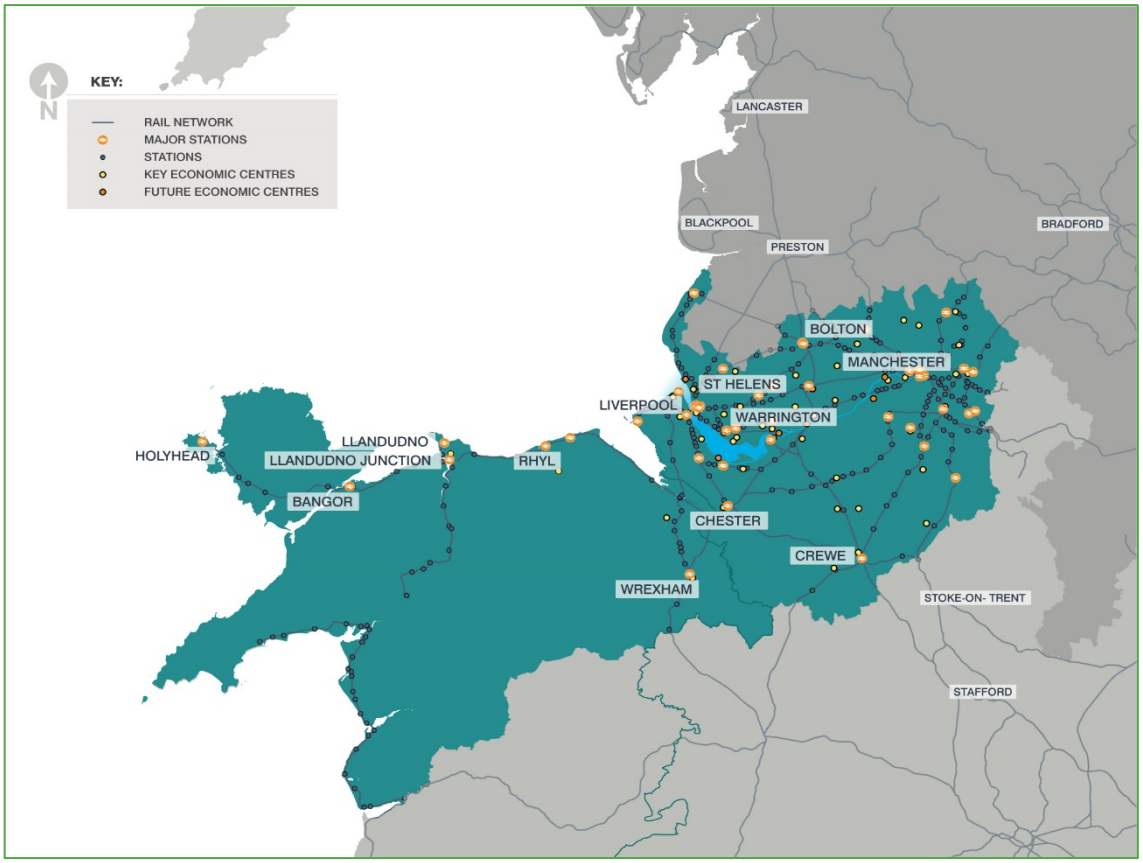
demand exists for a direct or improved connection. Major cities such as Manchester and Liverpool have limited (or no) direct connectivity to major cities such as Bristol, Cardiff, Derby and Leicester.

3.40 The West & Wales SDC contains several low-speed, infrequent and unreliable intercity and interurban rail services, which serve to extend the perceived distance between IECs for commuters, and act as a barrier to travel. Furthermore, issues such as overcrowding and unsuitable rolling stock can make rail travel unproductive, effectively removing one of rail's key advantages over other modes. The poor perception of rail within the north, and specifically the West and Wales SDC serves to increase the pressure on the road network since travelling by car represents a major travel time incentive. (especially on east / west inter-urban services between Manchester, Warrington, Liverpool, Chester, and the North Wales Coast)

3.41 With regard to tourist connectivity, timetables and capacity provision are not always aligned to seasonal demand patterns and special events, with evidence of overcrowding at key times, and poor direct links to rural or peripheral tourist destinations. Furthermore, the configuration of rolling stock is often not suited to larger groups or significant luggage requirements.

Currently, rail service provision from IECs to their catchments in the evening is inconsistent, with a more sporadic timetable unable to service the burgeoning night time economy of cities such as Liverpool, Manchester and Chester, especially on Sundays. Service improvements committed in the Northern and TransPennine Express franchises will go some way towards addressing these issues, but gaps will remain. This network is summarised within Figure 15.

Figure 15: West and Wales Rail Network



3.42 With specific reference to the West and Wales SDC area, the following challenges exist on what is a predominantly two track, largely mixed-traffic rail network:

Rolling Stock Quality & Suitability

3.43 The poor existing quality and age of rolling stock operated on local and inter-urban services within North West England leads to poor customer perception as a comparison with private car travel, particularly on non-electrified commuter routes into the major cities, where units are generally in excess of 30 years old.

3.44 The suitability of rolling stock for current deployment also leads to the discomfort of the travelling public through overcrowding on units that are short-formed with insufficient standing accommodation for the peak loadings. As identified above, issues also exist on modern longer distance units that serve the airport and major tourist destinations during seasonal peaks, notably with regard to insufficient and inconvenient positioning of luggage stowage, which can lead to obstruction of doors and impact upon dwell times at stations.

3.45 The current situation will be improved in the short term as the two major franchises within Northern England (Northern and Transpennine Express) deliver significant new investment in rolling stock over the course of the current franchise period that should considerably improve customer comfort and experience. The Merseyrail Network will also see the delivery of

significant investment in new rolling stock over the next two years to replace the current 40 year old stock.

Track Capacity Constraints

3.46 The limited capacity on the rail network within the West and Wales area can lead to issues of poor reliability due to the competing demand for paths associated with both passenger and freight traffic.

3.47 The key areas where this is evident within the West and Wales SDC can be summarised as follows:

- Poor journey time reliability on services crossing central Manchester on the Castlefield Viaduct affecting both local services, and having a wider network impact upon the reliability of Transpennine services between the North East and Manchester Airport
- Passenger congestion due to limited platform capacity for Merseyrail services at Liverpool Central (the busiest underground station outside of London).
- Limited track and platform capacity at Chester Station, limiting the potential for expanded through services between Chester, Liverpool, Halton and Wrexham; and between Manchester and the North Wales coast.
- Capacity constraints on inter-urban routes, notably the Cheshire Lines Committee (CLC) between Manchester and Liverpool via Warrington Central, which serves significant and growing local markets as well as longer distance demand.
- Access to Stockport station from the south at the convergence of the West Coast Main Line with the Hope Valley / Buxton and Mid Cheshire lines, noting the need to accommodate classic-compatible HS2 services in the medium term post-2027

Freight Pathing Requirements

3.48 The congested nature of the mixed traffic rail network within the West and Wales area limits the ability of the freight industry to operate rail freight in way that can provide genuine competition to road haulage.

3.49 Key issues within the West and Wales SDC are summarised below:

- Limited opportunities to cross central Manchester via the platforms at Victoria for movements of fuel and waste across the Pennines, and additional constraints at Castlefield Viaduct created by the requirement for Intermodal container traffic accessing Trafford Park to arrive from the east during peak periods through the passenger platforms at Manchester Piccadilly (13/14), Oxford Road and Deansgate.
- Limited gauge cleared routes for East-West freight movement. Freight leaving the Port of Liverpool subject to circuitous and uncompetitive routing to avoid congested hubs such as central Manchester, and fast passenger routes such as the West Coast Mainline.

Poor Journey times & Frequency

3.50 As identified above, the quality of east-west services between IECs across north is generally inhibited by competing demands for limited track capacity. Additionally, there are routes where the infrastructure limits the speed and frequency of services that can utilise it. A number of IECs lack direct connectivity to each other and international gateways. Connectivity is further inhibited by poor interchange times, which make a journey uncompetitive with that of the private car.

3.51 Key examples in the West and Wales SDC are summarised below:

- Poor rail frequency, quality and low speed (less than 40 mph) of rolling stock on the Crewe - Stoke-on-Trent – Derby corridor, which forms a key route to the south of the Pennines but is not utilised as such at present
- Poor journey times on Wrexham-Bidston (Borderlands) line operated by Transport for Wales, and the lack of direct connectivity into central Liverpool via the Merseyrail Electrics network.
- Poor journey times by rail between Manchester and North Wales via Warrington and Runcorn; and via Northwich on the Mid Cheshire Line.
- No current direct rail service between North Wales and Liverpool, noting the opportunities offered by the Halton Curve from the commencement of working in 2019.
- No viable direct rail service (one train per day) or reasonable interchange opportunities for movement between Crewe & Wrexham

3.52 A summary of current average speeds for Inter City and Inter-urban services within the West and Wales SDC is provided in Figure 16 below.

Figure 16: Intercity and Interurban Services Average Speed Map

Freight

3.53 With reference to Figure 19. freight is a key sector for the North, as a third of UK's freight is currently moved from the North's ports. It is also particularly important for the West & Wales SDC study area, as the region has experienced significant growth in recent years, reflecting the investment and aspiration of the region's logistics stakeholders. This has included the recently completed (November 2016) £400 million project of Liverpool2, a deep-water container terminal capable of accommodating the world's largest container vessels, which offers the potential to more than double container throughput at the Port of Liverpool. The port serves a wide range of European, transatlantic and further afield freight markets, and also sees a strong presence of passenger and freight services to the Republic of Ireland and Northern Ireland.

3.54 There are also several other terminals located on the River Mersey and down the length of the Manchester Ship Canal. Port Salford is a key location for freight interchange enabling waterborne, rail and road freight access to a large-scale logistics park and businesses across the North.

3.55 Whilst lying approximately 130km from the English border, The Port of Holyhead is an important component of Roll on Roll Off (RORO) activity between the TfN geography and Ireland. It offers scheduled RORO services for accompanied and unaccompanied freight, as well as passengers to Ireland. In 2015, Holyhead accounted for 80% of the total Irish Sea trade to and from Welsh Ports (492,000 lorries) which highlights the importance of the M56/A494/A55 in accessing Holyhead Port.

3.56 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 a significant amount of distribution centre capacity covering all types of warehousing, including Inter-modal terminals at Trafford Park, Garston and Widnes.

3.57 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 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. As the economy grows, so will the demand for goods and consequently the movement of goods. These increases will put additional pressure on already constrained key links such as the M6, M62 and M56.

Figure 17: Road Freight Annual Cargo Tonnes

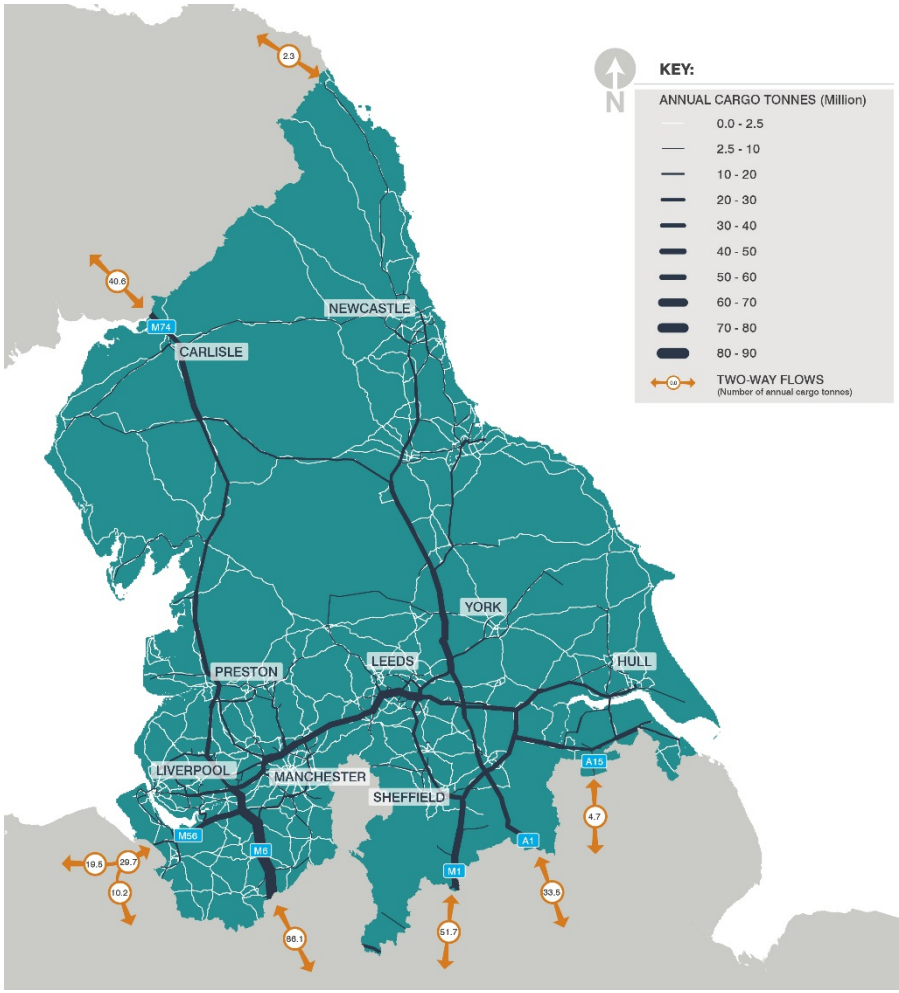


Figure 18: Rail Freight Annual Cargo Tonnes

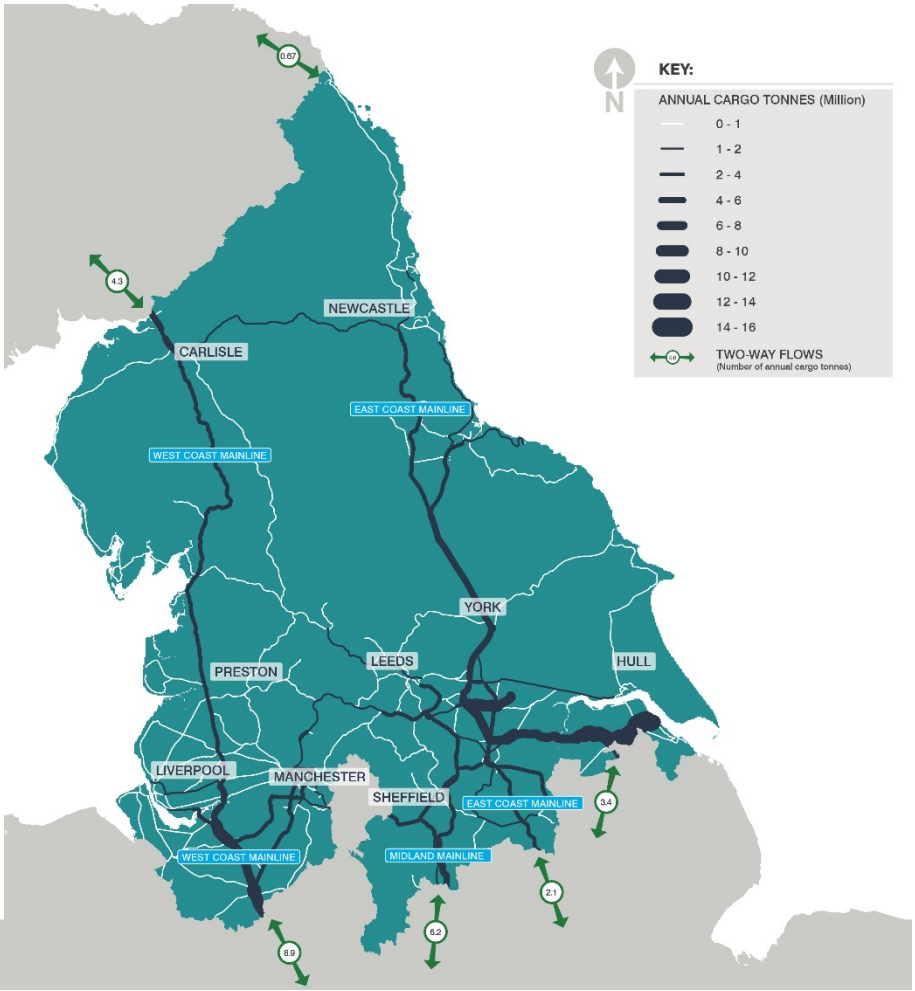
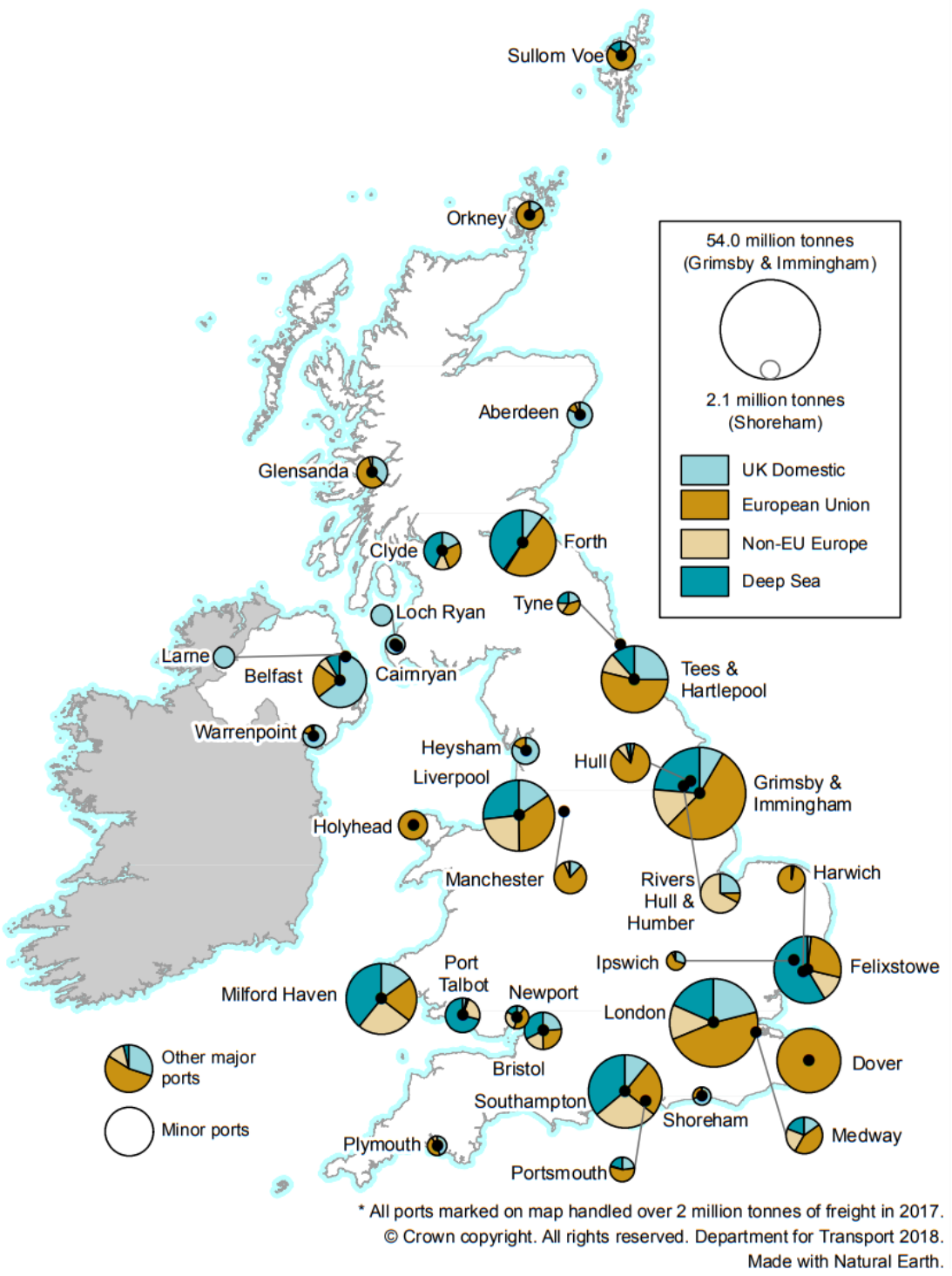


Figure 19: UK Major Ports – Domestic and International Annual Freight Tonnage[44]



International Passenger Connectivity and the Visitor Economy

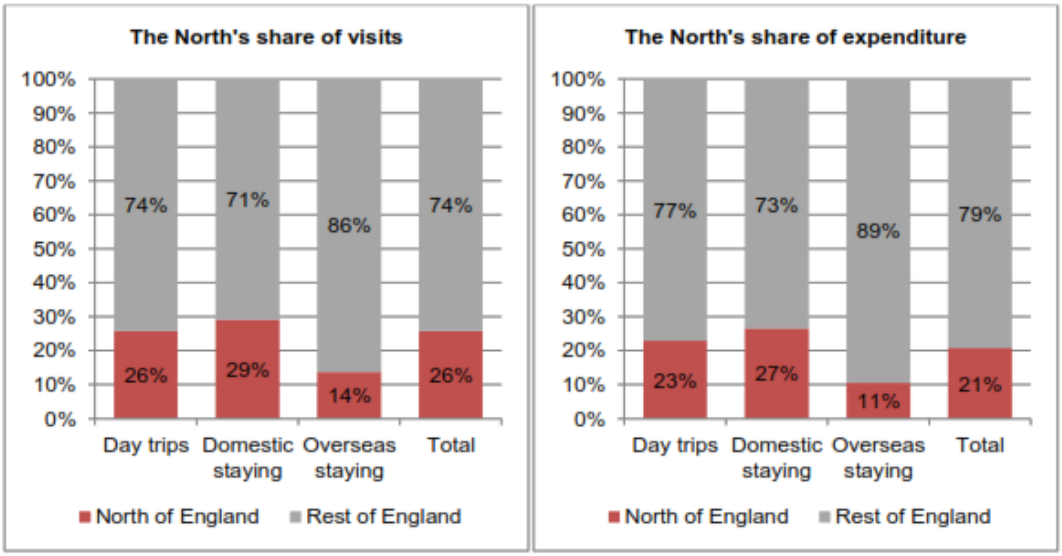
3.58 International connectivity and tourism is an important consideration for the West & Wales SDC. The cities and towns benefit from significant visitor

[44] DfT UK Port Freight Statistics 2017. https://www.gov.uk/government/statistics/port-freight-statistics-2017-final-figures

spend and are important contributors to the local and regional economy. At a national level, the tourism sector is a key sector to the economy, representing the third largest employer accounting for 9.5% of total employment.

3.59 Within the regions that encompass the north, nearly 350,000 people are directly employed by the tourism industry, with a further 88,000 in Wales. 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 visitors. For each additional visitor spend of £54,000 in the UK, an extra job in the sector is created, with analysis suggesting that UK tourism could grow by up to 94% over the next 20 years[45].

Figure 20: Visitor Economy: The North's share of visits and expenditure; source: STP



3.60 Manchester Airport is the largest airport in the north and the third largest in the UK, after Heathrow and Gatwick. It is the principal passenger gateway to the region, as well as the principal business airport, accommodating 27.8m passengers/annum (2016). Manchester Airport attracts passengers from across the north and further afield, with strong east - west flows. Manchester Airport also provides a limited contribution to the international freight market. However, the airport faces key challenges in maintaining accessibility and accommodating future growth in light of increasing congestion.[46]

3.61 Liverpool John Lennon Airport (LJLA) carried almost 4.9 million passengers in 2017 and exceeded 5 million in 2018, serving key destinations within

[45] TfN (2018) Strategic Transport Plan

[46] Manchester City Council, *Manchester Airport Master Plan to 2030* http://www.manchester.gov.uk/downloads/download/1665/manchester_airport_master_plan_to_2030

Europe. It has a core catchment area of 1.2 million passengers with a wider catchment area of 6.9 million passengers and routes to over 70 destinations with the greatest demand associated with Dublin (c. 540,000 passengers), and Belfast (c. 470,000 passengers). However, the necessity for better surface access including optimizing multimodal accessibility as well as improving both rail and road connectivity have been identified as a central challenge that needs to be overcome to maintain and grow the airport's role as a central gateway for international and national visitors.[47]

The Port of Liverpool and The Manchester Ship Canal are collectively known as Mersey Ports and together represent an international gateway highlighted by the UK Government as a key component of the country's global trading links. The Mersey Ports are the third busiest estuary in the UK with some 16,000 commercial shipping movements per annum.[48] In 2017, over 658,000 sea passengers used Irish sea services from the Port of Liverpool and there is a growing number of Cruise Ship services operating from the Mersey Ports. In addition, as noted earlier, in 2015, Holyhead accounted for 80% of the total Irish Sea trade to and from Welsh Ports which highlights the importance of Holyhead Port within the West and Wales area.

3.62 Figure 21 and Figure 22 show the key International Gateways of relevance to the West and Wales SDC. Table 7[49] identifies these gateways within the context of passenger activity to and from the UK as a whole.

