



Department
for Transport

Integrated Rail Plan for the North and Midlands



CP 490





Integrated Rail Plan for the North and Midlands

Presented to Parliament
by the Secretary of State for Transport
by Command of Her Majesty

November 2021

Department for Transport
Great Minster House
33 Horseferry Road
London
SW1P 4DR



© Crown copyright 2021

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ or contact, The National Archives at www.nationalarchives.gov.uk/contact-us.

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is also available on our website at www.gov.uk/government/organisations/department-for-transport

Any enquiries regarding this publication should be sent to us at www.gov.uk/government/organisations/department-for-transport

ISBN 978-1-5286-2947-8
E-Number: E02680339

Printed in the UK by HH Associates Ltd. on behalf of the Controller of Her Majesty's Stationery Office.

Contents

Foreword	6
Prime Minister Foreword	6
Secretary of State for Transport Foreword	10
Executive Summary	12
The Integrated Rail Plan –core projects	12
1. Introduction	26
2. Development of the Integrated Rail Plan	34
What is the Integrated Rail Plan?	35
Why an Integrated Rail Plan?	35
How has the Integrated Rail Plan been developed?	43
What are we seeking to achieve: strategic objectives	47
3. The Proposed Portfolio for the North and Midlands	54
Reaching our decisions	55
HS2 Phase 2b Western Leg	60
HS2 Phase 2b Eastern Leg	74
Northern Powerhouse Rail	94
Midlands Rail Hub	118
Freight	121
4. Phasing	122
5. How we will deliver the Integrated Rail Plan	141
6. Conclusion	155
Endnotes	157

Foreword

Prime Minister Foreword



I am proud to present the Integrated Rail Plan. The biggest ever government investment in our rail network, in redressing decades of underspending in the Midlands and North, and in levelling up our country.

It builds three new high speed lines, totalling around 110 miles of route and transforming connections to, from and between the East and West Midlands, the North West, Yorkshire, the North East, Scotland and North Wales. One of these will be Northern Powerhouse Rail, keeping my promise to build it between Leeds and Manchester.¹ But we will go further, extending NPR to Liverpool, York, the Tees Valley and Newcastle.²

It fully electrifies, modernises and upgrades two existing diesel main lines, the Midland Main Line from London to Leicester, Nottingham and Sheffield and the Transpennine Route, from Liverpool to Manchester, Leeds and York. This completes the electrification of around 180 route miles and more than 75% of Britain's main trunk routes.

It upgrades yet a third main line, the East Coast Main Line from London to Yorkshire, the North East and Edinburgh, with track improvements higher speeds, and digital signalling to slash journey times.

To most destinations, both from London and on the core Northern Powerhouse Route, this Plan delivers journey times which are the same as, similar to, or faster than the original HS2 and Leeds–Manchester proposals. It doubles or trebles capacity. It delivers similar or better value for money. And it starts bringing benefits for passengers far sooner than the previous plans.

But the vast majority of journeys in the North and Midlands are less than 30 miles. Local transport for those journeys lags too far behind the South-East, without the same convenient and green public transport options you find in London. The old plans got the balance wrong. They focused too much on showpiece, high speed links, and too little on local services – less glamorous, perhaps, but more important to most people.

This Integrated Rail Plan changes that. It helps our largest cities, but it also helps smaller places. It protects and improves services on the existing lines. And nor does it neglect the shorter-distance services which people use every day.

We commit today to building a Mass Transit System for Leeds and West Yorkshire, and to supporting West Yorkshire Combined Authority over the long term to ensure that this time, it gets done. That work begins now, with £200m of immediate funding to plan the project and start building it, with the first services operational in the second half of this decade.

We will begin work on the Midlands Hub Rail project, to transform local and regional services across the centre of England, and to link them with HS2.

And over the next three years we will install contactless tap-in and tap-out ticketing across the commuter networks of the Midlands and North – to unlock integration with bus and tram networks, and do away with queues at ticket windows, and excess fares offices. Many of us complain that rail fares and tickets are too confusing. Under contactless, you will automatically be charged the best price.

In total, this Plan confirms £54bn³ of spending on rail and local transport in the Midlands and North in addition to the £42bn already included for HS2 Phases 1 and 2a between London, the West Midlands and Crewe, its first stop in the North.

As we announced in the Budget, over the Parliament we are investing more than £5 billion to transform buses and cycling outside London, more than £8bn on local roads, and £450m in new transport projects as part of the first round of the Levelling Up Fund. We are also investing £5.7bn for eight English city regions to transform local transport networks, in the coming years. Beyond 2025, because we are spending less than we planned on high speed rail, there will be more money for all these things.

In my discussions on HS2 last year, I was struck by what one of my parliamentary colleagues, Lee Anderson MP, told me: that his constituents in Ashfield would have to watch the high speed trains go through at 200mph without stopping when what they really wanted was a decent bus service to the next town.

Levelling up means delivering that bus, just as much as better train services to London and other cities. And integration, as described in this Plan, means improving and tying together local, regional and long-distance transport to provide better links for everyone, not just those travelling between our biggest places.

As Doug Oakervee, the reviewer of HS2, found, the previous plans were designed