Table 7 West and Wales International gateways as a Percentage of Total UK Activity

International Gateway	Total Passengers	Percentage of UK Total
Manchester Airport	28 million	9.7%
Liverpool John Lennon Airport	5 million	1.7%
Port of Liverpool	0.686 million	2.8%
Port of Holyhead	1.9 million	7.8%

[47] Liverpool John Lennon Airport, *Master Plan to 2050* (2017) https://www.liverpoolairport.com/media/2561/ljla-master-plan-to-2050-full-document.pdf

[48] Peelports, *Mersey Ports Master Plan: A 20 year Strategy for Growth (2011)* https://www.peelports.com/media/1533/consultation-draft.pdf

[49] 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

Figure 21: International gateways to the West & Wales SDC

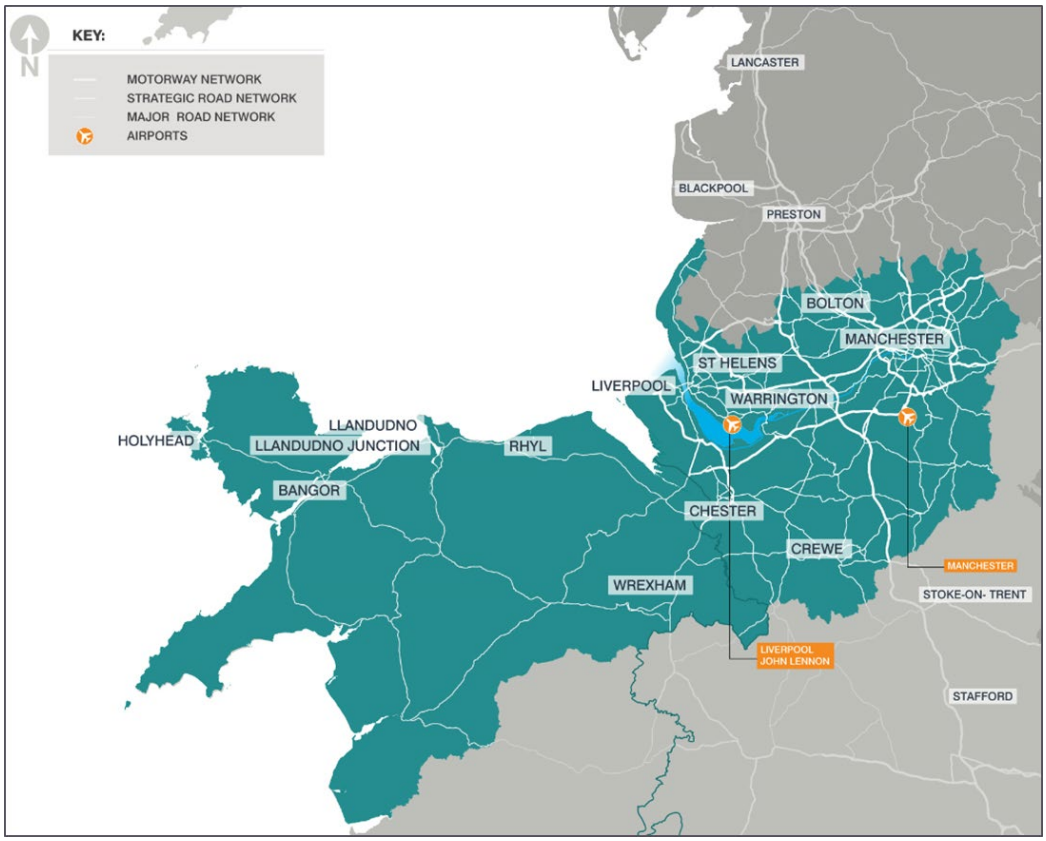
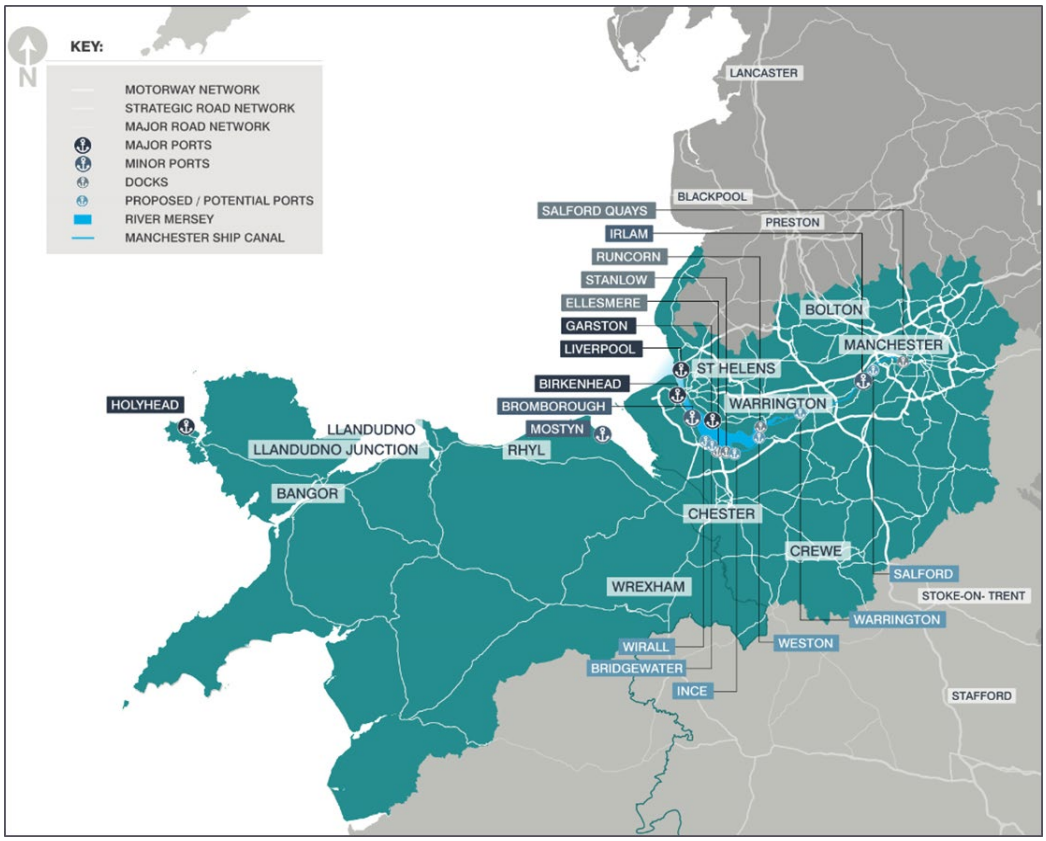


Figure 22: International gateways to the West & Wales SDC



Key locations of Environmental impact within the SDC

3.63 Key Environmental designations have been identified for the West & Wales SDC as a means to identify the key impacts of transport under existing conditions (such as Noise and Air Quality), but also the areas that are most sensitive to the delivery of new infrastructure within the SDC area.

3.64 Within the West & Wales Corridor, major road noise levels are most perceptible on the principal highway corridors, notably the following:

- The M6 between Crewe and Wigan
- The A55 in Chester
- The M53 between Chester and the Wirral
- The M60 Manchester Outer Ring Road
- The M602 / M62 between Manchester and Liverpool
- The M57 between the M62 and Switch Island
- The M58 between Switch Island and the M6
- The M56 at Preston Brook

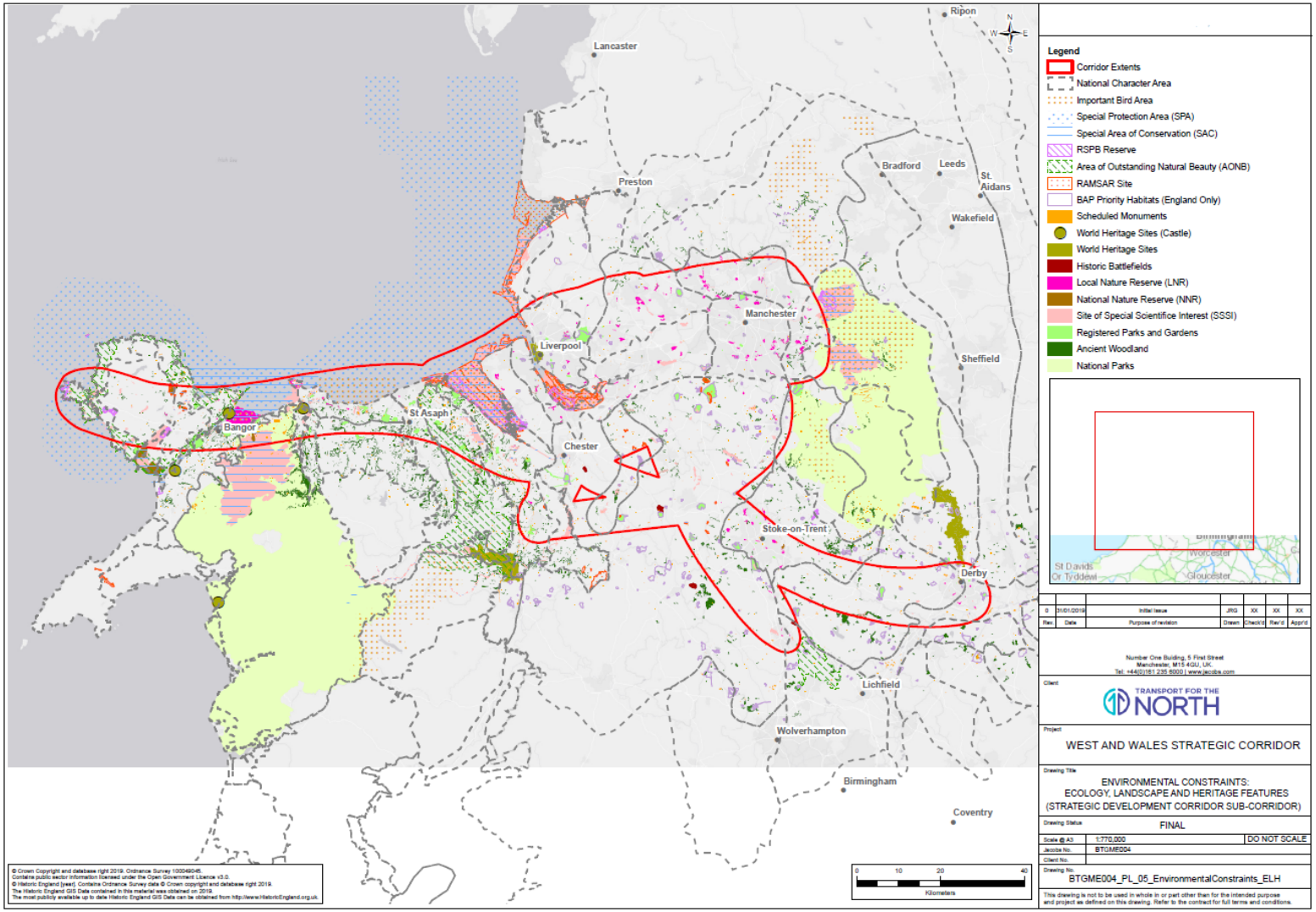
3.65 Any potential direct or indirect impacts on the designated environmentally sensitive areas (as shown in Figure 23) that may arise from new and/or upgraded transport interventions will be appropriately assessed, mitigated, and/or compensated for, in-line with existing best practice and relevant legislation across the life span of the Plan.

Baseline Summary

3.66 These transport challenges could play a key role in hindering the transformation of the North. The next section will set out the growth forecasts out to 2050 and subsequently discuss how transport challenges experienced in the West & Wales SDC are linked to economic opportunities. This section is underpinned by both evidence produced as part of the Options Assessment Report[50] and other publicly available reports produced by TfN.

[50] Key Product 11: Options Assessment Report

Figure 23: Environmental designation West & Wales corridor



Growth Forecasts

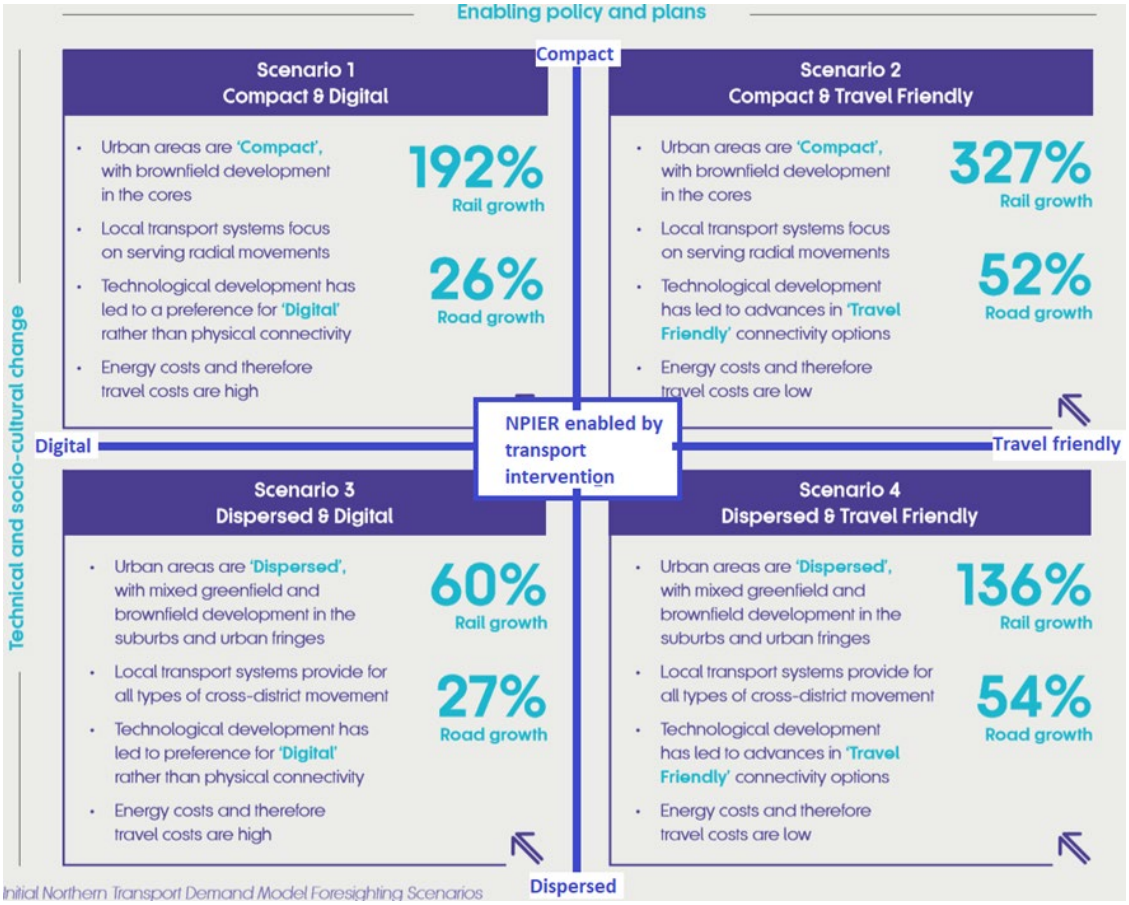
Road and Rail

3.67 TfN has produced a Northern Transport Demand Model (NTDM) that estimates how changes in employment, population and the transport network could affect travel patterns across the North. The model uses the transformational growth in population and employment from the NPIER to forecast transport demand on the road and rail networks in 2050.

3.68 The NTDM forecasts for 2050 show that there will be high growth in demand for road travel and long-distance rail travel throughout the West and Wales SDC.

3.69 To reflect uncertainty regarding key factors affecting travel demand, TfN has developed four future scenarios representing the potential variation in travel markets in the North by 2050. These four scenarios are presented within Figure 24.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.

Figure 24: Initial Northern Transport Demand Model Forecast Scenarios



3.70 The future scenarios of the transformational growth is set out in the NPIER. 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.

3.71 The North aspires to add 1.5 million jobs by 2050 under this 'transformational scenario' that would deliver 850,000 jobs more than under a 'business as usual scenario'. Across the North, significant growth in population and employment is therefore expected, which will put pressure on transport infrastructure.

3.72 By applying the NTDM, TfN has estimated future road and rail growth between 2015 and 2050 in the North.[51] TfN estimates that in a transformed North, **total demand for road travel is forecast to increase by up to 54% by 2050.** This would mean an increase of 67 billion vehicle km by 2050.[52]

3.73 **In 2050, total demand for rail travel is expected to be up to 4 times higher than today**. This would mean an increase of 106-582 million trips made annually within the North. The strongest growth is estimated to be between the NPR City Regions including Liverpool and Manchester. In 2015 approximately 43 million trips were made between all city regions. By 2050 this is forecast to increase to between 105-281 million trips.[53]

3.74 This estimated growth in transport demand highlights the increasing pressure on existing transport infrastructure and emphasises the need for strategic transport interventions and improvements.

Freight

3.75 Further growth is planned in the long term - the TfN Enhanced Freight and Logistics analysis forecasts over 50% growth in both road and rail freight until 2050, which will play a central role for increasing economic activity and to achieve the GVA growth outlined in the NPIER. Freight and logistics is also seen as a central enabling capability (as defined by NPIER) for the successful economic development of the North. This shows that this is a key sector to consider when developing options for improving connectivity. In addition, the growth of northern ports will help to alleviate congestion on the wider UK SRN through the re-distribution of sea freight from southern to northern ports and having direct access to the northern SRN.

---

[51] TfN. Future Transport Demand in the North of England. Available at: https://transportforthenorth.com/wp-content/uploads/TfN-Future-Transport-Demand-Statement.pdf [Accessed: 06/12/2018]

[52] TfN. Future Transport Demand in the North of England. Available at: https://transportforthenorth.com/wp-content/uploads/TfN-Future-Transport-Demand-Statement.pdf [Accessed: 06/12/2018]

[53] TfN. Future Transport Demand in the North of England. Available at: https://transportforthenorth.com/wp-content/uploads/TfN-Future-Transport-Demand-Statement.pdf [Accessed: 06/12/2018]

3.76 Principal north - south / east - west rail routes are expected to experience grow in demand with passengers and freight because they are direct and they provide access to key ports and markets. These routes are already lacking sufficient capacity, with conflicts between private passengers and freight movements[54]. Therefore, strategic freight initiatives need to be undertaken to supply this forecasted growth in demand.

3.77 The greatest change in rail freight paths expected between today and 2050 within the West & Wales SDC area is on the West Coast Mainline (WCML), forecast to be the main north - south artery. Growth is also forecast on the links between the WCML and freight centres in the North West. The Crewe-Manchester line and Chat Moss (Liverpool-Manchester) is also a critical route in terms of rail freight movements and their access to the WCML from the Port of Liverpool.

3.78 From a road freight perspective, the greatest change in road freight paths forecast between today and 2050 within the West & Wales SDC area is on the M6, clearly forecast to be the main north - south road freight artery. Across the north, the key SRN links for the M1, A1 and M62 are also forecast to be the routes seeing the majority of road freight growth. For east - west movements, the M56 and M62 are also critical, as is the A50 between Stoke and Derby.

3.79 The recent opening of the Liverpool2 deep water container terminal is also expected to require major changes in the freight network in the West & Wales SDC. TfN's Freight & Logistics Report shows that 80% of freight traffic is being carried by road on a highly congested network – estimated to cost the northern freight sector £500m a year by 2043 with road freight being expected to increase by 25%. It is also expected that this will further increase the need for better east-west freight connections.[55]

3.80 Figure 25 summarises the principal changes in forecast freight (cargo tonnes) for road between 2016 and 2050, with NPIER. Figure 26 summarises the principal changes in forecast freight (cargo tonnes) for rail between 2016 and 2050, with NPIER.

[54] Transport for the North, *Enhanced Freight and Logistics Analysis Report* (2018) https://transportforthenorth.com/wp-content/uploads/Freight-Logistics-Enhanced-Analysis-Report.pdf

[55] Transport for the North, *Northern Freight and Logistics Report (2016)* https://www.transportforthenorth.com/wp-content/uploads/TfN-Freight-and-Logistics-Report.pdf

Figure 25: Road Freight (cargo tonnes) - Difference between 2016 Base and 2050 NPIER scenarios

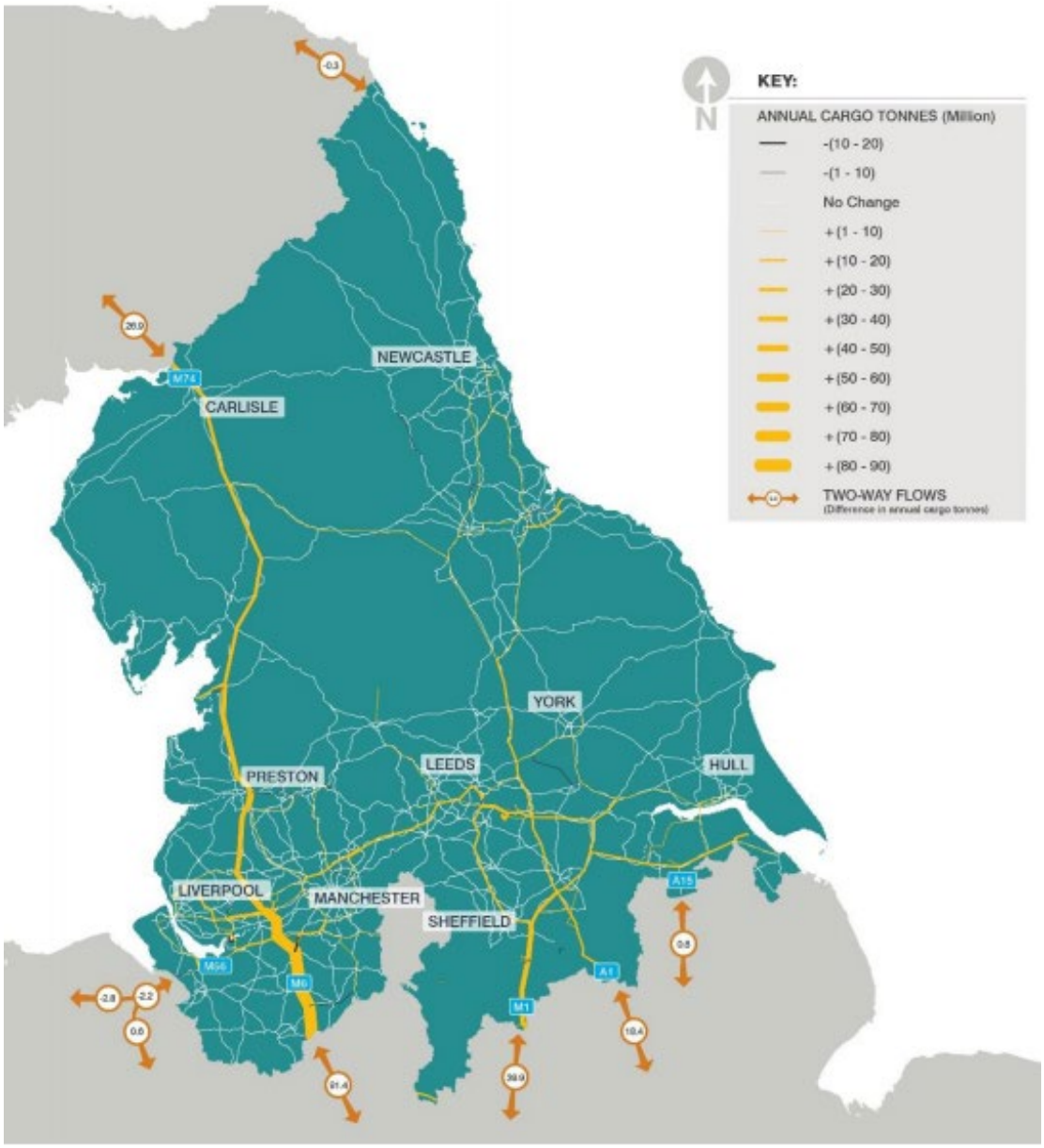
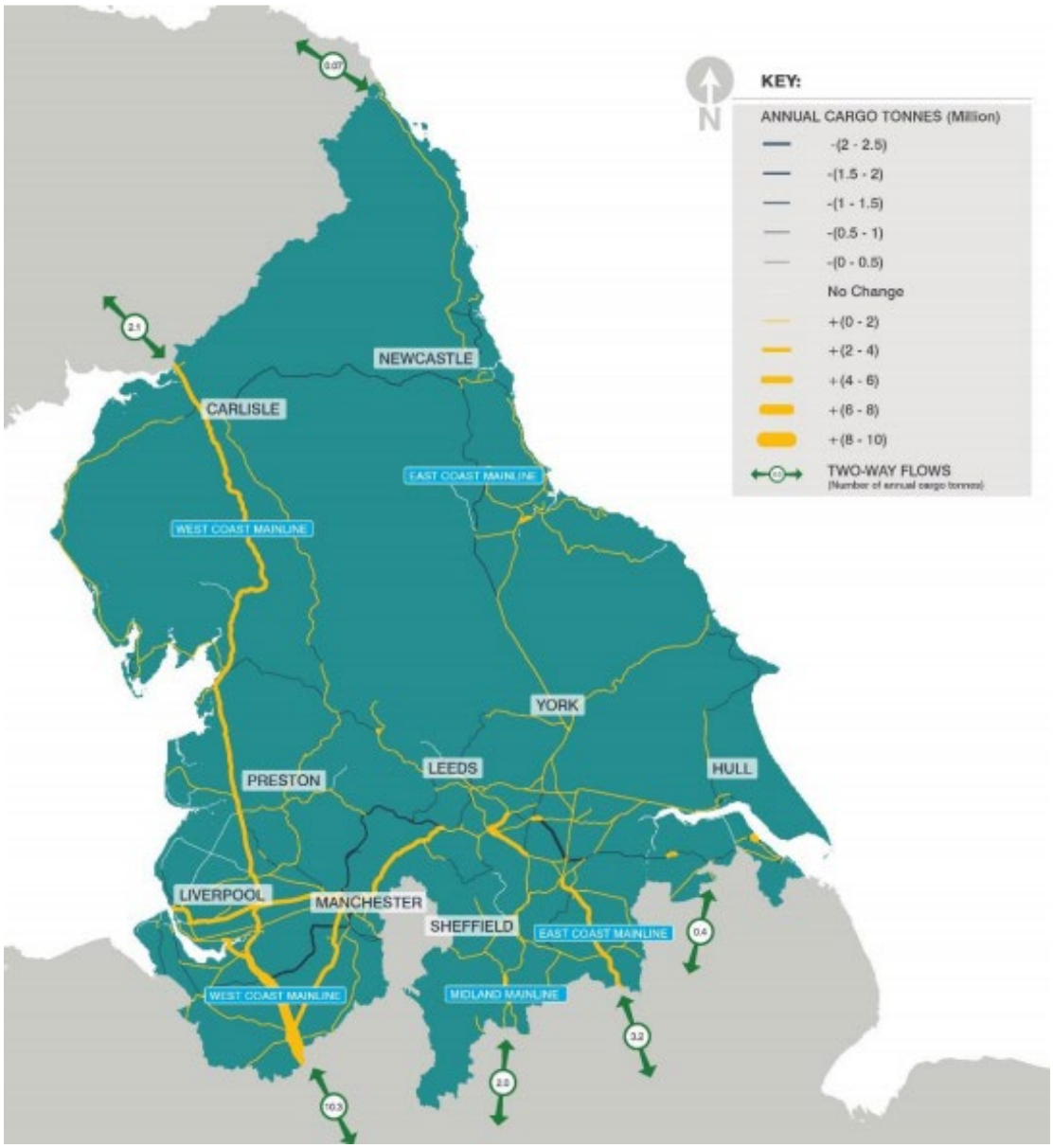


Figure 26: Rail Freight (cargo tonnes) - Difference between 2016 Base and 2050 NPIER scenarios



Transport Challenges and Economic Opportunities

3.81 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.

3.82 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.

3.83 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 and facilitate faster journeys via the HS2 network between Liverpool and London. At a broader pan-northern level, HS2 will provide dedicated HS2 links between Leeds and Sheffield. The delivery of HS2 will create a further significant opportunity for interface with Northern Powerhouse Rail (NPR), providing a high quality and dedicated high-speed connection between Manchester and Liverpool via Manchester Airport, as part of a broader programme of investment in east-west rail connectivity across the north to improve connections with Leeds, Hull, York and Newcastle.

3.84 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.

3.85 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 widen the catchment of these schemes, and therefore maximise the opportunities from the major transformational infrastructure projects. This section presents the key transport challenges and economic opportunities that can be realised with a programme of investments in the West and Wales SDC.

Supporting business interactions within the North

3.86 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.

3.87 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 since the 2008 economic recession.

3.88 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

3.89 This can be demonstrated tangibly, for example, through the legacy of lower public investment 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[56]. 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.

3.90 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.

3.91 Improved network connectivity and enhancing networks to operate more efficiently and more reliably is among the key opportunities identified for improving the economic performance and productivity in the West & Wales corridor. This must include increasing frequency and capacity to better connect IECs, which are found in multiple locations across the West & Wales SDC.

3.92 Transport initiatives can support economic growth across the West & Wales corridor by improving business to business connectivity. This will help businesses to expand their markets, which will cause greater competition and specialisation leading to productivity benefits.

3.93 For the transformation of the economy in the West and Wales SDC, it is necessary to improve links between the region's ports, airports, strategic transport interchanges as well as the major transport networks for people and goods to allow businesses to work within an integrated market across the entire SDC region. Improving access to economic assets of National and Pan-Northern significance such as Manchester Airport, LJLA, the Port of Liverpool, Manchester Ship Canal and North Wales Ports is particularly important to help strengthen NPIER's identified capabilities.

[56] IPPR North (2017), https://www.ippr.org/news-and-media/press-releases/new-transport-figures-reveal-london-gets-1-500-per-head-more-than-the-north-but-north-west-powerhouse-catching-up

3.94 As outlined in the NPIER, the North lacks sufficient transport connectivity which has a considerable impact on the performance of the economy in the region, for example leading to low levels of agglomeration and therefore low productivity[57]. In particular, the NPIER makes references to the lack of capacity across road and rail infrastructure, with the North experiencing some of the most crowded rail services in the country. Congestion on the road network is also highlighted as constraining the ability to respond to changes in global markets. These factors contributed to the identification of the conditional outcomes, which informed the sifting of interventions, with a focus on journey reliability, convenience, experience and safety.

Connecting strategic Capabilities and IECs in the West and Wales SDC

3.95 Connectivity and transport links between capabilities of the North (as identified by NPIER) and IECs will play a central role for closing the performance gap in the North and stimulating economic growth.

3.96 The NPIER has identified four 'prime' and three 'enabling' strategic capabilities respectively that are considered to have strong potential to contribute to the region's economic development and success. These are listed on Table 8.

Table 8: Prime Capabilities of the North

Prime capabilities	Enabling capabilities
Advanced manufacturing	Financial and professional services
Energy	Logistics
Health innovation	Higher Education
Digital	

Supporting access to employment and the needs of residents

3.97 The transport network in the West & Wales corridor will need to adapt to changing socio-economic trends such as shifting commuter patterns, changing leisure aspirations; changing climatic conditions including more extreme weather conditions caused by climate change; and emerging and new disruptive technology. In the context of increasing pressures on both the rail and road network, opportunities need to be identified to improve travel choices for the movement of both people and freight, which boost the resilience and sustainability of pan-Northern networks to keep the economy moving.

3.98 Recent analysis presented in the STP has investigated different scenarios of alternative patterns of spatial clustering of jobs, either clustered around town and city centers or more dispersed across urban areas, and how jobs are undertaken, either face-to-face interaction or digitally. By 2050, the analysis suggests an increased propensity for people who live in the North

[57] Transport for the North, *The Northern Powerhouse Independent Economic Review* (2016) https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf

to commute to work outside of their home local authority. While an increase in commuting is expected for all skill levels, the strong growth projected for high-skilled workers and the assumption that high-skilled/high-paid workers are much more likely to commute and travel longer distances than lower-paid workers are driving this trend.

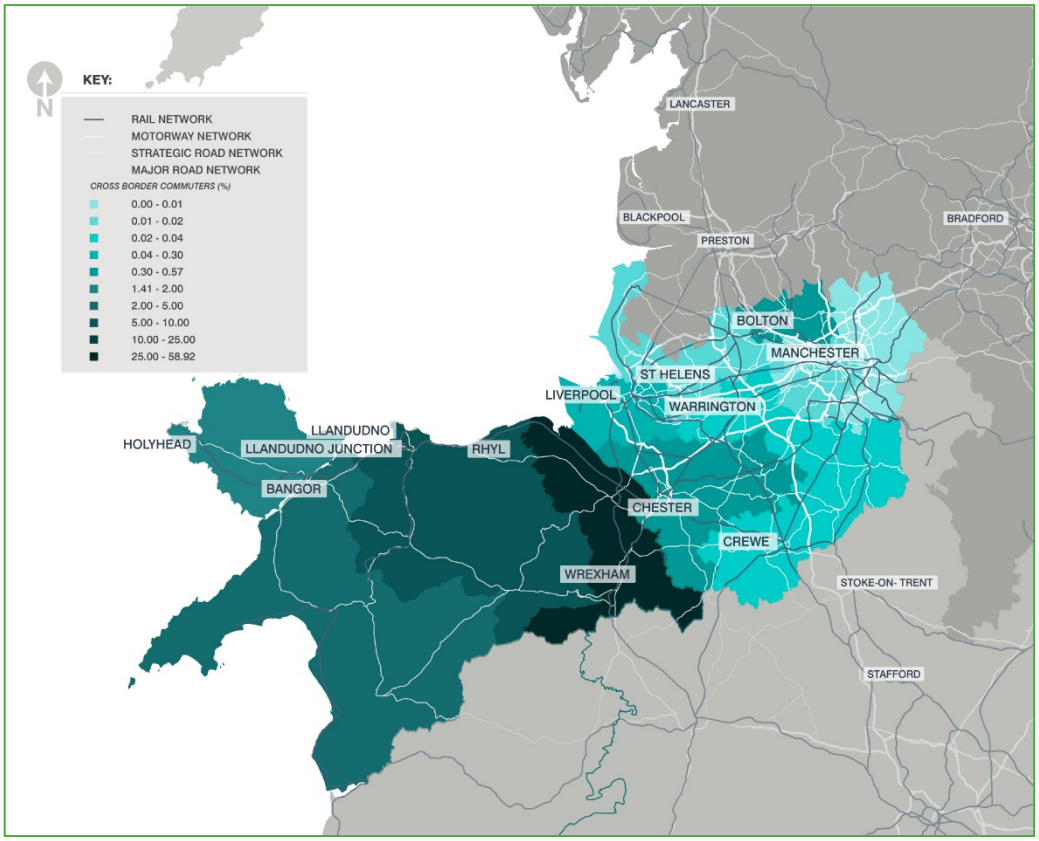
3.99 An analysis of UK skills demand demonstrates that the North West is one of the regions with the highest numbers of job vacancies in the UK, according to analysis from the UK Visa Bureau's 'UK Shortage Occupations List' by Small Business Prices, which is in accordance with the findings of the NPIER. The North West has particularly high demand for financial sector jobs, directors and CEOs, nurses, social workers, mechanical engineers and welding professionals.[58] This suggests that improving access to jobs and attracting talent are key priority areas to improve the functioning of labour markets in the North West.

3.100 The economic prosperity of the Cheshire & Warrington LEP area and the Liverpool City Region is intrinsically linked to activities taking place to the immediate west within North Wales; it is therefore recognised as part of the core geography of the West & Wales SDC and has representation on the Project Board. The economic relationship is especially apparent within cross-border journey to work flows, identifying the synergies of movement in both directions, notably between Deeside (within Flintshire) and the Cheshire West and Chester (CW&C) administrative areas. The major employment areas of Chester Business Park, Daresbury and Birchwood, as well the IECs of Chester, Liverpool, and Warrington, are mirrored on the opposite side of the border by significant employment generators at Airbus (Broughton); Deeside Park; and, Wrexham Industrial Estate.

3.101 Figure 27 identifies the proportion of all commuting trips originating within each region which cross the border between England and Wales in either direction. It shows that the greatest proportions lie immediately west of the border within the Wrexham and Flintshire districts.

[58] Small Business Prices, *UK Skills Shortage analysis* (2018) https://smallbusinessprices.co.uk/uk-skills-shortage/

Figure 27: Cross border commuters (NW Wales and NW England)



3.102 Attracting more skilled individuals from other areas within the North and other areas in the UK is therefore highly important to expand labour markets. Continued investment in jobs and an enabling infrastructure with better transport links is widely regarded as central for creating an environment in which the highly skilled want to live and work.[59]

3.103 Faster journeys and greater capacity will provide workers access to a greater number and range of employment opportunities and conversely, offering employers a larger potential labour force from which to recruit. To achieve this, improved network resilience and journey time reliability is required to maximise access to labour markets and employment opportunities across the widespread IECs in the West & Wales study area.

3.104 A review of passenger rail frequencies documented in the West & Wales SDC Options Assessment Report shows that, beyond the principal high capacity routes where there is a mix of intercity and local services sharing the same corridor, services between IECs are poorer than what would be expected between comparable routes within mainland Europe. This affects overall network resilience.

[59] Transport for the North, *The Northern Powerhouse Independent Economic Review* (2016) https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf

3.105 Resilience will need to be improved on major road networks. Increased resilience on the major freight and trunk routes in West & Wales Sub-corridor will become increasingly important, especially in freight-heavy corridors such as the Crewe – Stoke-on-Trent – Derby Sub-corridor on the A50/A500 where there is forecast to be significant growth in freight moved by road.

3.106 The high-volume traffic corridor Manchester – Liverpool is already experiencing high levels of congestion. Improved connectivity and freight accessibility, which is among the targets for this area, will require several initiatives that will reduce reliance on heavy-used transport routes and will make the overall transport network of this Sub-corridor more resilient.

3.107 Crewe will also play a key role for the UK rail network as it will improve connectivity across several Sub-corridors. At present the layout of the Rail Station provides low resilience to delays. Improvements need to significantly increase the resilience of this key node.

International Passenger Connectivity and the Visitor Economy

3.108 The North is currently underperforming in terms of scale of international air passengers and overseas staying. There is therefore an economic opportunity to build on current tourism assets to attract more visitors through improved international connectivity.

3.109 Improved connectivity to ports and airports could generate significant economic benefits by facilitating increasing international tourism and business trips, as well as freight movements to and from the region's ports and airports. Both improving the ability of domestic and inbound visitors to reach their destinations as well as ensuring that visitors once at their destinations face good and convenient transport alternatives for travelling locally will be central for a sustainable and growing visitor economy[60]. Enhanced connectivity to global markets would also encourage inward investment and therefore provide significant opportunities to transform the economic performance of the North.

3.110 There is significant economic opportunity associated with Manchester Airport, including connections onto high-speed rail (i.e. the planned HS2 station) and development of the Airport City Enterprise Zone. The Independent International Connectivity Commission Report[61] highlights the continued growth of Manchester Airport as the UK's principal international gateway outside London, with an immediate catchment area that accounts for 40% of business air related travel demand across the whole of the

[60] Visit England, *A Strategic Action Plan for Tourism 2010-2020* https://www.visitengland.com/sites/default/files/downloads/final_transport_action_plan_8_june_2012.pdf

[61] Transport for the North, *INDEPENDENT INTERNATIONAL CONNECTIVITY COMMISSION REPORT* (2017) https://www.transportforthenorth.com/wp-content/uploads/International-Connectivity-Report_websafe.pdf

North. This airport is expanding to provide global connections that will become increasingly important for the wider Northern economy.

3.111 In order to capitalise on the continued expansion of Manchester Airport, an extension to the catchment will be required and underpinned through improvements to the strategic transport network. These improvements will allow the quality and efficiency of access to the North, reducing the costs and time constraints to business, as well as access for the local population, visitors and freight.

3.112 The Manchester – Chester – Holyhead corridor provides access to an important tourism area in North Wales. While the asset is outside of TfN geography, providing improved access to it can play a key role for stimulating the visitor economy in the region. This is increasingly important, as visits by international tourists to the UK outside of London have increased in recent years, with the North of England being one of the regions seeing the biggest increase[62]. According to Visit Britain, in 2017 3.3 million international tourists visited the West and Wales region[63]. Improved access would not only benefit tourism, but it would also support improved access to labour force for businesses in the TfN area.

3.113 In summary, the West & Wales corridor contains several key assets in terms of international connectivity including Manchester Airport, LJLA, Holyhead Port and the Port of Liverpool all have plans for substantial expansion in passenger numbers. Connectivity to these key assets in the West & Wales corridor is therefore key to maximising the benefits from these investments and to ensure successful economic development.

Supporting the Built/Natural Environment

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

3.115 Reducing carbon emissions and improving air quality is now a central requirement for the transport, freight and logistics sector. The UK's Clean Growth Strategy[64] includes the aim to collaborate with the industry to reduce the impact of freight emissions and improve air quality across all

[62] https://www.visitbritain.org/more-international-tourists-visiting-nations-and-regions-ever

[63] https://www.visitbritain.org/nation-region-county-data

[64] HM Government, *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

transport modes. There is a need to investigate and understand the different options for the West and Wales corridor to move towards delivery of alternative fuelling and operation.

3.116 Additionally, reducing the impact of transport on local communities and environmentally sensitive areas will be a priority to ensure higher levels of quality of life and a healthy ecosystem.

3.117 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, see Figure 23) and identified as a serious threat to quality of life and local ecosystems. Although the North has experienced a decrease in severance, noise and visual impact of rail, there has been some increase in these factors due to new road schemes.

3.118 Future interventions need to focus on further minimising levels of severance, noise and visual impact of transport infrastructure. Additionally, interventions also need to focus on improving air quality by promoting a modal shift from private motor vehicle use to sustainable travel modes (public transport, walking and cycling) which can help to reduce CO2 and air pollution as well as improve physical activity levels, which will provide additional public health benefits. However, given the significant number of current and future road-based trips, TfN and Partners, working with the private sector, also need to ensure that vehicles on the highway network will also become cleaner and greener.

Technology

3.119 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 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.

3.120 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.

3.121 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 global markets from less connected areas.

3.122 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'.

3.123 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.

3.124 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.

Summary of Transport Opportunities

3.125 A more resilient transport system suitable for adjusting to changing socio-economic trends in the West & Wales SDC will be central to better connect workers with locations of employment and hence the economic performance of the region. Improving network resilience is key to enable people to get to work and improve access to opportunities, one of TfN's key objectives.

3.126 Several key links within and across the West and Wales SDC have been identified as having the potential to stimulate transformational economic growth, including targeted growth within the Prime and Enabling capabilities defined by NPIER. A number of these links would benefit directly from current TfN supported programmes of Investment such as High Speed 2 (HS2) and Northern Powerhouse Rail, as well as The Manchester North West

Quadrant (MNWQ) and Transpennine Tunnel Highway Schemes. This SPOC identifies the supporting interventions that would be required to maximise the catchment opportunity through improvements to the quality and scope of the existing rail network, and the MRN.

3.127 The **Manchester – Warrington – Liverpool** link not only represents a key economic link of the West & Wales SDC but also for the UK in general, being vital for accessing jobs, the labour market, ports, airports and leisure. Connectivity to the key assets of this link will therefore be central to ensure successful economic development, building upon the potential of NPR as a link between the two cities and Warrington, and the potential to provide a better quality of service to the markets that will continue to be served by the CLC (via Warrington Central) and Chat Moss (via St. Helens) routes. The M62 will continue to play an important role in passenger and freight connectivity and will need to be augmented by improvements to the MRN (such as the A580) to ensure that resilience and recovery from incidents is improved.

3.128 The **Crewe – Chester – North Wales** corridor not only provides an opportunity to improve connections between IECs within the West & Wales Geography, it could also add resilience into nationally significant trade routes between the South / Midlands and the Mersey Dee / Port of Holyhead. The MRN (A51) provides a shorter highway connection from the M6 to the A55 link than the current signed route via the SRN (M6 / M56); however, it currently suffers from uncompetitive journey times and poor journey time reliability. The provision of an improved alternate MRN link could augment the parallel M6 between Junction's 16-20 (Lymm Interchange) and help stimulate economic growth within the Cheshire & Warrington and Mersey Dee areas.

3.129 Whilst passenger rail services are operated by franchises beyond TfN's Control (Transport for Wales and Intercity West Coast) there are significant wider opportunities to improve the connectivity of Chester and North Wales to London through access to HS2 at Crewe. This should also be considered within the context of the broader catchment of this corridor, and the means to which the benefits of such links could be maximised through better interchange opportunities at Chester Station onto the Northern and Merseyrail networks.

3.130 The **Crewe – Runcorn – Liverpool** corridor contains a number of opportunities for housing growth within the Mid-Cheshire area that could be assisted by improvements to the MRN around Middlewich and Winsford, forming part of a wider growth strategy to accommodate HS2 infrastructure. The rail corridor will continue to facilitate access from Liverpool to London, with scope to significantly improve the quality of the service through access to HS2 at Crewe. At an inter-urban level, there are opportunities to improve the service provision at intermediate stops between Crewe and Runcorn, and to link better with LJLA.

3.131 The **North Wales - Chester – Liverpool** corridor has the potential to be improved to reflect the economic ambitions for growth in the Mersey Dee

area. At present, journey times by rail in particular are uncompetitive, and do not actively promote the demand that exists for cross-border movement. The delivery of the Halton Curve in mid 2019 will allow the operation of direct services between Liverpool and Chester via Runcorn, creating opportunities to significantly improve access to North Wales, and widening the catchment of significant travel generators such as LJLA and major employers within the Mersey Dee area. On the highway network, significant opportunities exist to improve cross-border movement, building upon the Welsh Government's A55 / A494 scheme (Northop to Shotwick).

3.132 The **Crewe – Warrington – Wigan / Manchester (Airport)** link will continue to form one of the key national arteries, carrying nationally significant traffic via the M6 and the West Coast Mainline between the South / West Midlands and Scotland. The route will continue to carry significant (and increasing) volumes of intermodal freight traffic between the south coast ports and the rest of the UK, linking into strategic container terminals, including the Post-Panamax terminal at Liverpool2; and will continue to provide a critical link to Manchester International Airport from the south. The delivery of HS2 Phase 2b will provide additional capacity on new parts of the network, but will also potentially create new constraints on the classic network north of Wigan. The lack of resilience during incidents on the M6 will need to be addressed, and opportunities exist on the parallel MRN to assist recovery, and provide additional capacity (such as the A51 and A34 corridors)

3.133 The **Manchester – Chester – North Wales** corridor provides access to an important tourism area in North Wales. While the asset is outside of TfN geography, access to it can play a key role for stimulating the economy, including seasonal access to the North Wales Coast, but also in association with Irish Sea Ferry traffic (passengers and freight). Improved access to both the rail and highway networks would also support improved access to labour force for businesses on either side of the border within the Mersey Dee area, and opportunities exist to improve the interface between road and rail through the delivery of strategically located Park & Ride sites. The M56 will continue to facilitate access to significant clusters of economic opportunity in the Energy, Health Innovation, and Advanced Manufacturing Industries on the south bank of the River Mersey, and scope exists to widen the catchment of transformational rail interventions such as HS2 and NPR, through improvements to journey time and frequency on the two routes that connect Manchester and Chester / North Wales.

3.134 The two **International Airports** at Manchester and Liverpool will continue to grow and will require better surface access provision to meet this demand. HS2 will provide a direct link to Manchester International Airport; it also provides further opportunity for a link into the NPR network and therefore access to Liverpool, Manchester and Leeds, as well as more local rail access to North Wales and Cheshire. Opportunities exist to better integrate public transport connectivity with LJLA from both the MRN and via Liverpool South Parkway rail station, with direct rail connectivity considered a longer term opportunity.

3.135 Across the **Cheshire region**, enhancing connectivity to Manchester Airport and Manchester City Centre is vital as they represent key areas of employment and potential for economic and population growth. Improvements delivered by HS2 are critical therefore ensuring HS2 and the stations at Crewe and Manchester Piccadilly remain a top priority.

3.136 The **Crewe Hub** is another key location as it is a key "Pivot" for the UK rail network with the growth of other links highly dependent upon interventions at Crewe on Road and Rail networks. As it provides a key node and central element to connectivity improvements in the region, investment packages at Crewe will need to be developed in the context of the associated links.

3.137 The **Crewe-Wrexham** link is also of strategic importance to both TfN and the Welsh Government to strengthen access to labour markets. Linked to this, the cross-border movements between England and Wales through the Mersey Dee area are of critical economic importance to the region.

3.138 There are a number of other "Pan Northern" opportunities that exist across the SDC's, for which West and Wales will form an important component:

- Increase provision for Northern Ports and Transpennine freight traffic
- Increase intermodal freight provision
- Funding support to bring new intermodal services in to operation
- Enhance digital connectivity across the major road network and rail network
- Better use of technology to increase efficiency of the rail and road systems
- Better use of data/ technology to manage freight demand and integration of rail paths
- Better integrated travel
- Improve how people and goods move and travellers' customer experience
- Reduce the environmental impact from transport
- Improve affordability of travel

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 schemes 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 STP objectives, TfN aims to achieve with a programme of investment in the West and Wales 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.

Why TfN is the appropriate promoter

4.7 TfN's remit is focused on the identification and recommendation of strategic transport interventions, 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 through TfN's Technical Assurance Group (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 9 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?

STP Objectives	Sub Objectives	SDC Performance Measures
	Increasing the resilience of major transport networks	Does the scheme improve the resilience/ recovery of major transport networks?
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 reduce 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 of 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 West and Wales 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) Core – in line with WebTAG guidance;
- NTEM Core with spatial plans and TEMPRO constrained at Local Enterprise Partnership (LEP) level;
- NTEM Core with NPIER 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 Section 10.

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, as they interface with the local road networks of Greater Manchester and Liverpool City Region.

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 West and Wales 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 The Reference Case schemes have their own benefits which will be assessed in their own right, however this has not been examined as part of this early stage of development 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 NPR[65], 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.

5.13 Key national non-transport policies and strategies such as the UK Industrial Strategy or the Making our Economy Work for Everyone report[66], 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

[65] Global Railway Review (2018) https://www.globalrailwayreview.com/news/67419/hs2-npr-ambitions-greater-manchester/

[66] ibid

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

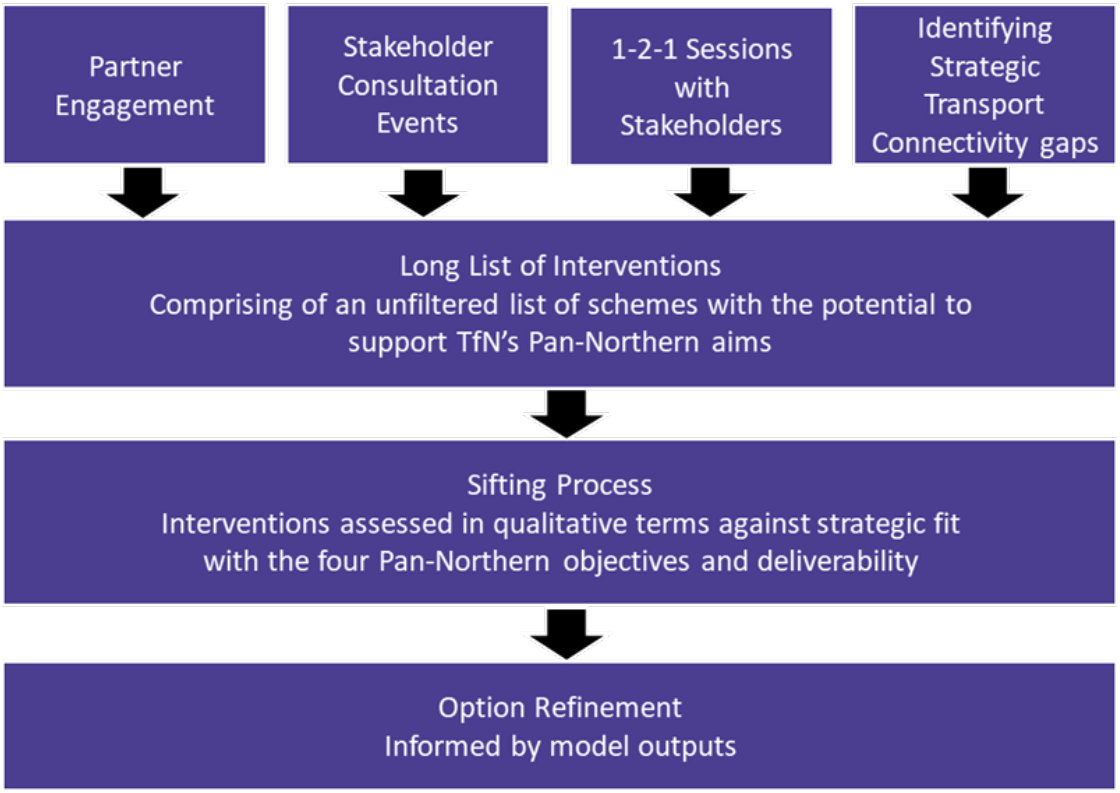
6 Option Assessment Process

Introduction

6.1 The Option Assessment Process outlines the different steps undertaken to identify and shortlist priority interventions for the West and Wales corridor. A thorough approach was undertaken including the consideration of strategic priorities, multiple criteria as well as different future scenarios to identify an initial set of options. In the following step, an additional sift process was applied to distinguish the final set of interventions.

6.2 This process is presented within Figure 28 and described in the following section.

Figure 28: Staged Approach to Pan-Northern transport scheme identification



Stakeholder Consultation

6.3 In order to ensure that the options assessment process aligns with stakeholders' interests and aspirations, TfN undertook two stakeholder consultation sessions for the West and Wales SDC in 2017, encompassing

representatives from councils, transport authorities and businesses with an interest in the SDC area:

- Chester – 21st November 2017 (14 attendees)
- Warrington – 29th November 2017 (37 attendees)

6.4 The feedback received is summarised below in Table 10.

Table 10 Stakeholder Consultation Chester and Warrington Summary

Chester	Warrington
Cheaper cross border ticketing to coincide with the start of the new Transport for Wales rail franchise, for local journeys between North Wales and the TfN area	GVA increase, effect on productivity, strong, compelling argument for infrastructure investment in the north, to spread equity across the country.
A51 Improvements between Crewe and Chester	Temptation is for new 'hard' civil infrastructure rather than trying to maximise current infrastructure
Enhancements to the Aberystwyth to Chester route via Wrexham	'European Model' Park and Ride systems should be investigated
Better road access from eastern side of LJLA	Utilise new technology, beacon projects to tackle congestion, help manage choices and provide real time information, integrated smart travel
A483 Improvements between Oswestry, Wrexham and Chester	Utilise data, companies doing the right thing by recording it however they are then not utilising it enough
Grow multi-modal connectivity to Manchester Airport from North Wales via Crewe and from the East/West Midlands	Need to explore options, people have the mind set of let's get in a car and sit in a queue. Integrated smart travel to make them aware of the alternatives
A rail intervention to meet increased demand for Air Freight at Manchester Airport	How can we use transport hubs to support people's needs?
Ease of use and availability of facilities for Park & Ride	Planning and place making – especially freight hubs – opportunity to plan now and integrate shift movements
Movement of Wylfa Newydd workforce	Cross-pollination across Finance sector/Manufacturing sector/Digital (Growth areas)
Better multi-modal infrastructure	Reliability and journey times of rail services alongside poor quality of rolling stock

6.5 Further sessions were undertaken during Spring 2018 to feedback progress to stakeholders and demonstrate the means to which their views had been included within the OAR. They were conducted as *'You said, we did'* sessions and introduced the concept of the SDC longlist and how the intended outcomes of the SDC would be met.

6.6 Three sessions were held at the following locations:

- Liverpool – 28th February
- Manchester Airport – 7th March
- Llandudno – 14th March

Option identification and shortlisting

6.7 For each SDC, a process of identifying and shortlisting schemes 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, the 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.

6.8 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 9). 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 11. and aided through application/ reference to a set of metrics (covering the four-point scale) for each performance indicator.

Table 11 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 desire 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	

6.9 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.

6.10 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:

- **Core SOP Intervention:** An intervention that has the potential to support transformation improvement, measured against the four Strategic Plan objectives, in its own right

- **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

6.11 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 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

6.12 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.

6.13 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.

6.14 Due to the reliance on a NTEM demand scenario only it has been necessary 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 travel market scenario, and requiring further development and analysis.

6.15 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

6.16 A final Strategic Outline Programme (SOP) of interventions for the West and Wales SDC has been defined and is presented in Table 12 and Figure 29 for road. The SOP proposals alongside the relevant Reference Case schemes are set against the key Pan-Northern outcomes within the corridor.

6.17 Following the sifting process, a final programme of interventions has been defined. For a full overview of road scheme interventions see

6.18 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.

6.19 Delivery of these draft transport interventions should not be relied upon for planning and development purposes.

Table 12 Reference Case and Proposed Road Interventions and Outcomes

Key Pan Northern Outcomes within the West and Wales SDC	Status	Road
Ensuring the North is ready for HS2 to maximise the benefits of this nationally significant project, including access to growth opportunities in and around Central Manchester, Crewe Hub, Warrington, and Wigan.	SDC Reference Case	• Crewe HS2 Hub – Access package and depot access improvements • A500 dualling – Crewe to M6
	SDC SOP intervention	• Multimodal access improvements to ensure Crewe HS2 Hub and neighbouring developments are well connected, including measures to address existing congestion on the corridor between the A530 and A534 to the north of Crewe
Enhance cross border movements into North Wales and the Midlands to support economic growth and UK competitiveness	SDC SOP intervention	• A534 route upgrade • A54 improvements (A556 to A55 - potential expressway) • A51 improvements (Nantwich to Chester - potential expressway)
Enhance North-South strategic connections across the North to support UK competitiveness	SDC SOP intervention	• M6 Improvements Junctions 19 to J21a
Enhance East-West strategic connections across the North to support UK competitiveness	SDC Reference Case	• A6 to M60 Relief Road
	SDC SOP intervention	• M62 Junctions 5 to 10
Enhance access to the North's international gateways in the West and Wales SDC	SDC SOP intervention	• Eastern route access package to LJLA and associated developments • M57 Junctions 4 and 5 and Switch Island (M57/M58/A5036)

Key Pan Northern Outcomes within the West and Wales SDC	Status	Road
Improve connectivity and resilience around the Greater Manchester City Region economic clusters	SDC SOP intervention	• Highway and public transport interventions to support the future growth of Manchester Airport and its enterprise zone and facilitate access to a future Airport HS2 Station, e.g. M60/M56 interchange improvements, and improvements to access from the south and west • Highway interventions to unlock employment and housing growth potential and improve strategic and local connectivity across the north and west of Greater Manchester, e.g. Wigan to Bolton strategic route • Highway interventions to support Atlantic Gateway employment and housing growth, reduce the severance impact of the Manchester Ship Canal and improve connectivity to the Strategic Road Network (including M62-Carrington-M60 link and M62 to A57 junction and link)
Facilitating significant private sector investment to support economic growth and UK competitiveness	SDC Reference Case	• Port Salford Western Gateway Infrastructure Scheme
Addressing significant points of congestion on the North's strategic road network to improve reliability	SDC Reference Case	• 15 schemes, including international gateway improvements such as A5036 Princess Way, north – south improvements on the M6, east – west improvements on the M60 / M62 / M66 (including Simister Island), Improvements to the M53 (Junctions 5 to 11)
A package of improvements to support economic and housing growth in the North through addressing existing points of congestion	SDC Reference Case	• East – west improvements on the M62 (including M62 Junction 6)
Improve connectivity and resilience around the Lancashire economic clusters	SDC SOP intervention	• M6 Junction 25 slip roads

Key Pan Northern Outcomes within the West and Wales SDC	Status	Road
Improve connectivity and resilience around the Liverpool City Region, Greater Manchester City Region, the Cheshire & Warrington LEP, the Potteries, and the Mersey Dee economic clusters in the West & Wales SDC	SDC Reference Case	• A55 Northop to A494 Shotwick improvements • M56 Junction 11 to 15 • Middlewich Eastern Bypass • Congleton Bypass • Warrington Waterfront Western Link • Poynton Relief Road
	SDC SOP intervention	• Middlewich southern and western link (including access to the M6 from Winsford) • A500 dual carriageway with grade separated junctions • Warrington Growth Programme transport improvements package • A34 (potential expressway) • Nantwich southern relief road • Chester Box improvements (A550, A494/A548 to M53 link, Chester Broughton growth corridor) • Northwich and Winsford transport improvements package • A580 dual carriageway with some grade separated junctions

Figure 29: West and Wales SDC SOP Road Interventions Map (includes schemes promoted by Welsh Government)

Multimodal Interface with the MRN

1) Skelmersdale Rail Link: Park & Ride Opportunities

2) Shotton: Better Integration of Rail connections

3) Deeside Park: Rail access Opportunities linked to Growth

4) Broughton: Rail access Opportunities linked to Growth

5) Chat Moss: Rail Park & Ride opportunities

6) Crewe HS2 Hub Access Package

7) Warrington Growth Package: Integration with NPR

8) Manchester Airport: Better integration of HS2, NPR, Classic Rail, Light Rail and Highway Park & Ride Interface with the MRN

9) Liverpool John Lennon Airport (LJLA): Better Integration of Heavy Rail with the Airport Terminal

10) Stoke Park & Ride Opportunities

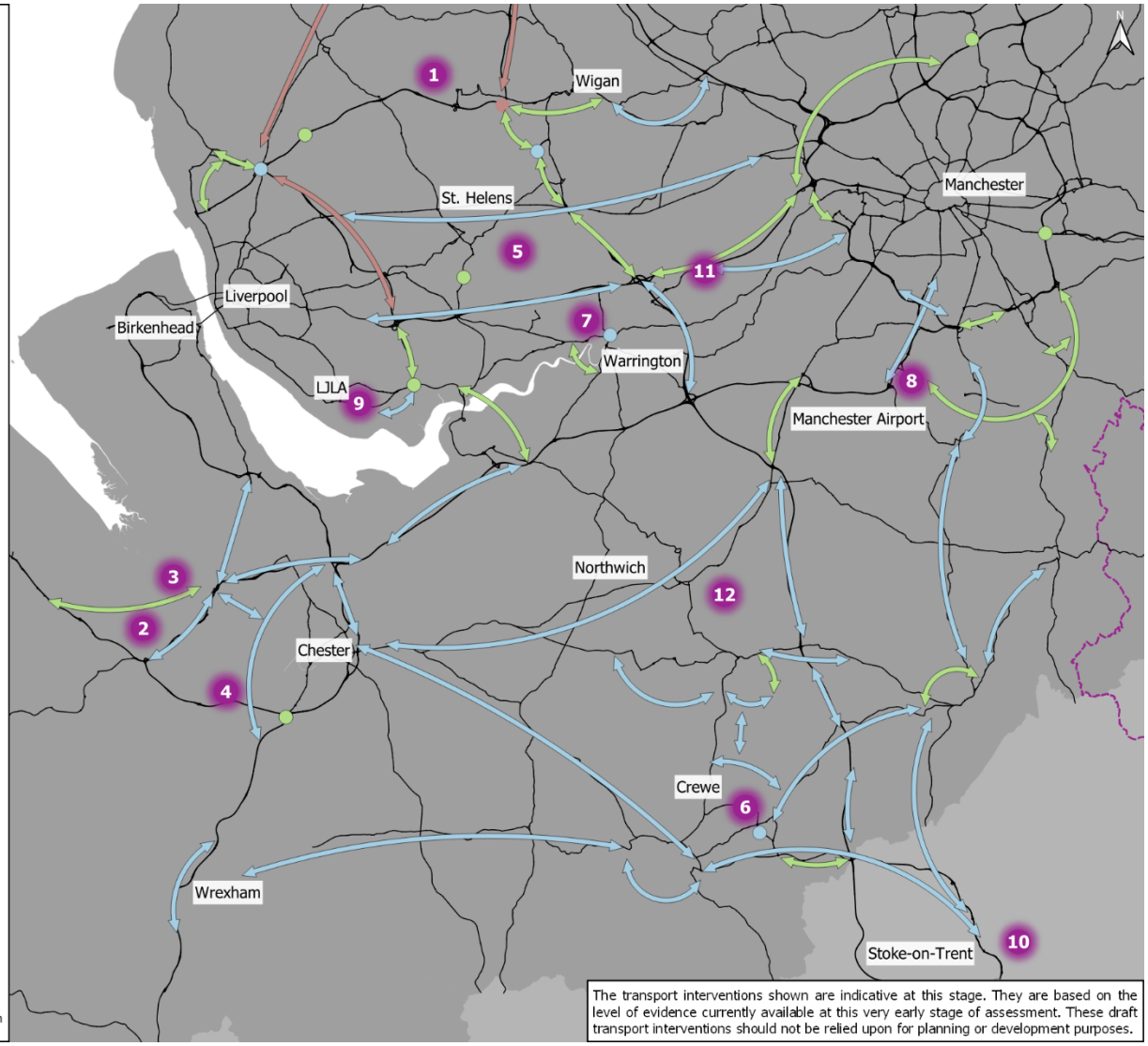
11) CLC Park & Ride Opportunities: Birchwood

12) Sandbach to Northwich: New Station and Park & Ride opportunities

Key

- Corridor Interventions
- Interventions assessed by adjacent SDCs
- Reference Case Schemes
- Major Road Network
- Welsh Trunk Road Network
- Highways England Network
- National Park

0 5 10 15 20 km



6.20 For a full overview of rail schemes, see Table 13, Figure 30 and Figure 31 respectively. Delivery of these draft transport interventions should not be relied upon for planning and development purposes.

Table 13 Proposed Rail Interventions and Outcomes

Key Pan Northern Outcomes within the West and Wales SDC	Status	Rail
Ensuring the North is ready for HS2 to maximise the benefits of this nationally significant project, including access to growth opportunities in and around Central Manchester, Crewe Hub, Warrington, and Wigan.	SDC Reference Case	• HS2 Phase 2a • HS2 Phase 2b • Crewe Hub (including Crewe North Junction link to "Classic" network • Wigan North Western station (or integrated station at Wigan) - Stockport Capacity Improvements
	SDC SOP intervention	• Stockport Station (later phases) • Warrington Bank Quay (or integrated station at Warrington) • Wigan North Western (or integrated station at Wigan)
Enhancing connectivity between the North's largest economic centres, with faster more frequent services, to build on HS2	SDC Reference Case	• Northern Powerhouse Rail • Interventions at the major hubs necessary to realise the benefits of improved connectivity along the NPR corridors, including, within the West & Wales SDC: Warrington, Stockport, Manchester Piccadilly, Liverpool Lime Street • Multi-modal, integrated ticketing across the north (Integrated & Smart Travel Phases 1-3)
Enhance East-West strategic connections across the North to support UK competitiveness	SDC Reference Case	• Transpennine Route Upgrade (including Intermediate Interventions) • Lostock – Wigan Electrification
Ensure that the needs of freight operators can be met	SDC SOP intervention	• Port of Liverpool to West Coast Main Line enhancements • Parkside enhanced connectivity • West Coast Main Line freight capacity enhancements • Port Salford rail freight access
Facilitating the delivery of housing growth	SDC Reference Case	• New Station at Warrington West

Key Pan Northern Outcomes within the West and Wales SDC	Status	Rail
	SDC SOP intervention	• Skelmersdale Rail Link • New & Upgraded Stations in the Mersey Dee area (Shotton, Deeside Park, Broughton) • Park & Ride Opportunities on the Chat Moss Route
Enhance Access to the North's International Gateways	SDC Reference Case	• Light Rail Links to Terminal 2 at Manchester Airport
	SDC SOP intervention	• Knutsford to Manchester Airport (Western Link) • Links between Liverpool South Parkway and LJLA
Improve connectivity and resilience around the Liverpool City Region, Greater Manchester City Region, the Cheshire & Warrington LEP, the Potteries, and the Mersey Dee economic clusters in the West & Wales SDC	SDC Reference Case	• Northern, Transpennine Express and Wales and Borders rail franchise commitments • Liverpool Central Station passenger capacity enhancements • Manchester - Preston improvements • Liverpool City Region upgrades (Lime Street improvements & Chat Moss) • Cross Manchester Capacity and Reliability • Journey time improvements to the "Borderlands" (Wrexham – Bidston – Liverpool) Corridor
	SDC SOP intervention	• Crewe - Stoke - Derby (Journey Time Improvements) - Stoke Park & Ride • Northwich to Sandbach rail reopenings and new stations • Mid-Cheshire Line (Journey Time, Capacity Improvements) • CLC line (Capacity and Service Improvements) - Birchwood Park & Ride • Chester Station – Passenger & track capacity enhancements

Figure 30: Passenger Rail SOP Proposals across the Strategic Development Corridors

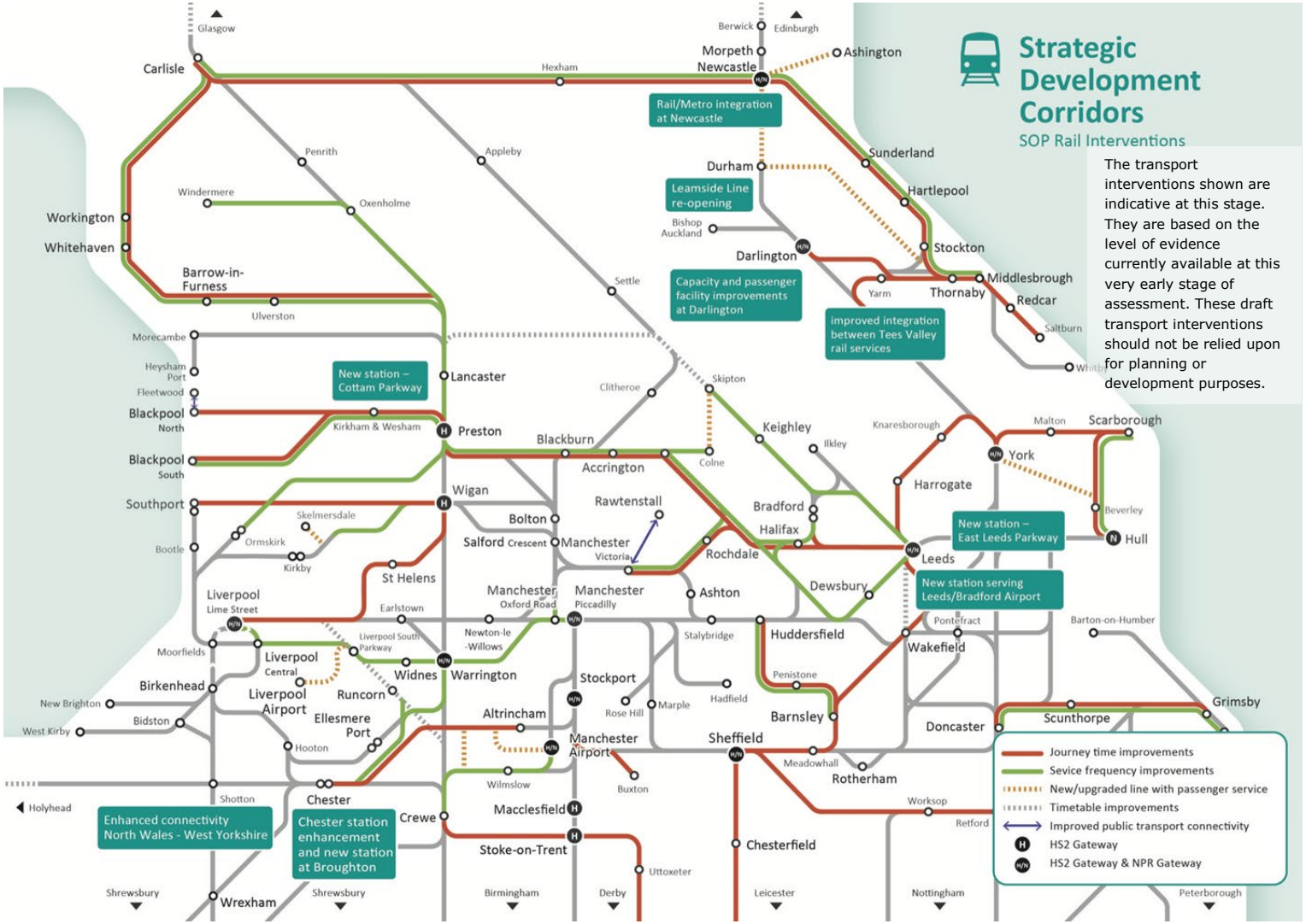
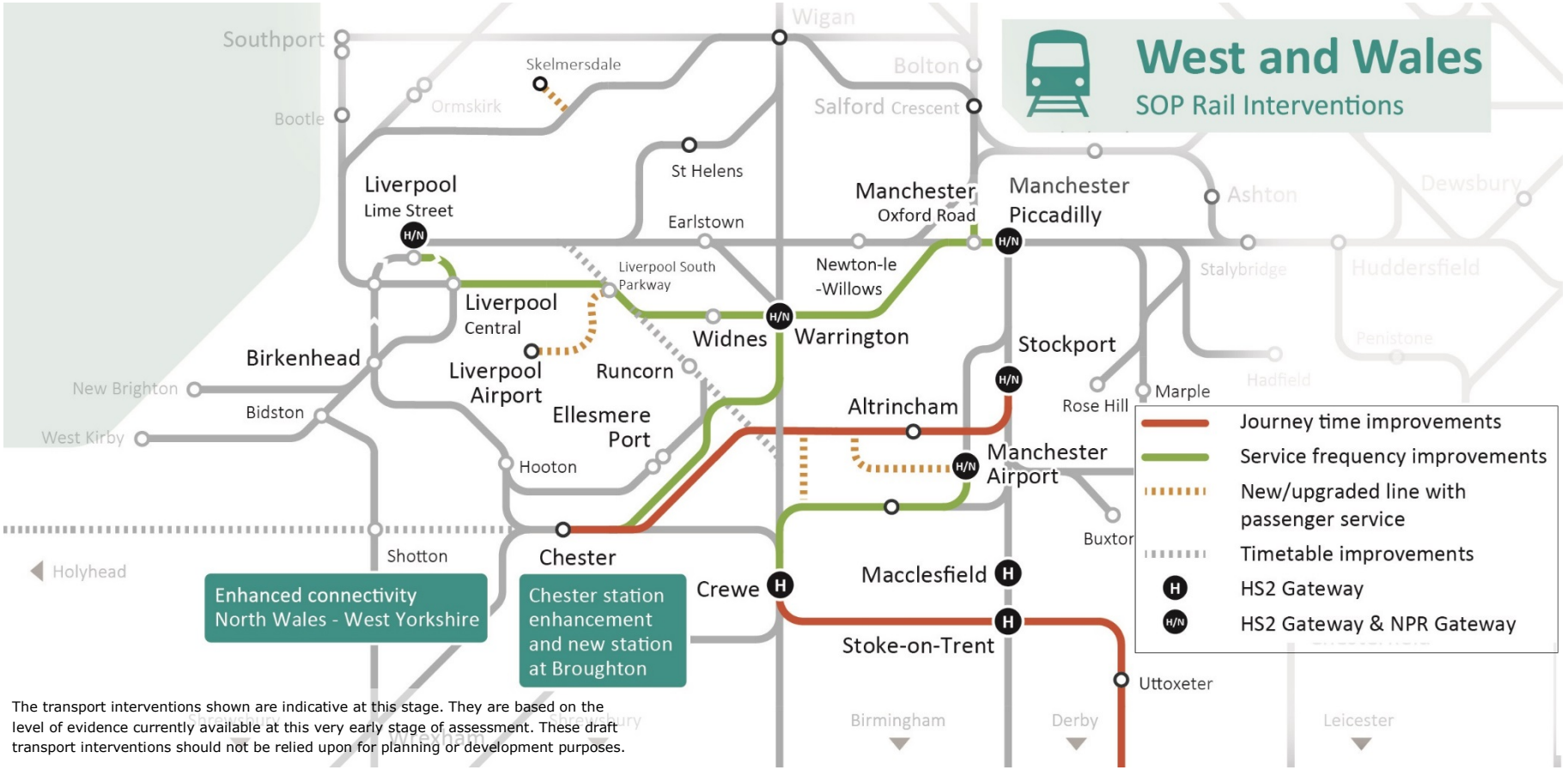


Figure 31: West and Wales SDC SOP Rail Interventions Map



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. These draft transport interventions should not be relied upon for planning or development purposes.

Multi modal interface

6.21 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.

6.22 Figure 32 identifies the general locations where improvements to the rail network can be linked to areas of forecast growth in housing and employment, or there is potential to affect modal shift through the provision of high quality Park & Ride opportunities in association with improvements to the MRN.

Freight and Warehousing

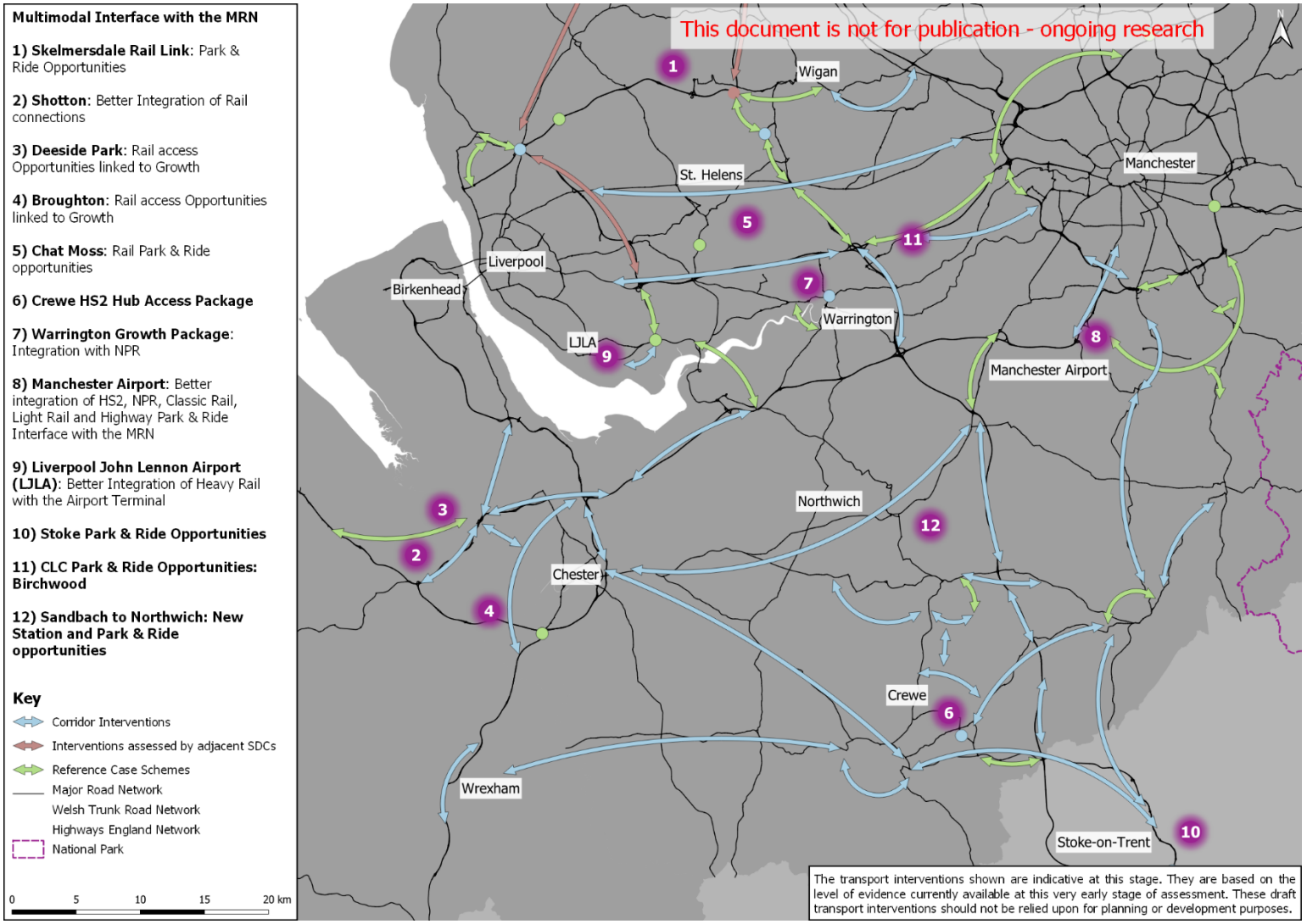
6.23 Work has been undertaken to better understand the implications of future growth in freight demand, both to, from and through the North of England, and the demand it might create at a spatial level for new warehousing associated with intermodal terminals and ports.

6.24 Table 14 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 West & Wales 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 14: Warehousing growth by region (assumptions made for freight modelling of clustered warehousing)

Location	Local Authority
Northern Gateway / Kingsway	Rochdale
Astley (Port Salford / Parkside)	Wigan
Carrington	Trafford
Trafford Park	Trafford
Parkside	St. Helens
Knowsley Industrial Park	Knowsley
Garston	Liverpool
Port of Liverpool	Sefton
3MG	Halton
Runcorn Docks / Port of Weston	Halton
Port Warrington	Warrington
Bromborough	Wirral

Figure 32: MRN Multi-modal Interface



Anticipated impacts of the programme

6.25 As outlined in section 3, addressing current transport challenges in the West and Wales SDC will enable this region to exploit significant economic opportunities and support the closure of the performance gap with the rest of the UK. The delivery of the Investment Programme will lead to wide-ranging positive effects that aim to tackle some of the economy's shortcomings and stimulate the overall economic development of the region.

Connectivity and economic development

6.26 The delivery of connectivity improvements with the intention of stimulating greater economic activity within the West and Wales SDC is highlighted as a key thread within the STP. Several key interventions on the MRN and heavy rail have been identified as having the potential to stimulate transformational economic growth, including targeted growth within the Prime and Enabling capabilities defined by NPIER. A number of these interventions directly build upon current TfN supported programmes of Investment such as High Speed 2 (HS2) and Northern Powerhouse Rail, as well as The Manchester North West Quadrant (MNWQ) and Transpennine Tunnel Highway Schemes. The principle objective of the investment programme is to maximise the catchment opportunity through improvements to the quality and scope of existing networks

6.27 The delivery of improved access to growth opportunities in and around the "Crewe Hub" would serve to maximise the benefit of HS2 investment to the Northern economy, including multimodal access improvements to ensure Crewe HS2 Hub and neighbouring developments are well connected, including measures to address existing congestion on the corridor between the A530 and A534 to the north of Crewe.

6.28 Further positive relationships between the Investment Programme and economic growth include improved capacity, connectivity and resilience to support the sustainable delivery of new homes and jobs in line with the vision of the Warrington Growth Programme. This programme would be centred upon the delivery of an HS2 / NPR hub, connected to key employment zones and major housing growth through the delivery of mass transit corridors and highway improvements. Broader resilience to through-movement on the Strategic Road Network would be achieved through improvements to the SRN and MRN at crossing points on the Manchester Ship Canal.

6.29 Significant highway and public transport interventions have been identified to support the future growth of Greater Manchester as identified by the Greater Manchester Transport Strategy 2040 and the 2020-2025 Delivery Plan, and the Greater Manchester Spatial Framework (GMSF) and its associated Infrastructure Plan. This includes new rapid transit services on radial corridors into the city centre, and to Manchester Airport and its enterprise zone, together with reviewing the transformational solutions that could be required to address congestion on the rail network within central

Manchester such as a city centre metro tunnel, noting the impact that the current network constraints will continue to have on the local economy if not adequately addressed.

6.30 On congested radial and orbital corridors around Greater Manchester, TfGM are committed to improving bus-based and fixed track provision to provide residents with a competitive alternative to the private car for commuting purposes, alongside improved park & ride facilities. Development of tram-train solutions, bus reform, and development of Streets for All initiatives will also play a significant role will also all play an important role in maximising the quality, capacity and integration of Greater Manchester's public transport networks.

6.31 The programme of interventions also covers key initiatives that aim to increase international connectivity and stimulate the visitor economy. Improved surface access to LJLA will create improved road and rail access to the airport, a key economic asset in the West & Wales study area. Improved inter-urban services on North Wales coast and improved accessibility between Manchester Airport, the SRN & Manchester City Centre (M60 / M56 / A5103) will also facilitate required access to international gateways and stimulate international travel.

6.32 Additionally, further strategic highway and public transport interventions will be brought forward to unlock employment and housing growth potential and improve strategic and local connectivity, with the specific aim of increasing the region's productivity and economic performance.

- improved East - West connectivity between Manchester (Airport) / M6 & Chester / North Wales (M56 / A41 / A556);
- improved East - West Links from Liverpool (and Port) to Wigan (M6);
- Improved access to Western Gateway Infrastructure (Port Salford);
- Improved access to Flintshire employment sites and Wrexham; and,
- Improved links between Liverpool and LJLA to Cheshire and North Wales

Resilience

6.33 Resilience as a prerequisite to ensure a well-functioning transport network that can support the region's economy has been identified as a key target for the West & Wales corridor. Several programme interventions are aiming to safeguard and improve the resilience of the regional transport system.

6.34 The following resilience improvements are all potential outcomes based on interventions with the target to improve the area's transport system's resilience:

- Improved East - West resilience between Manchester (Airport) / M6 & Chester / North Wales (M56 / A41 / A556).
- Improved resilience between Manchester & Liverpool City Region via Mersey Gateway (M56 / A533 / A558 / A5300) including access package to LJLA and MRN / SRN.

- Better resilience through upgrades within the M6 corridor between J.16 – 19.
- Better resilience through upgrades within the M6 Corridor between J.19 - 25 (Including SRN & MRN Crossings of the Manchester Ship Canal).
- Better resilience through upgrades on East - West Routes across the M6 between J. 15 -16.
- Improved network resilience between Manchester and Liverpool (M62 / A580).

Freight

6.35 Freight and logistics plays an important role in the West & Wales corridor and 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 initiates of the programme of interventions are proposed with the target to ensure and improve the freight infrastructure in the corridor.

6.36 The proposed programme of interventions will lead to improvements on the East - West route, which will reduce the need to use WCML. Additionally, using released capacity generated by HS2 to enable additional freight paths as well as developing alternative freight paths between the Port of Liverpool to WCML will help accommodate increased freight demand.

Policy

6.37 A number of policy interventions were also identified in the West and Wales Option Assessment Report (OAR). These policy interventions have been considered further in the 'Future Technology Intervention Impacts' Report (Jan 2018).

Constraints

6.38 While the proposed programme of initiatives 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.

6.39 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 'promote and support the built and natural environment' has played a central role in the sifting process of possible interventions. While an overall reduction of transport-related greenhouse gases (GHGs) and noise pollution is difficult to achieve by increasing 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 need to be carefully considered at every stage of the project.

6.40 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. 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 Investment Programme that are ultimately unnecessary as a result of being superseded by changing methods of addressing travel demand.

7 Strategic Dimension Summary

7.1 This document sets out the case for the strategic importance and necessity of the proposed programme of interventions in the West and Wales SDC. It is necessary to be ambitious to meet the vision and objectives of the DfT and TfN and those of partners across the North to support the region's, as well as the country's, future prosperity by investing in a modern and reliable transport network that will help to rebalance the UK economy, improve overall regional productivity and enable inclusive growth.

7.2 The strategic dimension has clearly outlined the strategic needs of the Corridor and how the proposed programme of interventions will add significantly more value than by the reference case alone. It was shown that only by moving forward with these additional investments and projects, transformational growth can be achieved which will benefit not only the West and Wales corridor but also the wider competitiveness of the UK.

7.3 This document has also demonstrated the close alignment of the proposed programme of interventions with national, regional and local policies. In a next step, the strategic dimension has also discussed in detail the transport challenges and economic opportunities of the West and Wales corridor. The following opportunities with respect to the proposed programme of interventions have been identified with particularly high potential to achieve transformational growth in the region and the North:

- Improving business to business connectivity;
- Supporting access to employment;
- Improving international connectivity and strengthening the visitor economy; and
- Supporting the Built/Natural Environment.

7.4 In a following step, the Option Assessment Process was described in detail to allow a transparent review of how the numerous interventions were scored and identified as priority actions. Additionally, the wider context outlining the programme's delivery constraints, interdependencies with other implemented or planned projects as well as wider stakeholder needs

and views were provided to reflect the bigger picture with regards to the ease of implementation, its relation to other projects and the wider public opinion.

7.5 In addition to the strategic assessment of the proposed programme of interventions, more detailed information on economic, financial, commercial and management implications are required to demonstrate an informed and comprehensive case. The next section outlines the economic dimension demonstrating the value for money of the proposed programme of interventions.

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 West and Wales SDC is described in Chapter 5, within the Strategic Dimension of this 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 DfT and TfN strategic objectives as set out in Table 2 and Table 9 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.

8.4 The economic appraisal has followed the TfN assurance process which includes:

- TAG Meetings - to agree the appraisal process with partners;
- Weekly Senior Modelling Group (SMG) meeting 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.

8.5 The level of appraisal and assurance undertaken is considered to be greater than what would normally be expected for a Strategic Outline Programme of schemes at this stage of development.

8.6 The appraisal is documented in detail in the following supporting documents:

- Data Requirements and Model Zoning (April 2018)
- Local Model Validation Report (LMVR) (August 2018)
- Combined Transport Forecasting and Economics Report (ComMA) (February 2019)
- Environmental Appraisal Report (EnvAR) (February 2019)
- Distributional Impact Report (February 2019)
- Appraisal Summary Tables (AST) (February 2019)

Rationale for Investment

8.7 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 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

8.8 The VfM appraisal of the West and Wales SDC Programme has been undertaken with reference to DfT's Transport Appraisal Guidance[67] (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 values[68], as specified by WebTAG.

8.9 The proportionate approach to the VfM appraisal of the West and Wales SDC Programme was set out in the Stage 1 Appraisal Specification Report[69] (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.

8.10 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 for all four corridors combined. 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

[67] https://www.gov.uk/guidance/transport-analysis-guidance-webtag

[68] For further details, see paragraph 9.6 onwards

[69] Product 04: Appraisal Specification Report (February 2018)

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.

8.11 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 National Trip End Model (NTEM)[70]. In contrast, the option identification and selection process was based on the assumption that the transformational economic growth identified in NPIER was achieved. At this stage if lower demand growth demonstrates a credible value for money case, then further analysis using transformational growth will only strengthen the investment business case. TfN will assess transformational impacts in any further business case development using its Analytical Framework.

8.12 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 outputs[71].

8.13 Table 15 and Table 16 list the final strategic outline programme of road and rail interventions that have been appraised at this very early stage of programme development for the West and Wales 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.

Table 15: Appraisal of Strategic Outline Programme of Road Interventions

Road Interventions Appraised within the Economic Dimension	Road Interventions Not Appraised within the Economic Dimension at this stage
• A534 route upgrade • A34 (potential expressway) • A54 improvements (A556 to A55 - potential expressway) • Improvements to the A536 Corridor between Congleton and Poynton • M6 Improvements Junctions 19 to J21a	• Multimodal access improvements to ensure Crewe HS2 Hub and neighbouring developments are well connected, including measures to address existing congestion on the corridor between the A530 and A534 to the north of Crewe

[70] 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.

[71] 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.

Road Interventions Appraised within the Economic Dimension	Road Interventions Not Appraised within the Economic Dimension at this stage
• A500 dual carriageway with grade separated junctions • A51 improvements (Nantwich to Chester - potential expressway) • Chester Box improvements (A550, A494/A548 to M53 link, Chester Broughton growth corridor) • M56 Junctions 11 to 15 • Highway and public transport interventions to support the future growth of Manchester Airport and its enterprise zone and facilitate access to a future Airport HS2 Station, e.g. M60/M56 interchange improvements • Cooperative working with Midlands Connect to implement and support operational interventions with regards to the Key Route Network • Targeted improvements on the A556 between M6 J19 and A54 • Northwich and Winsford transport improvements package • Eastern route access package to LJLA and associated developments • A580 dual carriageway with some grade separated junctions • M62 Junctions 5 to 10 • Highway interventions to unlock employment and housing growth potential and improve strategic and local connectivity across the north and west of Greater Manchester, e.g. Wigan to Bolton strategic route • Highway interventions to support Atlantic Gateway employment and housing growth, reduce the severance impact of the Manchester Ship Canal and improve connectivity to the Strategic Road Network (including M62-Carrington-M60 link and M62 to A57 junction and link)	• Middlewich southern and western link (including access to the M6 from Winsford) • Improve connectivity and resilience to the Cheshire, Warrington and the Potteries economic clusters • Warrington Growth Programme transport improvements package • M6 Improvements Junctions 16 to 17 • M6 Junction 25 slip roads • Coordinate management operations with Welsh Govt & Midlands Connect regarding signing & Technology on A534 / M6 / A50 Route • Nantwich southern relief road • Improvements to A483 between Junctions 4 to 6 • A55 Northop to A494 Shotwick improvements • Cooperative working with TfGM and the districts to implement and support operational interventions with regards to the Key Route Network • Cooperative working with TfGM / Liverpool City Region to implement and support operational interventions with regards to the Key Route Network • Cooperative working with Liverpool City Region to implement and support operational interventions with regards to the Key Route Network • Cooperative working with Lancashire County Council to implement and support operational interventions with regards to the Key Route Network • M57 Junctions 4 and 5 and Switch Island (M57/M58/A5036)

Table 16: Appraisal of Strategic Outline Programme of Rail Interventions

Rail Interventions Appraised within the Economic Dimension	Rail Interventions Not Appraised within the Economic Dimension at this stage
• Journey time improvements Preston to Blackpool North • Skelmersdale rail link	• South Fylde Line (journey time and capacity improvements)

Rail Interventions Appraised within the Economic Dimension	Rail Interventions Not Appraised within the Economic Dimension at this stage
• 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)	• 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 Leeds Bradford Airport Parkway, East Leeds Parkway and Cottam • Parkway • Rapid transit link between Liverpool South Parkway station and LJLA • 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)

Rail Interventions Appraised within the Economic Dimension	Rail Interventions Not Appraised within the Economic Dimension at this stage
	• 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 Trans-Pennine 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

8.14 Distributional impacts (DI) consider the variance of transport intervention impacts across different social groups. DfT guidance on Distributional Impact Appraisal[72] 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.

72 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)

8.15 A completed DI Screening Pro-Forma has been completed and included within the West and Wales Distributional Impact 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 phase[73]:

- **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 (vehicle operating costs).

8.16 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, with specific relevance to 'Improve inclusivity, health, and access to opportunities for all, which underpin the SDC programme in support of TfN's STP (see Table 9), together representing the improvement in connectivity from a more efficient transport system and resulting gain in productivity.

8.17 The screening process should not be interpreted as a suggestion that TfN does not consider the remaining DI impacts as unimportant nor 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.

8.18 It is further noted that the two impacts identified for consideration above, are simply where material impacts of the programme overlap with indicators which DfT has identified for their DI 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

8.19 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

[73] DfT DI Guidance excludes employers' business trips and impacts during construction

- 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 West and Wales SDC programme and the lifecycle costs, comprising maintenance, operating costs and renewals costs for the appraised highway interventions.

9.2 The monetised Economic Appraisal, which forms the foundation of the VfM Appraisal, represents the difference between a Reference Case[74] and the interventions of the SDC programme.

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 West and Wales SDC programme adopts the 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 out each other.

[74] For further details, see paragraph 2.26 onwards

SDC Programme

Implementation Costs

9.6 The Wales and West economic appraisal considers the capital cost of the SOP programme itself, together with any changes in the capital cost of operation and maintenance in future years. Only those schemes presented the SDC SOP Intervention lines in Table 12 in the Strategy Dimension 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 West and Wales SDC, all monetary units are presented in 2010 discounted market prices.

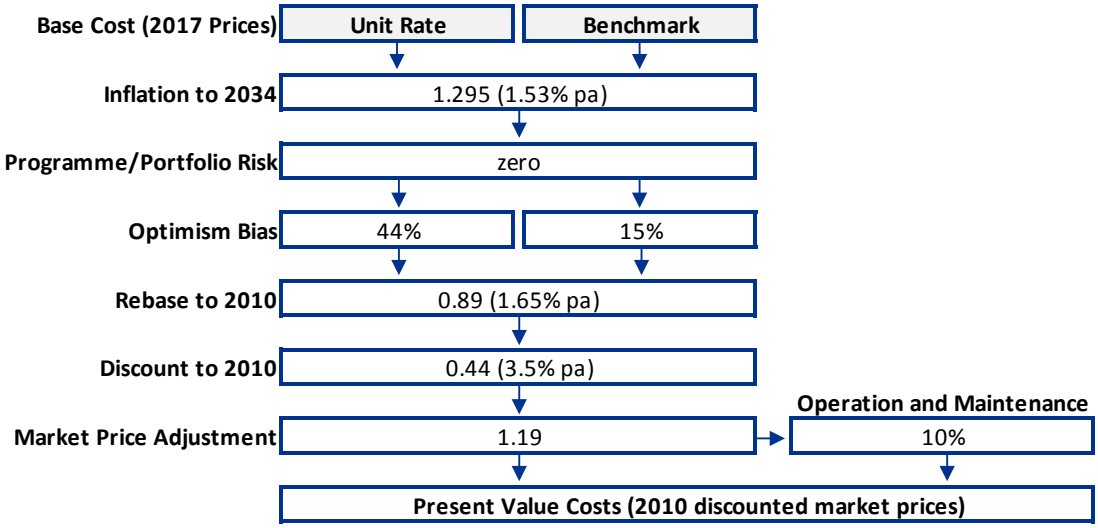
9.8 It should also be noted that the process described in this section refers to Highway capital costs. The approach to developing passenger rail costs is set out in the Passenger Rail SPOC.

9.9 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 W&W 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 AACEI Class 5 given the early concept stage which the SDC SOP is currently at.

9.10 These two sources of costs provide values scheme base costs in 2017 prices. The process to convert of 2017 scheme base costs to 2010 discounted market prices to be used in appraisal is presented within Figure 33.

Figure 33: Estimation of Costs for Appraisal



9.11 Table 28 (within section 14) presents the West and Wales 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 West and Wales 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 For Benchmark costed schemes, a lower level of 15% Optimism Bias has been applied. This is a reflection of the robust evidence based and costing methodology available to Benchmark as a result of their intellectual property, industry experience and application of risk within the 2017 base

costs. The risk allowances Benchmark applied were based on typical levels for estimates within the Major Projects portfolio and are consistent with Highways England submissions. As set out in WebTAG A1.2 paragraph 3.5.10 "*in cases where the risk assessment can draw on an extensive reference class database of similar schemes; accounts for unquantifiable risks through a top-down uncertainty adjustment; and is complemented by governance arrangements, such as verification of cost estimates by independent experts, robust and comprehensive cost estimation can potentially reduce the optimism bias adjustment. The Highways England's Project Control Framework is an example where this has been effectively applied.*"

9.18 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 West and Wales 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
- Freight and Logistics Modelling

Highway Demand Modelling

10.3 The demand forecasting approach has been developed to ensure that this appraisal calculates the benefits of the West and Wales SDC highway interventions only. Separate documents have been produced for the Freight and PT appraisal.

10.4 The 2015 Trans-Pennine South (TPS) Regional Transport Model has been used as the base for developing the West and Wales model. The TPS was expanded using the Midlands RTM to include further model detail in the Wales and West Midlands (WM) area. Both the TPS and Midlands RTM are SATURN highways assignment models.

10.5 The resulting W&W variant RTM was subject to a revalidation exercise, following which the W&W variant RTM was considered fit for purpose. Full details are provided within the LMVR (August 2018) and Data Requirements

& Model Zoning (April 2018) reports. The LMVR includes details on zoning, time periods, trip purposes and user classes.

Passenger Rail Demand Modelling

10.6 Rail passenger forecasting was undertaken using the NoRMS Phase 2 model, which was developed for 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.

10.7 It should be noted that the economic appraisal of the Rail SOP is detailed within the Rail SPOC.

Freight and Logistics Modelling

10.8 The Freight and Logistics Market is modelled using the Great Britain Freight Model 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

10.9 The West and Wales Highway SOP is forecast to cause changes in traffic flows and demands across the West and Wales study area network. The changes in traffic flow in 2050 within the Interpeak time period is presented in Figure 34. The traffic flow changes within the Interpeak are typical of those seen within the AM and PM periods. For more information, refer to the ComMA report.

10.10 The key SOP interventions running parallel to the M6 including the A34, A500 & A51 expressway schemes provide alternative routes and resilience to the M6 with flows slightly decreasing between Junction 16 and Junction 20. However, an increase in flows south of the M6 Junction 16 is also forecast as these two interventions take vehicles away from the A41 east of Telford and up to Chester.

10.11 There have been improvements to delays in the full model, SDC area and in the individual Sub-corridor areas. This is consistent with an increase seen in the average simulation speed results. The additional SOP network provides an increase in network capacity therefore increases in actual link flows

along with an increase in the total travel time and total travel distances throughout the full model and the SDC area are expected.

10.12 Average trip time has also seen an improvement across the majority of sector to sector movements within the SDC area. There are some increases and decreases in the average travel distance across the sector to sector movements. Some of the larger increases in average trip distance reflect the additional network in the model and the fact that vehicles may travel slightly further to benefit from an overall reduction in travel time.

10.13 The distribution of benefits across the West and Wales SDC study area is presented within Figure 35. This shows the majority of user benefits are experienced by the urban centres of Manchester and Liverpool, with a strong trend of benefits running up the M6 corridor from Crewe to Wigan. This suggests the West and Wales SOP is offering benefit to the congested M6 corridor through providing alternative strategic routes (such as the A51 and A34) and enhanced capacity (such as the SOP improvements on the M6 between the M56 and M62).

10.14 The West and Wales SOP also offers benefits to the wider Cheshire and North Wales region, as well as south of the study area and into Staffordshire.

10.15 The distribution of benefits presented in Figure 35 is not weighted by population[75]. More details as to the distribution of benefits per head of population is provided in section 13 and within the Distribution Impacts report.

10.16 The economic appraisal results are summarised between sections 11 and 14. For full details on the economic assessments, refer to the ComMA report.

[75] Note that this figure shows the distribution of benefits for the West and Wales appraisal SOP only and does not reflect the distribution of benefits from the reference case schemes or TfN's full programme of proposed interventions.

Figure 34: 2050 Interpeak Traffic Flow Changes (SOP minus Reference Case)

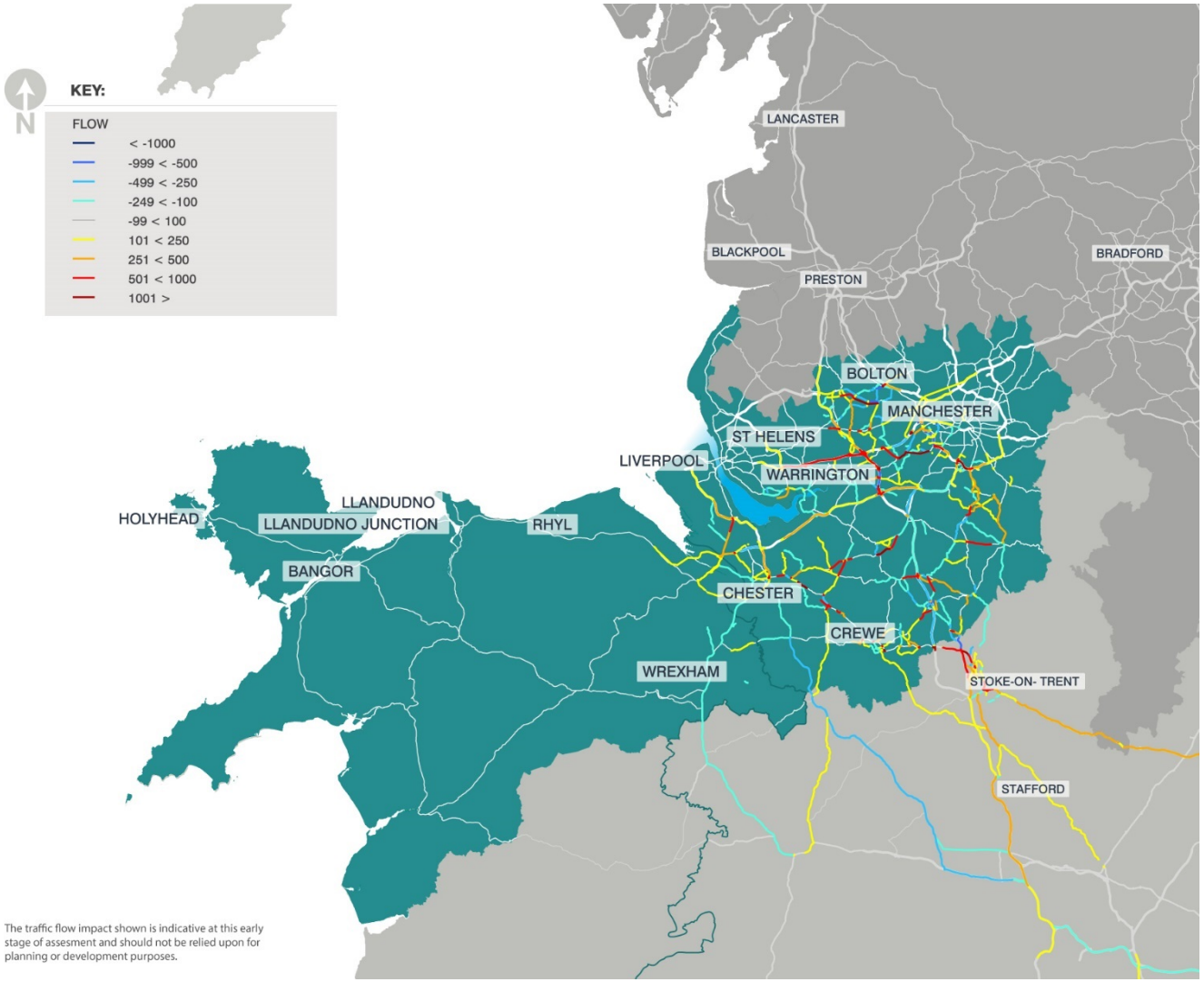
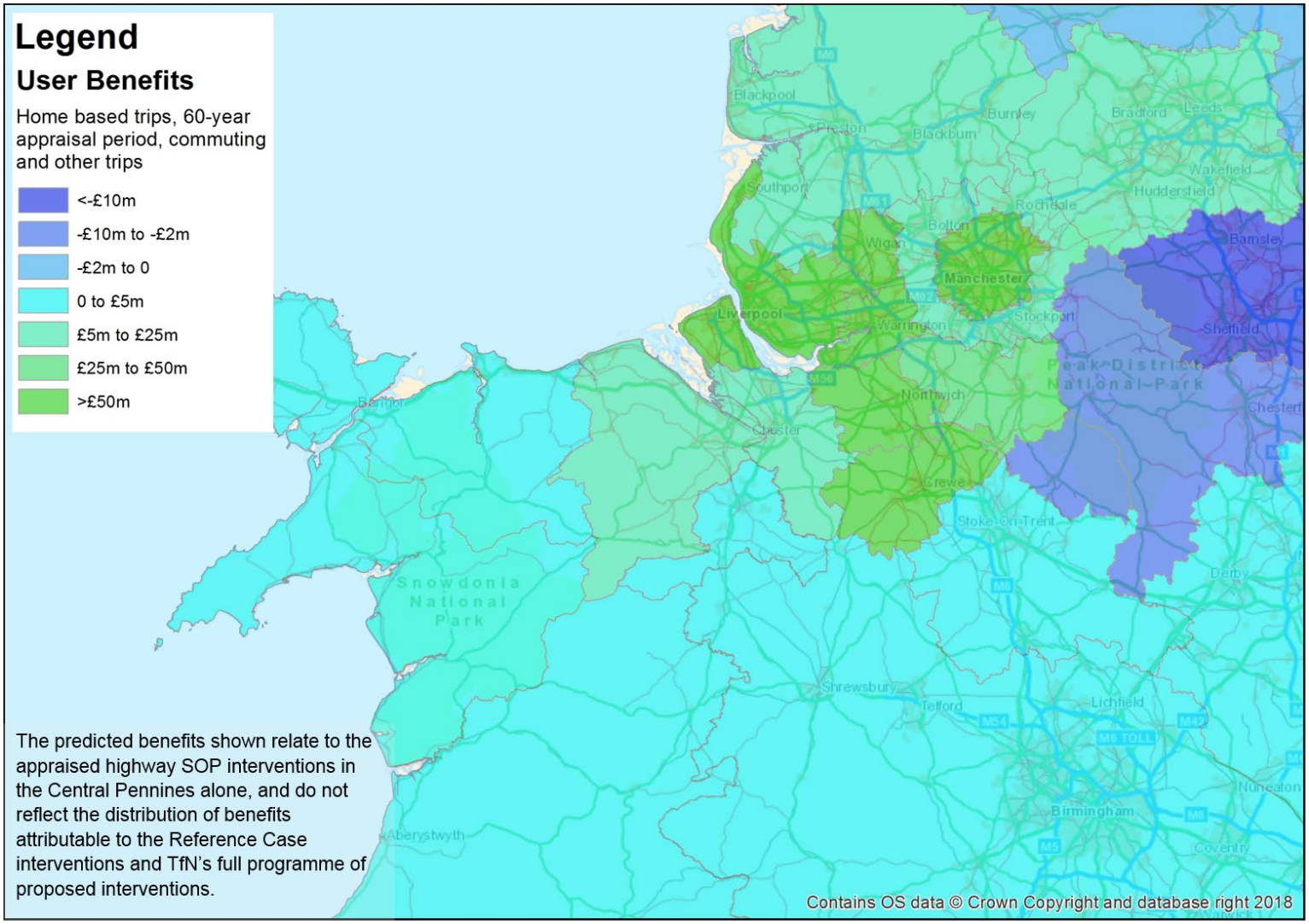


Figure 35: Sector User Benefits



Approach to Economic Appraisal

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

10.18 As will be presented within section 15, the overall Value for Money of the W&W SOP will be determined through a consideration of both monetised and non-monetised benefits which fall across the three levels of benefits detailed below.

Level One Established Monetised Impacts

10.19 Level One user benefits have been appraised using TUBA 1.9.10. 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 value of time;
- 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

10.20 The Level One monetised impacts include:

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

Level Two Evolving Monetised Impacts

10.21 Level Two benefits will be used to generate an adjusted VfM metric. This will seek 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

10.22 Level Two static Wider Economic Benefits (WEBs) have been assessed using the approach detailed in WebTAG Units A2.1 – A2.4. This approach to assessing Static WEBs has been undertaken by Arup following a similar approach to which was previously been approved for use on different projects for DfT and Highways England including Manchester North West Quadrant and A1 East of England. This approach has been agreed through TAG and SMG. A full breakdown of the appraisal parameters is documented in the combined economic and forecasting report.

Level Three Indicative Monetised Impacts

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

Non-Monetised Impacts

10.24 Non-monetised impacts form a key component of assessing the overall value for money of a scheme. For the West and Wales SDC, the following non-monetised assessments have been undertaken:

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

Scope of Economic Appraisal

10.25 For clarity as to the scope of economic appraisal, Table 17 sets out the monetised and non-monetised assessments undertaken across the three levels of benefits.

10.26 To ensure a proportional appraisal given the stage of scheme development, a number of appraisal components have not been assessed at this time. These are also presented within Table 17.

Table 17 Scope of Economic Assessment for W&W SDC SOP

	Established Monetised Impacts *Included in initial and adjusted metrics*	**Evolving Monetised Impacts** *Included in adjusted metric*	**Indicative Monetised Impacts** *Considered after metric using switching values approach*	**Non-monetised Impacts**
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		Moves to more/less productive jobs Dynamic clustering Induced investment	Security Severance Access to services Option and non-use values

	Established Monetised Impacts *Included in initial and adjusted metrics*	Evolving Monetised Impacts *Included in adjusted metric*	Indicative Monetised Impacts *Considered after metric using switching values approach*	Non-monetised Impacts
			Supplementary Economy Modelling	

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 West and Wales 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 National Trip End Model (NTEM).

Business Users & Transport Providers

11.3 A summary of the business user impact estimated by TUBA is provided in Table 18. 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 (59.4%).

Table 18: Business Users and Transport Provider benefits (£m discounted market prices)

User benefits	Goods Vehicles	Business Cars & LGVs	Total
Travel time	£2,309.43	£1,710.88	£4,020.30
Vehicle operating costs	£124.20	£247.10	£371.29
User charges	£5.30	£7.31	£12.61
Total	£2,438.93	£1,965.28	£4,404.20

11.4 As a result of travel time savings, the assessment shows that there will be monetised benefits resulting from journey time savings of business users amounting to £4,020.30m. The distribution of these benefits by journey time is presented within Table 19.

Table 19: Distribution of Business Users and Transport Provider time saving benefits (£m discounted market prices)

Journey time	0 to 2min	2 to 5min	> 5min	Total
Benefit	505.32	1,557.15	1,957.90	4,020.30

11.5 For business users there will also be a benefit of £371.29m associated with changes to Vehicle Operating Costs (VOCs).

Reliability Impact on Business Users

11.6 Using an approach applied on previous projects and with reference to DfT guidance[76], reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA. The benefits generated through reliability to business users are calculated as £402.03m. This value is not included in the PVB or BCR calculations but will be included in the Appraisal Summary Table (AST).

Regeneration

11.7 With reference to TAG Unit A2.2, the schemes included in the Wales and West SDC programme represent a substantial investment in transport provision across the corridor, which are designed to improve accessibility. Thus, it is considered likely that the Wales and West 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 closer. 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 missing modes. This reduction produces the upper bound wider benefits as reported in Table 20.

11.9 The lower bound benefits have been estimated by applying weighted average 'distance decay' and 'agglomeration elasticity' parameters following the 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 Table 20 provides a summary of the Level 2 wider impacts as estimated by WITA.

Table 20 Level 2 Wider Impacts Summary (£m discounted market prices)

	Lower Bound	Upper Bound
WI1 – Agglomeration Impacts		
Manufacturing	262.23	87.37
Construction	83.38	63.11

[76] DfT, 2013. Value for Money Assessment: Advice Note for Local Transport Decision Makers

	Lower Bound	Upper Bound
Consumer Services	577.67	337.17
Producer Services	1,080.57	2,157.58
Sub-Total	2,003.85	2,645.23
WI2 – Output change in imperfectly competitive market		
Sub-Total	440.42	440.42
WI3: Tax revenues arising from labour market impacts		
Labour supply impacts	38.25	38.25
Move to more / less productive jobs	0.00	0.00
Sub-Total	38.25	38.25
Total Wider Benefits	**2,482.52**	**3,123.90**

Summary

11.11 Table 21 below summarises the Economy impacts:

Table 21 Summary of SDC Programme Economy Impacts (£m discounted market prices)

	West and Wales SOP
Business user benefits	£4,404.20
Reliability impacts on business users	£402.04
Regeneration	Strong Beneficial
Wider Benefits (Level 2)	£2,482.52 - 3,123.90

12 Environment Impacts

Introduction

12.1 One of TfN'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 appraised SOP interventions (as presented within Table 15) 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 West and Wales SDC Programme are set out as an Environmental Appraisal[77] report, which takes

[77] Product 17: Environmental Appraisal Report (February 2019)

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 SPOC using a high-level, qualitative approach informed by traffic modelling. Environmental impact appraisal scores are provided using WebTAG scoring categories, noting that WebTAG guidance is different for the appraisal of schemes within Wales. Given uncertainty in scheme characteristics, the environmental baseline and future trends quantitative appraisal was not considered proportionate or to provide meaningful appraisal at this stage. Quantitative appraisal would be conducted at later stages of scheme development.

12.5 Appraisal scores for environmental capital 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. The risk categories applied as part of the environmental capital appraisal are as follows:

- likely to have significant adverse environmental effects
- potential to have significant adverse environmental effects
- unlikely to have any significant adverse environmental effects.

12.6 A summary of the potential risks related to the environmental capital i 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.

12.7 Full details on the environmental assessments undertaken can be found within the West and Wales Environmental Assessment Report.

Noise

12.8 The creation of new and improved road links will have the effect of encouraging more road traffic, which will increase road noise levels to the surrounding areas.

12.9 The SOP also includes several interventions which pass through or are adjacent to Noise Important Areas (NIAs). These have the potential to cause significant impacts on the existing NIAs and surrounding areas.

12.10 With the SOP interventions there are opportunities to reduce the impacts of noise on several residential areas particularly with the introduction of bypasses including the proposed Crewe North Bypass, Nantwich Southern Bypass, Middlewich Southern Bypass and Winsford Southern Bypass. These are likely to have a net beneficial effect by reducing noise in these residential areas by moving the traffic away.

12.11 The adverse effects would also be offset by the anticipated move in the medium to long term to electric vehicles and improvements in road vehicle fuel efficiencies.

12.12 In addition, the Rail interventions have been reported in the Rail SPOC (which considers rail interventions in all the SDC areas) to encourage some modal change from road to rail, which will have a small beneficial effect. With the future consideration of more regional interventions, including a change to electric trains, further benefits would be achieved.

Score at an SDC Level - *Moderate Adverse*

Air Quality

12.13 The creation of new and improved road links will have the effect of encouraging more road traffic, which will decrease air quality in the surrounding areas.

12.14 A number of SOP interventions pass through or are adjacent to AQMAs within the West and Wales SDC. These SOP interventions cumulatively or in isolation have the potential to have significant impacts on AQMAs and the surrounding areas. In some situations where bypasses are considered, road traffic may be taken away from the AQMAs, which would have a beneficial effect.

12.15 With the SOP interventions there are opportunities to reduce the impacts of air quality on several residential areas particularly with the introduction of bypasses including the proposed Crewe North Bypass, Nantwich Southern Bypass, Middlewich Southern Bypass and Winsford Southern Bypass. These are likely to have a net beneficial effect by improving air quality in these residential areas by moving the road traffic away.

12.16 The adverse effects would also be offset by the anticipated move in the medium to long term to electric vehicles and improvements in road vehicle fuel efficiencies.

12.17 In addition, the Rail interventions have been reported in the Rail SPOC (which considers rail interventions in all the SDC areas) to encourage some modal change from road to rail, which will have a small beneficial effect. With the future consideration of more regional interventions, including a change to electric trains, further benefits would be achieved.

Score at an SDC Level - *Moderate Adverse*

Greenhouse Gases

12.18 The creation of new and improved road links will have the effect of encouraging more road traffic, which will have the general effect of causing more carbon emissions. This will be potentially offset by the anticipated move to electric vehicles and improvements in road vehicle fuel efficiencies.

12.19 With regards to highway SOP interventions, the TUBA results forecast a negative benefit of -£273.80m as a result of increased Greenhouse Gas

emissions. This equates to an additional 6.58m tonnes of non-traded carbon and 0.09m tonnes of traded carbon over the 60 year appraisal period.

12.20 In addition, the Rail interventions have been reported in the Rail SPOC to encourage some modal change from road to rail, which will have a small beneficial effect. With the future consideration of more regional interventions, including a change to electric trains, further benefits would be achieved.

Score at an SDC Level - *Moderate Adverse*

Landscape

12.21 The SOP includes interventions which fall within the proximity of the Peak District National Park which is a landscape of the highest national value. The nearest interventions are the proposed improvements to the A536 between Congleton and Macclesfield and targeted junction improvement on the A523 between Macclesfield and Poynton. These are over 5km and 2.5km away, respectively, and as such it is anticipated that with mitigation any impacts would be negligible. There are no Areas of Outstanding Natural Beauty potentially affected by the SOP interventions.

12.22 A number of SOP interventions have the potential to impact local landscape designations. The Expressway upgrade of A34 (Stoke to Congleton) including new road from A534 to A34 and bypass of Scholar Green and a new and improved link between Congleton Bypass and a new M6 Junction, all of which fall within close proximity of Astbury Mere Country Park. Winsford Southern Bypass is in close proximity of the Little Budworth Country Park and Holmes Chapel Bypass falls within close proximity to Brereton Heath Country Park. These schemes have the potential to degrade the visual amenity and tranquillity of these landscapes however with appropriate mitigation, these impacts will be minimised.

12.23 In-combination impacts of the SOP interventions may adversely affect the characteristics of the National Character Areas (NCAs). The SOP includes a number of interventions in NCAs including, Shropshire, Cheshire and Staffordshire Plain (NCA61), Mersey Valley (NCA60), Cheshire Sandstone Ridge (NCA62) and Deeside and Wrexham (NLCA13). SOP interventions cumulatively or isolation may degrade the characteristics of these areas.

12.24 The rail interventions would have negligible effect on landscape apart from localised loss of deciduous woodland and potential loss of lowland raised bog for the construction of the Skelmersdale Rail Link rail link.

12.25 With all the SOP interventions there will be opportunities for landscape enhancements, through embedded mitigation included in the design process, so that the schemes are sensitive to local landscape character and visual amenity.

Impact Risk - *potential to have significant adverse environmental effects*

Townscape

12.26 There are several SOP interventions which fall within settlements and have the potential to impact on physical and social characteristics of the urban environments. Several of the SOP interventions are anticipated to have direct and indirect impacts on townscapes along the route or in proximity of the route. These interventions include improvements to existing routes, and new link routes.

12.27 Where SOP interventions draw traffic from existing settlements, it is anticipated that these would have a locally beneficial impact on townscapes. The new Holmes Chapel bypass, Nantwich Southern Bypass, Crewe North Bypass, Middlewich Southern Bypass and Winsford Southern Bypass are all anticipated to reduce traffic flows along existing routes in urban areas, therefore improving townscape characteristics i.e. appearance.

Impact Risk - *potential to have significant adverse environmental effects*

Historic Environment

12.28 The SOP interventions fall within the proximity of numerous designated heritage assets. However, there are no anticipated impacts on the Liverpool Maritime Mercantile City World Heritage Site which falls within the SDC.

12.29 The SOP interventions have the potential to affect designated heritage assets comprising of Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields and listed buildings. Several of the SOP schemes are likely to be located in the vicinity of these heritage assets and pose direct impacts on the heritage assets as well as setting impacts. The proposed segregated HGV Bypass lanes between M6 J.16-19 falls within or is in close proximity to the boundary of Tabley House Grade II park and garden, and improvements on the A536 between Macclesfield and Congleton falls within close proximity to the boundary of Gawsworth (old) Hall Grade II* park and garden.

12.30 Other SOP interventions which fall in close proximity to registered parks and gardens are, Expressway upgrade of A34 (Stoke to Congleton) including new form A543 to A34 and bypass of Scholar Green at Rode Hall (Grade II), Dual Carriageway with grade-separation on A500 M6 J16 to Stoke at Crewe Hall (Grade II), Nantwich Southern bypass at Dorfold Hall (Grade II) and A5036 Princess Way (Access to Port of Liverpool) full Grade separation of junction at Ince Blundell Park (Grade II*). Many of the scheduled monuments are located in the proximity of the SOP interventions. Grade I, II* and II listed building are also located in proximity to many of the SOP interventions, therefore direct and setting impacts are considered likely. It is anticipated that through the use of mitigation measures, the direct impacts of the SOP interventions and setting impacts will be minimised.

12.31 The impacts of the SOP interventions on non-designated heritage assets, unknown archaeological remains and historic landscape character are

unknown at this stage. The SOP interventions may have some adverse effects on these, either direct or on their setting.

Impact Risk - *potential to have significant adverse environmental effects*

Biodiversity

12.32 A number of SOP interventions fall within or in close proximity to nature conservation sites protected at european, national and local levels. Interventions which have the potential to affect European designated wildlife sites are outlined below:

- Delivery of Segregated HGV bypass Lanes between M6 J. 16-19, is in close proximity of Midland Meres and Mosses Phase 2 Ramsar Site.
- Junction improvements on the A54 between M6 J.18 and Kelsall are adjacent to Oak Mere SAC and Midland Meres and Mosses Phase 2 Ramsar Site.
- Extension of Knowsley Expressway (A5300) to the south of the A562, is in close proximity to the Mersey Estuary SPA/Ramsar Site.
- Proposed new road from A494 to A55 passes through the River Dee and Bala Lake/ Afon Dyfrdwy a Lly Tegid (Wales) SAC.
- Localised junction improvements between A49 and Wrexham on the A534 passes through River Dee and Bala Lake and River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid (Wales) SAC.
- A51 Nantwich Dual Carriage Way is in close proximity to River Dee and Bala Lake SAC.
- Proposed Nantwich Southern Bypass is in close proximity to Midland Meres and Mosses Phase 1 Ramsar Site and West Midland Mosses SAC.

12.33 These schemes would cause potential impact to the qualifying attributes and integrity of these sites. It is anticipated that with mitigation the impacts of these schemes can be minimised.

12.34 Other SOP interventions are located within the proximity of European protected sites, and therefore have the potential to cause indirect adverse impacts on these sites. These impacts may be through the loss of supporting functional habitat, visual disturbance, noise or air pollutant emissions. The nature of these impacts is unknown at this time, however pose a risk of impact to the qualifying attributes of these sites.

12.35 At a national level, protected sites including SSSIs, National Nature Reserves and RSBP Reserves, would be potentially affected by a number of the SOP interventions, due to direct and indirect impacts. Several of the interventions are located within or adjacent to the SSSIs, and therefore present a risk to the integrity of these sites. This includes the proposed measure to extend the B5210 to the A56, proposed new road from A494 to A55, localised improvements between A49 and Wrexham on the A534, A494 upgrade from M56/M53 across River Dee to A55 and the widening of A483 between Jn. 4-6. Many other SOP interventions involving existing road improvements and new links are located in proximity of SSSIs however it is

anticipated that any impacts or losses can be minimised through mitigation measures.

12.36 Many of the SOP interventions are located in close proximity to ancient woodland, and therefore there is a risk of loss or disturbance to this habitat. Through appropriate route selection and mitigation measures it is anticipated that any impacts or losses can be minimised.

12.37 A number of the SOP interventions are located in close proximity to Local Nature Reserves including the extension of Knowsley Expressway (A5300) to the south of the A562 and Dual Carriageway with grade-separation on A500 M6 J16 to Stoke. As such there is the potential for degradation of the characteristics of these sites.

12.38 The rail interventions would have negligible effect on biodiversity apart from potential localised impacts associated with the Manchester to Skelmersdale (via Wigan) service frequency enhancement, which is near several Local Nature Reserves including Greenslate Water Meadows, Borsdane Wood, Hall Lee Bank Park and Pretoria Pit. The increase in the frequency of trains has the potential for degradation and disturbance on the characteristics of these sites.

12.39 As well as causing adverse effects on biodiversity, there are also opportunities for the SOP interventions to include enhancements. This can include looking at opportunities to consider strategic biodiversity priorities, considering Biodiversity Action plans and other local authority polices and strategies. This may include the planting of native species and developing wildflower meadows along the linear infrastructure. TfN will continue to work with Natural England, local authorities, environmental stakeholders and local communities to discuss and agree the appropriate enhancement measures and actions for this.

Impact Risk - *likely to have significant adverse environmental effects*

Water Environment

12.40 The SOP interventions fall within the catchment of a number of main rivers and ordinary watercourses, these schemes have the potential to contribute to pollution of surface water. As well as improvements to existing infrastructure, the SOP interventions include a number of new road and rail links. With appropriate mitigation, it is anticipated that the impact of the SOP interventions on the water quality of the watercourses will be negligible. Through the potential improvement to and the upgrade of existing draining systems, there may be enhancement opportunities associated with the SOP interventions.

12.41 A number of groundwater bodies may be affected by the SOP interventions. Several of the interventions are located within groundwater source protection zones, including the A5036 Princess Way (Access to Port of Liverpool) full grade separation of junction, A580 upgrade at M6 J23 and westwards to the A579 and localised junction improvements between A49 and Wrexham on the A534, which all fall within or in close proximity of

source protection zone 1 (inner protection zone). These schemes and other SOP interventions present a risk to the chemical quality of the protected and non-protected aquifers within the SDC. Through the use of appropriate mitigation, it is anticipated that there would be a negligible impact on the chemical quality of groundwater from the schemes.

12.42 The majority of the SOP interventions fall within flood zone 2 or 3, or both at certain locations along their routes. The extent at which the flood zones intersect these interventions is generally limited, therefore through the use of appropriate mitigation the interventions will not adversely affect floodplains or increase flood risk to sensitive receptors.

Impact Risk - *potential to have significant adverse environmental effects*

Summary

12.43 The transport network off the West and Wales SDC will undergo significant changes because of the SOP, including the creation of new roads and bypasses, road improvements, and several localised rail improvements (including more train services, improvements in journey time, a new link to Skelmersdale and a new park and ride station. These interventions will create increases in road induced noise and carbon emissions and a decrease in air quality. With the anticipated move in the medium to long term to electric vehicles and improvements in road vehicle fuel efficiencies, these adverse effects will be offset.

12.44 In addition, the Rail interventions have been reported in the Rail SPOC (which considers rail interventions in all the SDC areas) to encourage some modal change from road to rail, which will have a small beneficial effect. With the future consideration of more regional interventions, including a change to electric trains, further benefits would be achieved.

12.45 The SOP includes road improvements that are near environmental designations and resources, therefore local environmental impacts are anticipated. These impacts include potential adverse impacts on landscape and townscape characteristics, and risk of direct impacts to the setting of cultural heritage assets. The SOP also has the potential for impacts on other designations of national and local value, including ecological networks and registered parks and gardens.

12.46 It would be the intention of TfN and its partners to ensure environmental impacts are minimised. With further environmental assessment and option development, and where necessary mitigation and compensation, it is anticipated that 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 natural, historic and built 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.

12.47 Interventions proposed through this study will 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 will include more detailed consideration of individual interventions or groups of interventions, for which appropriate environmental appraisal will take place. Subsequently, any schemes will undergo further environmental assessment through the Highways England Project Control Framework (PCF) process or 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 will lead to production of an Environmental Statement (ES). The environmental impacts of these schemes will inform the consenting authority's decision.

12.48 Table 22 below summarises the Environment impacts.

Table 22 Summary of Environment Impacts (£m discounted market prices)

	West and Wales SDC
Noise	Moderate Adverse
Air Quality	Moderate Adverse
Greenhouse Gases	Moderate Adverse *-£273.80*
Landscape	Potential to have significant adverse environmental effects
Townscape	Potential to have significant adverse environmental effects
Historic Environment	Potential to have significant adverse environmental effects
Biodiversity	Likely to have significant adverse environmental effects
Water Environment	Potential to have significant adverse environmental effects

13 Social Impacts

Introduction

13.1 Following the structure of DfT's standard Appraisal Summary Table (AST), this chapter sets out the potential impacts to the social impacts of the SDC Programme, including the Transport Economic Efficiency impacts (Commuting and Other Users, Personal Affordability) which are represented within the Economic Appraisal. This chapter also contains qualitative assessments of a range of impact, with Access to Services, being of particular importance to the case for the West and Wales SDC.

Commuting and Other Users

13.2 A summary of the commuting and other user travel time impacts estimated by TUBA is provided in Table 23. Commuting benefits contribute to 22.2% of the overall distribution of travel time benefits, with Other users contributing to 18.4%.

Table 23: Commuting and Other Travel Time benefits (£m discounted market prices)

User benefits	Commuting	Other	Total
Travel time	£1,503.36	£1,243.30	£2,746.67

13.3 As a result of travel time savings, the assessment shows that there will be monetised benefits resulting from journey time savings of Commuting and Other users amounting to £2,746.65m. The distribution of these benefits by journey time is presented within Table 19.

Table 24: Distribution of Commuting and Other user time saving benefits (£m discounted market prices)

Journey time	0 to 2min	2 to 5min	> 5min	Total
Commute	86.29	571.81	845.27	1,503.36
Other	119.51	469.14	654.65	1,243.30
Total	205.80	1,040.95	1,499.92	£2,746.65

Distributional Impacts

13.4 The DI appraisal of User Benefits is only concerned with home-based commute and other car trips within the affected area.

13.5 The total home-based commute and other car trip benefits (Time, user charges and VOC) for each Local Authority zone within the affected area are presented in Figure 36[78]. This shows that the most significant benefits are grouped around Crewe, Chester and Northwich, which is a reflection of the SOP schemes on the A51, A34 and between the M56 and M62 on the M6 which are helping to relieve congestion and improve network resilience through the M6 north-south corridor.

13.6 Note that the values presented are based on a subset of the TUBA benefits and therefore cannot be directly compared to the data provided in the Economic Dimension. The components of the User Benefits distributional impacts appraisal subset in relation to TUBA are set out in Table 25.

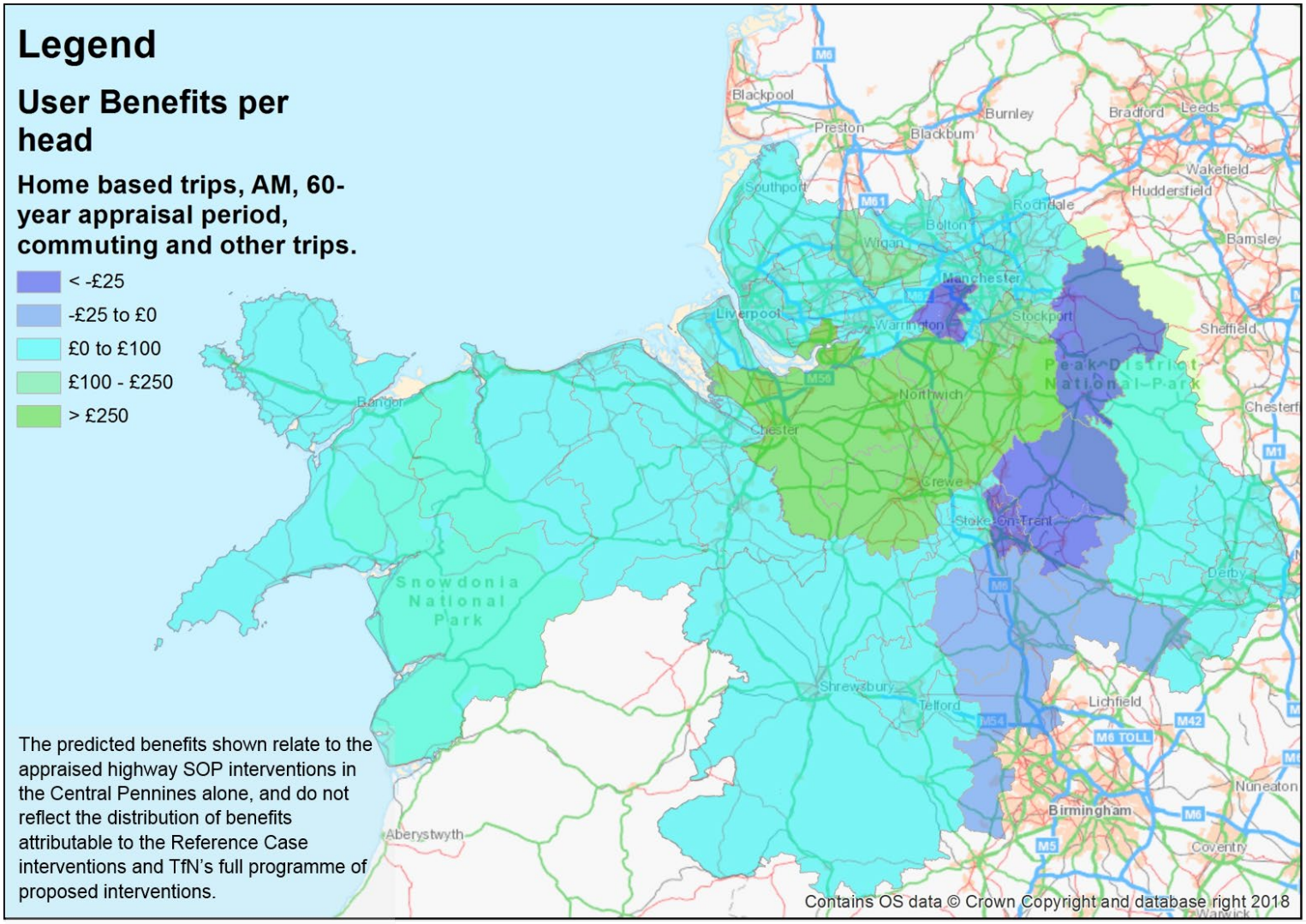
Table 25: User Benefit DI Appraisal Subset of TUBA

TUBA	User Benefits
User Time Benefit	✓
User Charge Benefit (e.g. tolls)	✓
Fuel Benefit (Vehicle Operating Cost)	✓
Non-Fuel Benefit (Vehicle Operating Cost)	✓
Change in operator revenue	
Change in indirect tax revenue	

[78] Note that this figure shows the distribution of benefits for the West and Wales appraisal SOP only and does not reflect the distribution of benefits from the reference case schemes or TfN's full programme of proposed interventions.

13.7 For more details on the distributional impacts of User Benefits, including their distribution between income quintile across the West and Wales SDC, refer to the West and Wales Distributional Impact (February 2019) report.

Figure 36: User Benefits per Head



Reliability impact on Commuting and Other Users

13.8 Using an approach applied on previous projects and with reference to DfT guidance[79], reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA. The benefits generated through reliability to Commuting and Other users are calculated as £274.67m. This value is not included in the PVB or BCR calculations but will be included in the Appraisal Summary Table (AST).

Physical Activity

13.9 The effect of the West and Wales SOP on Physical Activity is not assessed within this SPOC and will be considered at a later stage of scheme development.

Journey Quality

13.10 The effect of the West and Wales SOP on Journey Quality is not assessed within this SPOC and will be considered at a later stage of scheme development.

Accidents

13.11 The effect of the West and Wales SOP on Accidents is not assessed within this SPOC and will be considered at a later stage of scheme development.

Security

13.12 The effect of the West and Wales SOP on Security is not assessed within this SPOC and will be considered at a later stage of scheme development.

Access to Services

13.13 The effect of the West and Wales SOP on Access to Services is not assessed within this SPOC and will be considered at a later stage of scheme development.

Personal Affordability

13.14 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 commuting and other users. A summary of the commuting and other user benefits relating to personal affordability estimated by TUBA is provided in Table 26. Commuting benefits contribute to 20.8% of the overall distribution of travel time benefits, with Other benefits contributing to 13.1%.

[79] DfT, 2013. Value for Money Assessment: Advice Note for Local Transport Decision Makers

Table 26: Commuting and Other Personal Affordability benefits (£m discounted market prices)

User benefits	Commuting	Other	Total
Vehicle operating costs	-£123.24	-£372.00	-£495.23
User charges	£6.54	£3.23	£9.76
Total	-£116.70	-£368.77	-£485.47

13.15 For Commuting and Other users there will be a net negative benefit of £485.47m associated with changes to Vehicle Operating Costs (VOCs) and user charges.

13.16 The results show an aggregate increase in vehicle operating costs over the 60-year appraisal period with the West and Wales 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.

13.17 For details on the distributional impacts of changes in Affordability, including their distribution between income quintile across the West and Wales SDC, refer to the West and Wales Distributional Impact (February 2019) report.

Severance

13.18 With reference to Tag Unit 4.1, community severance is defined as the separation of residents from facilities and services they use within their community caused by substantial changes in transport infrastructure or by changes in traffic flows.

13.19 Severance is focused on the effect of changes in transport infrastructure on pedestrians. Given the scale of the West and Wales SOP and stage of scheme development, Severance is not assessed within this SPOC and will be considered at a later stage of scheme development.

Option and Non-use Values

The effect of the West and Wales SOP on Option and Non-use Values is not assessed within this SPOC and will be considered at a later stage of scheme development.

Summary

13.20 Table 27 below summarises the Social impacts:

Table 27 Summary of Social Impacts (£m discounted market prices)

	West and Wales SDC
Commuting and Other Users	£2,746.65
Reliability impact (Commuting & Other Users)	£274.67
Physical Activity	Not assessed
Journey Quality	Not assessed
Accidents	Not assessed following screening
Security	Not assessed following screening
Access to Services	Not assessed
Personal Affordability	-£485.47
Severance	Not assessed following screening
Option and Non-use values	Not assessed

14 Public Accounts Impacts

Introduction

14.1 This chapter outlines the impact of the West and Wales 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 section 9, the construction, operation and maintenance costs associated with the West and Wales SOP have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.

14.3 For the West and Wales 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 West and Wales economic appraisal.

14.4 With reference to the process set out in Figure 33, Table 28 presents the West and Wales 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.

Table 28: DfT's CPSS Cost Proforma Summary Sheet

Cost Including	£m	unit
Base Costs	£3,280.84	*2017 prices*
Inflation	£4,247.28	*2017 prices inflated to 2034*
Risk	£4,247.28	*2017 prices inflated to 2034*
OB	£5,806.27	*2017 prices inflated to 2034*

Cost Including	£m	unit
GDP Deflator	£5,176.37	*2010 prices*
Discounting	£2,267.03	*2010 discounted prices*
Market Prices	£2,697.77	*2010 discounted market prices*
Investment Costs	£2,697.77	*2010 discounted market prices*

14.5 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 West and Wales SOP (£269.78m).

14.6 In addition, there are a series of toll roads within the West and Wales RTM network. The changes in traffic flow and route choice as a result of the West and Wales SOP causes a reduction in the use of toll roads as a result of non-tolled routes becoming less congested and more attractive to users. In the West and Wales TUBA, toll roads have been set as National Toll roads, so this reduction of toll users results in a reduction in revenue received by the government. This reduction in revenue equates to £21.33m over the 60 year appraisal period.

14.7 Combined therefore, the total cost to the Broad Transport Budget generated by the West and Wales SOP is £2,988.87m.

Indirect Tax Revenues

14.8 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.

14.9 As the West and Wales SOP only considers highway benefits for the economic appraisal, only fuel duty effects on indirect tax revenues is quantified in this SPOC.

14.10 The results output from TUBA forecast an increase in indirect tax revenues, representing a benefit of £498.92m.

Summary

14.11 The relevant impacts are summarised in the form of standard DfT 'Public Accounts' tables for the SDC Programme (Figure 37) under NTEM growth.

Figure 37: Public Accounts Table for the SDC Programme (NTEM Growth Scenario) (£'000s discounted market prices)

Values in £000s	ALL MODES		ROAD	BUS and COACH	RAIL	OTHER
Local Government Funding	TOTAL		INFRASTRUCTURE			
Revenue	£21,329		£21,329			
Operating Costs	£0		£0			
Investment Costs	£0		£0			
Developer and Other Contributions	£0		£0			
Grant/Subsidy Payments	£0		£0			
NET IMPACT	£0	*(7)*	£0			
Central Government Funding: Transport						
Revenue	£0		£0			
Operating costs	£269,777		£269,777			
Investment Costs	£2,697,767		£2,697,767			
Developer and Other Contributions	£0		£0			
Grant/Subsidy Payments	£0		£0			
NET IMPACT	£2,988,872	*(8)*	£2,988,872			
Central Government Funding: Non-Transport						
Indirect Tax Revenues	-£498,917	*(9)*	-£498,917.00			
TOTALS						
Broad Transport Budget	£2,988,872	*(10) = (7) + (8)*				
Wider Public Finances	-£498,917	*(11) = (9)*				

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers.
All entries are discounted present values in 2010 prices and values.

15 Value for Money

Introduction

15.1 A VfM appraisal of the West and Wales SDC Programme has been undertaken with reference to DfT's Transport Appraisal Guidance[80] (WebTAG) 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 DI. 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 (chapter 11), Environmental (chapter 12), Social (chapter 13) and Public Accounts (chapter 14) impacts set out in this SPOC 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 from chapter 14 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 (Figure 38) 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).

[80] https://www.gov.uk/guidance/transport-analysis-guidance-webtag

Figure 38: TEE Table for the SDC Programme (NTEM Scenario) (£'000s discounted market prices)

Values in £000s								
Non-business: Commuting	**ALL MODES**		**ROAD**		**BUS and COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**		**Passengers**	**Passengers**		
Travel time	£1,503,363		£1,503,363					
Vehicle operating costs	-£123,235		-£123,235					
User charges	£6,535		£6,535					
During Construction & Maintenance	£0		£0					
NET NON-BUSINESS BENEFITS: COMMUTING	£1,386,662	*(1a)*	£1,386,662					
Non-business: Other	**ALL MODES**		**ROAD**		**BUS and COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**		**Passengers**	**Passengers**		
Travel time	£1,243,287		£1,243,287					
Vehicle operating costs	-£371,995		-£371,995					
User charges	£3,229		£3,229					
During Construction & Maintenance	£0		£0					
NET NON-BUSINESS BENEFITS: OTHER	£874,521	*(1b)*	£874,521					
Business								
User benefits			**Goods Vehicles**	**Business Cars & LGVs**	**Passengers**	**Freight**	**Passengers**	
Travel time	£4,020,304		£2,309,428	£1,710,876				
Vehicle operating costs	£371,286		£124,194	£247,092				
User charges	£12,611		£5,299	£7,312				
During Construction & Maintenance	£0		£0	£0				
Subtotal	£4,404,201	*(2)*	£2,438,922	£1,965,279				
Private sector provider impacts						**Freight**	**Passengers**	
Revenue	£0							
Operating costs	£0							
Investment costs	£0							
Grant/subsidy	£0							
Subtotal	£0	*(3)*						
Other business impacts								
Developer contributions	£0	*(4)*	£0					
NET BUSINESS IMPACT	£4,404,201	*(5) = (2) + (3) + (4)*						
TOTAL								
Present Value of Transport Economic Efficiency Benefits (TEE)	£6,665,384	*(6) = (1a) + (1b) + (5)*						

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2010 prices and values

Initial DfT Economic Appraisal

15.6 A standard DfT 'Analysis of Monetised Costs and Benefits' (AMCB) table is presented below for the SDC Programme (Figure 39) 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 Figure 38)
  - Monetised Environmental Impacts (Greenhouse Gases from Table 22)
  - Indirect Tax Revenues (from Figure 37)
- The Present Value of Costs (PVC) equals:
  - Cost to Broad Transport Budget (from Figure 37)

Figure 39: AMCB Table for the SDC Programme (NTEM Scenario) (£'000s discounted market prices)

Analysis of Monetised Costs and Benefits

Values in £000s

Noise	£0	*(12)*
Local Air Quality	£0	*(13)*
Greenhouse Gases	-£273,797	*(14)*
Journey Quality	£0	*(15)*
Physical Activity	£0	*(16)*
Accidents	£0	*(17)*
Economic Efficiency: Consumer Users (Commuting)	£1,386,662	*(1a)*
Economic Efficiency: Consumer Users (Other)	£874,521	*(1b)*
Economic Efficiency: Business Users and Providers	£4,404,201	*(5)*
Wider Public Finances (Indirect Taxation Revenues)	£498,917	*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Present Value of Benefits (see notes) (PVB)	£6,890,504	*(PVB) = (12) + (13) + (14) + (15) + (16) + (17) + (1a) + (1b) + (5) - (11)*
Broad Transport Budget	£2,988,872	*(10)*
Present Value of Costs (see notes) (PVC)	£2,988,872	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	£3,901,632	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	2.305	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Adjusted (Level 2) Economic Appraisals

15.7 The initial (Level 1) BCR presented above does not include monetised Wider Economic Impacts or Reliability, see Table 21 and Table 27; DfT's guidance includes of Level 2 impacts 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 29 sets out the derivation of Adjusted and Indicative BCRs for the SDC Programme under the NTEM Scenario.

Table 29 SDC Programme (NTEM Scenario): Initial and Adjusted BCRs (£m discounted market prices)

	Initial BCR (Level 1)	Adjusted BCR (Level 2)	
		Lower Bound	Upper Bound
AMCB PVB	£6,890.50	£6,890.50	£6,890.50
Reliability benefits	NA	£676.97	£676.97
Static clustering	NA	£2,003.85	£2,645.23
Dynamic clustering	NA	NA	NA
Imperfect competition	NA	£440.42	£440.42
Labour supply impacts	NA	£38.25	£38.25
Present Value of Benefits (PVB)	£6,890.50	£10,049.99	£10,691.37
Present Value of Costs (PVC)	£2,988.87	£2,988.87	£2,988.87
Net Present Value	£3,901.63	£7,061.12	£7,702.50
Benefit Cost Ratio	**2.31**	**3.36**	**3.58**
Value for Money Category	**High**	**High**	**High**

15.9 On the basis of the Adjusted DfT BCRs, which include the Level 2 impacts, the West and Wales SDC Programme would be categorised as High Value for Money under the NTEM Scenario.

Appraisal Summary Table

15.10 An Appraisal Summary Table (AST) which allows comparison of the impacts of the SDC programmes under different growth scenarios is presented as Table 30. DfT Standard ASTs, which include a summary justification for the scoring of each impact, for the scenarios separately are provided as Appendix A to this SPOC.

Table 30 Comparative Appraisal Summary Table (collation of the above) (£m discounted market prices)

Economy Impacts		
Business user benefits		£4,404.20
Business transport provider operating impacts		n/a
Reliability impacts on business users		£402.04
Regeneration		Strong Beneficial
Wider Benefits (Level 2)		£2,482.52 - 3,123.90
Environment Impacts		
Noise	Moderate Adverse	
Air Quality	Moderate Adverse	
Greenhouse Gases	Moderate Adverse *-£273.80*	
Landscape	Potential to have significant adverse environmental effects	
Townscape	Potential to have significant adverse environmental effects	
Historic Environment	Potential to have significant adverse environmental effects	
Biodiversity	Likely to have significant adverse environmental effects	
Water Environment	Potential to have significant adverse environmental effects	
Social Impacts		
Commuting and Other Users		£2,746.65
Reliability impact (Commuting & Other Users)		£274.67
Physical Activity		Not assessed
Journey Quality		Not assessed
Accidents		Not assessed
Security		Not assessed
Access to Services		Not assessed
Personal Affordability		-£485.47
Severance		Not assessed
Option and Non-use values		Not assessed
Public Accounts		
Cost to Broad Transport Budget		£2,988.87
Indirect Tax Revenues		£498.92

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, rail and 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 West and Wales SDC is based on the Department for Transport's standard forecasts and completion of Reference Case interventions. These are initial results, which will be re-evaluated as TfN take forward further work on modelling and appraising the SDC programme.

15.14 A Value for Money (VFM) assessment is presented within Table 31 which draws together the quantified and qualitative factors, the latter including consideration of the programme's alignment with DfT and TfN strategic objectives. This VfM statement is a summary of the appraised highway interventions, assuming DfT's NTEM traffic forecasts and completion of reference case interventions as listed in Table 4.

Table 31: West and Wales Value for Money Statement

West and Wales Value for Money Assessment		
Established Monetised Impacts (journey times/operating costs):		
Established Monetised Impacts £6,890.50m	Net Cost to the Transport Budget £2,988.87m	Initial Ratio of Benefits to Costs 2.31
Initial Value for Money Category		**High**
Evolving Monetised Impacts (plus L2 wider impacts/reliability):		
Established + Evolving Monetised Impacts £10,049.99m - £10,691.37m	Net Cost to the Transport Budget £2,988.87m	Provisional Ratio of Benefits to Costs 3.36 – 3.58
Provisional Value for Money Category		**High**
Non Monetised Impacts		
Alignment with Strategic Objectives: The West and Wales SOP has been developed designed around TfN's main initiatives to develop and enhance connectivity and accessibility in the North, whilst promoting sustainable growth. The SOP has been designed to improve the resilience of the SRN and improve the movement between IECs.		
Other Economy Impacts: In addition to the monetised wider impacts above, the West and Wales SDC programme has been assessed as having strong beneficial regeneration impacts. It is expected that the SDC programme will improve connectivity by linking businesses closer and 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.		
Other Environmental Impacts: The West and Wales SDC programme includes interventions which have potential for environmental impacts close to National Parks, ANOB or designated heritage assets. These impacts will be carefully considered and will be mitigated, as appropriate, through the individual scheme development process. The programme is forecast to increase the number of trips made in the North by road and rail, with former in particular having negative impacts on noise and air quality in addition to Greenhouse Gas emissions. These negative impacts will be offset to a degree through benefits generated by modal shift, as established within the Rail SPOC. At a programme level, the overall net impact is expected to be adverse, but comfortably exceeded by the benefits to the Northern, and UK, economy.		

West and Wales Value for Money Assessment

Other Social Impacts:

Social Impact assessments have been undertaken at a high level for the programme only, so there is a significant level of uncertainty at this stage and because of this, some assessments have not been undertaken within this SPOC.

The DI assessments undertaken suggest a reasonably even spread of benefits across the income quintiles within the West and Wales SDC as presented in the table below.

Distributional Impacts	Most Deprived	<<<	Income Quintiles	>>>	Least Deprived
User Benefits	Slight Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Large Beneficial
Affordability	Slight Adverse	Moderate Adverse	Moderate Adverse	Large Adverse	Large Adverse

Analytical Certainty:

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.

TfN's Technical Assurance Group (TAG) have reviewed and approved all methodologies employed within the West and Wales economic appraisal and derivation of benefits. Scheme costs have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.

The appraisal methodology is therefore considered sound and reasonable for the stage of scheme development which the West and Wales SOP is currently at.

As a result, when considering the non monetised impacts and their potential effect on the derived Level 2 monetised benefits, it is considered **Likely** that the West and Wales SDC will remain within the **High** VfM category.

VfM Category	Poor	Low	Medium	High	Very High
Likelihood	Very Unlikely	Very Unlikely	Possible	Likely	Unlikely

Non-monetised Impacts conclusion:

At this stage of scheme development, high level environmental assessments have been undertaken, which when considered collectively, suggest a slight adverse effect as a result of the West and Wales SOP. A fundamental aim of TfN and Partners is to protect and enhance, where possible, the natural and historical assets of the North

Taking this into account and given the position of the BCR value within the High VfM category, it is not considered necessary to revise the VfM category following the consideration of the non-monetised impacts.

Adjusted Value for Money Category	**High**

Appraisal of Passenger Rail Interventions

15.15 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 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.

15.16 The passenger rail economic appraisal is at a northern level, so includes costs and benefits of appraised rail interventions within the West and Wales SDC and within the other Strategic Development Corridors. Table 32 summarises the results of the rail appraisal.

Table 32: Summary of passenger rail economic appraisal (£m discounted market prices)

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

15.17 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.

15.18 Further detailed evidence on the Appraisal of Rail Passenger interventions is detailed in the Rail SPOC which is available on TfN's website at: **www.transportforthenorth.com**.

Great Britain Level Freight Benefits Appraisal

15.19 The benefits of the programme of 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 33, provide a strong indication of the economic benefit of supporting freight growth in the North of England.

15.20 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 33: Summary of Freight Benefits of the Strategic Outline Programme (£'000s 2010 prices)[81]

Freight scenario	Allocated to 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 (rail)	2,213	3,789	6,002

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

Freight scenario	Allocated to North	Allocated elsewhere	Total
Benefit of removing all other rail freight capacity limits	1,683	4,080	5,763
Benefit of warehouse clustering	1,886	3,731	5,597
Benefit of port measures (larger ferries)	761	1,929	2,690

15.21 The approach to assessing passenger rail and freight interventions is detailed further in their Strategic Outline Programme Case documents and detailed further in separate reports available on TfN's website at: **www.transportforthenorth.com**.

Analytical Certainty

15.22 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.

15.23 TfN's Technical Assurance Group (TAG) have reviewed and approved all methodologies employed within the West and Wales economic appraisal and derivation of benefits. Scheme costs have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.

15.24 The appraisal methodology is therefore considered sound and reasonable for the stage of scheme development which the West and Wales SOP is currently at.

Summary of Value for Money

15.25 The costs and benefits demonstrated above show that the transport interventions appraised in Wst and Wales 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

15.26 In the next year, TfN plan to update the Strategic Programme Outline Cases to inform an update of the Investment Programme. This will complete the remaining SDCs, to at least Options Assessment Appraisal stage and will be start work on reviewing the current SDCs and Investment Programme, including the sequencing of schemes based on evidence and appraisal. The next stage of modelling will include transformational NPIER forecasts and the latest spatial planning information.

15.27 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.

15.28 The reference case assumptions will be updated, so reflect the latest plans for the schemes such as NPR and Trans-Pennine tunnel.

15.29 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.

15.30 As more definitive scheme definitions emerge, scheme costings will be reviewed and the environmental appraisal will adopt the more detailed WebTAG methodologies.

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 WEST AND WALES 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 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 separately at this very early stage of work[82].

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 SDC programme funding requirement for appraised (within the Economic Dimension) and non-appraised interventions is set out in Table 34. 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

[82] Other general highway intervention costs that would benefit road freight traffic are included within the highway cost assumptions.

Passenger Rail and Road & Rail Freight costs are presented at a combined level.

Table 34 Illustrative Funding Requirement (£m 2017 prices)

SPOC	Appraised Programme	Non-Appraised Programme	Full Programme
Highway: Central Pennines	£7,144	£334	£7,478
Highway: Connecting the 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[83]	**£14,896**	**£8,575**	**£23,471**
TfN Programme Level Contingency (5%)[84]			£1,174
Total			**£24,645**
Illustrative Total (Nominal)	**£40,000 to £50,000**		

Funding Arrangements

17.4 A key element of the STP will be how the infrastructure proposed by TfN, as set out in the Investment Programme, 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.

17.5 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.

17.6 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

[83] The sub-total values do not equal the sum of the rows above, because the double counting of interventions in more than one SDC has been removed.
[84] A single TfN programme-level contingency allowance has been applied for the purposes of illustrating the overall funding requirement. The programme-level allowance reflects the assumption that not every intervention or package of interventions would require the full level of contingency allowed.

Board (noting that it will need to consider the more detailed proposals as and when these are developed).

17.7 The TfN Funding Framework includes the following elements:

a) The Principles – which underpin a deliverable and appropriate funding arrangement

b) The Potential Funding Sources – demonstrating that TfN's funding requirement is reasonable

c) The Governance Arrangements that will enable funding allocated for strategic transport infrastructure in the North to be directed to TfN programmes

d) How Financial Risk is managed.

17.8 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.

17.9 The key points to note within the TfN Funding Framework are as follows:

a) 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.
b) 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.
c) 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 Investment Programme. 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.
d) 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.

17.10 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 is 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 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 SOBC and OBC stage.

19.2 The short list of interventions in the West and Wales 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 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 procured 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 West and Wales 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 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.

Welsh Government Sponsorship

20.15 It is recognised that a number of schemes contained within the TfN Reference Case and Interventions list lie wholly within the jurisdiction of Welsh Government. In these cases, TfN support and recognise the intervention from the perspective of meeting broader "Pan Northern" objectives. Where schemes bisect the Welsh Border, TfN will work with Welsh Government in a joint sponsorship role and the relevant local highway authorities as required.

Private Sector Sponsorship

20.16 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. TfN will examine each of these proposals closely as and when the necessary information is available.

20.17 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)

20.18 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.

20.19 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.

20.20 It is likely that the schemes within the West and Wales 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

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

20.22 The process map presented in Figure 40 shows how the STP 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 40 Investment programme development process

Next Phase

20.23 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.

20.24 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-programmes, 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.

20.25 The new evidence, analysis and appraisal tools will be made available for scheme promoters to support the development of interventions, ensuring that TfN is adding value to the process.

20.26 TfN will work closely and collaboratively with Government and all Delivery Partners to ensure that this Investment Programme is delivered.

20.27 TfN co-manages the Northern and TransPennine Express rail franchises, ensuring that the provisions of the two franchise agreements are delivered. TfN is also delivering the Integrated and Smart Travel programme over the coming years.

Market Engagement

20.28 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.

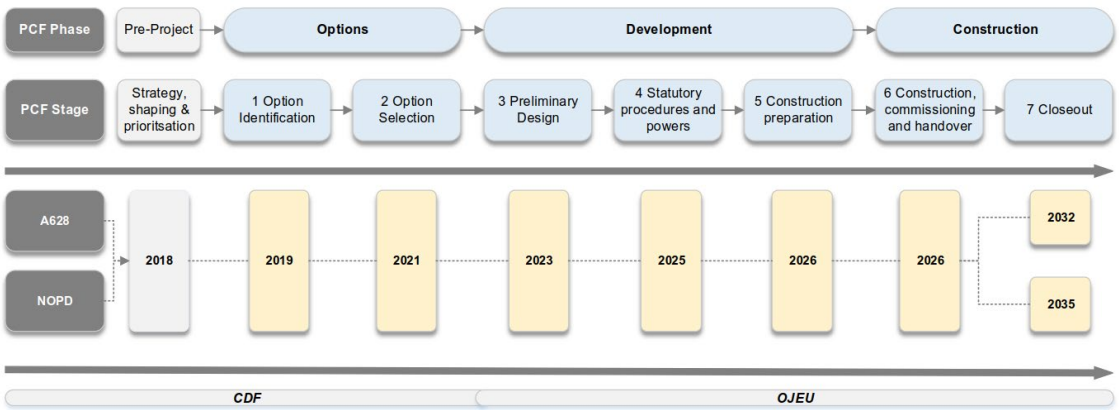
20.29 TfN encourages potential suppliers to register their interest using a form on the TfN website. TfN retains these contacts so that when projects are ready for launch, a potential supply chain is already in place.

20.30 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

20.31 Figure 41 illustrates the anticipated procurement timeframes, commencing with further programme refinement and SOBC development.

Figure 41: Example from Trans Pennine Tunnel



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 risks.

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 West and Wales 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 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, TfN is leading the development of a multi-modal package of schemes to implement in the West and Wales corridor. The SPOC for the SDCs provide a key part of the evidence base for TfN's STP and Investment Programme. 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 Reflecting TfN's governance arrangements, TfN's local authority partners have been engaged and have contributed to the development of West and Wales throughout its lifecycle. This includes participation in the infrastructure options sifting and economic appraisal processes. Specific information has also been sought from local authorities on development plans for their areas to understand the interactions between the West and Wales SDC and local development plans.

23.5 The Partnership Board includes representatives from the following organisations: Combined Authorities in the North, Local Transport Authorities in the North, LEPs in the North, DfT, Network Rail, Highways England, High Speed 2 Ltd.

23.6 Representatives from Department for Transport, Network Rail, Highways England and TfN's Transport Authority partners have provided direction, technical scrutiny and oversight throughout the development of the proposed set of interventions.

23.7 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.

23.8 For an overview of the governance structure, see Figure 42.

Figure 42 SDC Governance Structure

Roles & Responsibilities

23.9 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.

23.10 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.

23.11 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.

23.12 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

23.13 Within TfN, as the Senior Responsible Officer (SRO), the Major Roads Director is accountable for delivery of the SDC SOP Case.

23.14 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.

23.15 Through the governance structure TfN will work with partners to review and update the STP Investment Programme, and to determine which partner organisation will take lead responsibility for progressing business case development for specific interventions or packages of interventions.

23.16 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)[85] and the Network Rail 'Governance for Railway Investment Projects' (GRIP)[86] 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

[85] Highways England (2017), The Project Control Framework Quick Reference Guide

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

by the Senior Responsible Owner (SRO) and this is assessed at a stage gate assessment review (SGAR). The application of these proven 'Codes of 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 West and Wales 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 and Wales. 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 West and Wales SDC.

Outline Delivery Programme

24.3 The programme of investments proposed for the West and Wales 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 Overall, TfN's Investment Programme outlines a programme of short (up to 2027), medium (2027-2035) and long term (post 2035) interventions will be developed. 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.

24.5 2027 has been chosen as an initial point within the Investment Programme to reflect when HS2 is due to be completed to Crewe, marking a significant change to the North's transport network. As the Investment Programme is refreshed, further milestones will be selected to match similar significant changes to the North's transport network.

Figure 43 High-level delivery programme

Interfaces with other schemes

24.6 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 and Northern Trans-Pennine)
- Northern Powerhouse Rail
- Welsh Government schemes
- The Borderlands proposition
- Other major developments of national and regional importance
- Local schemes

24.7 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 West and Wales 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
- Welsh Government
- 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

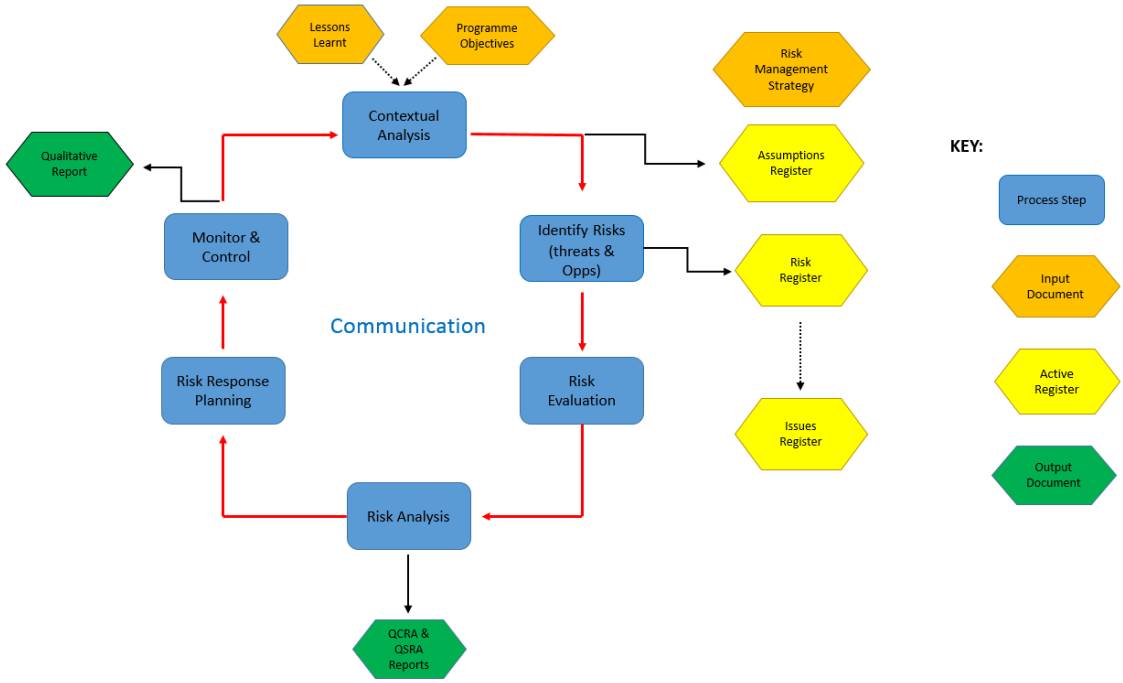
26.3 Collectively, these steps form a logical sequence, necessary for the adoption of a robust approach to the implementation of the risk management with the SDC programme.

26.4 The SDC team maintain an up-to-date programme risk register, which is reviewed and updated regularly and 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 44 provides an overview of TfN's risk management process. A description of key stages is provided below.

Figure 44 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)

requirements[87]. 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.

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 Book[88], 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 evaluation[89]. 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 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 TfN will also develop in consultation with partners 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).

---

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

[88] HM Treasury. (2011). The Magenta Book

[89] DfT. (2013). Monitoring and Evaluation Strategy

- 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.

28 Management Dimension Summary

28.1 This chapter has discussed the deliverability of the proposed programme of interventions for the West and Wales 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.

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 between1,500 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.
Important Economic Centres	IECs	Generally these have a population of >50,000 people (or perform a strong sub-regional function, e.g. Northallerton), represent a regionally important international gateway for people or goods (e.g. Manchester Airport or the Port of Liverpool) or employment cluster (e.g. Daresbury) or university located external to a major settlement (e.g. Liverpool Hope).
Liverpool John Lennon Airport	LJLA	Liverpool Airport
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.

Term	Acronym	Definition
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
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

Term	Acronym
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
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 Evaluation Process	POEP
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

Term	Acronym
Strategic Transport Plan	STP
Trans-Pennine South	TPS
Technical Assurance Group	TAG
Transport Economic Efficiency	TEE
Value for Money	VfM
Value of Time	VoT
Variable Demand Model	VDM
Wider Economic Benefits	WEBs

West and Wales: Strategic Development Corridor

Appendices

A Appraisal Summary Table

Appraisal Summary Table

Date produced:	February 2019

Contact:	
Name	Chris Macdonald
Organisation	Jacobs
Role	Consultant to TfN

Name of scheme:	West and Wales Strategic Development Corridor
Description of scheme:	Strategic Outline Programme (SOP) of highway interventions.

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 (59.4%). The assessment shows that there will be monetised benefits resulting from journey time savings of business users amounting to £4,020.30m.	Value of journey time changes(£m	4,020.30				4,404.20	Not Assessed
			Net journey time changes (£m)						
			0 to 2min	2 to 5min	> 5min				
			505.32	1,557.15	1,957.90				
	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					402.03	
	Regeneration	The schemes included in the Wales and West SDC programme represent a substantial investment in transport provision across the corridor, which are designed to improve accessibility.					Strong Beneficial		
	Wider Impacts	The West ang Wales SOP will generate between £2,482.52 and £3,153.90m of benefits from labour supply impacts (£38.25), productivity (Static Clustering) (£2,003.85 - 2,645.23m), and output change in imperfectly competitive markets (£440.42m). This benefit will be incorporated into the Level 2 adjusted BCR for the West and Wales SOP.						Lower Bound: 2,482.52 Upper Bound: 3,123.90	
Environmental	Noise	The creation of new and improved road links will have the effect of encouraging more road traffic, which will increase road noise levels to the surrounding areas. The adverse effects would also be offset by the anticipated move in the medium to long term to electric vehicles and improvements in road vehicle fuel efficiencies. In addition, the Rail interventions have been reported in the Rail SPOC (which considers rail interventions in all the SDC areas) to encourage some modal change from road to rail, which will have a small beneficial effect.					Moderate Adverse		Not Assessed
	Air Quality	The creation of new and improved road links will have the effect of encouraging more road traffic, which will decrease air quality in the surrounding areas. The adverse effects would also be offset by the anticipated move in the medium to long term to electric vehicles and improvements in road vehicle fuel efficiencies. In addition, the Rail interventions have been reported in the Rail SPOC (which considers rail interventions in all the SDC areas) to encourage some modal change from road to rail, which will have a small beneficial effect.					Moderate Adverse		Not Assessed
	Greenhouse gases	The creation of new and improved road links will have the effect of encouraging more road traffic, which will have the general effect of causing more carbon emissions. This will be potentially offset by the anticipated move to electric vehicles and improvements in road vehicle fuel efficiencies. In addition, the Rail interventions have been reported in the Rail SPOC to encourage some modal change from road to rail, which will have a small beneficial effect. With the future consideration of more regional interventions, including a change to electric trains, further benefits would be achieved.	Change in non-traded carbon over 60y (CO2e) (million tonnes)	6.58			Moderate Adverse	- 273.80	
			Change in traded carbon over 60y (CO2e) (million tonnes)	0.09					
	Landscape	Potential adverse impacts on landscape character, although these will be mitigated. Risk of landscape impacts to Ashbury Mere, Little Budworth and Brereton Heath Country Parks, although these effects will be mitigated.					Potential to have significant adverse environmental		
	Townscape	Potential adverse impacts from improvements of existing routes and construction of new road scheme located within urban areas. Townscape improvements proposed bypasses and new link interventions.					Potential to have significant adverse		
	Historic Environment	Risk of potential adverse impacts on Tabley House Grade II park and garden from segregated HGV Bypass lanes between M6 J.16-19. Risk of potential adverse impact to Gawsworth (old) Hall Grade II* park and garden from improvements on the A536 between Macclesfield and Congleton. Risk of impacts on the integrity and characteristics of designated and non-designated assets and the setting of these.					Potential to have significant adverse environmental effects		
	Biodiversity	Potential adverse impacts to European designated sites, however impacts likely to be mitigated. Potential direct impacts on SSSIs, notably through proposed extension the B5210 to the A56 and localised improvements between A49 and Wrexham on the A534. Likely impacts on ancient woodlands, priority habitats and locally designated sites.					Likely to have significant adverse environmental effects		
	Water Environment	Potential increased risk of pollution of surface watercourse, although this can be mitigated; Number of interventions located within groundwater source protection zones which presents an increased risk to groundwater bodies, particularly A5036 Princess Way (Access to Port of Liverpool) full grade separation of junction, A580 upgrade at M6 J23 and westwards to the A579 and Localised junction improvements between A49 and Wrexham on the A534 located in source protection zone 1 which may be more difficult to mitigate.					Potential to have significant adverse environmental effects		
Social	Commuting and Other users	Commuting benefits contribute to 22.2% of the overall distribution of travel time benefits, with Other users contributing to 18.4%. The assessment shows that there will be monetised benefits resulting from journey time savings of Commuting and Other users amounting to £2,746.65m.	Value of journey time changes(£m	2,746.67				2,746.67	Not Assessed
			Net journey time changes (£m)						
			0 to 2min	2 to 5min	> 5min				
			205.80	1,040.95	1,499.92				
	Reliability impact on Commuting and Other users	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					274.67	
	Physical activity	The effect of the West and Wales 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 West and Wales 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 West and Wales 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 West and Wales 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 West and Wales 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	Commuting benefits contribute to 20.8% of the overall distribution of travel time benefits, with Other benefits contributing to 13.1%. For Commuting and Other users there will be a net negative benefit of £485.47m associated with changes to Vehicle	£m	Commuting	Other			- 485.47	Not Assessed
			VOC	- 123.24	- 372.00				
			User Charges	6.54	3.23				
	Severance	Severance is focused on the effect of changes in transport infrastructure on pedestrians. Given the scale of the West and Wales SOP and stage of scheme development, 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 West and Wales 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 West and Wales SOP total £2,697.77m. 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 West and Wales SOP (£269.78m). In addition, a reduction in the use of toll roads (all assumed to be Central Government) as a result of the West and Wales SOP results in a lower toll revenue of £21.33m.						- 2,988.87	
	Indirect Tax Revenues	As the West and Wales 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 £498.92m.						498.92	

A.1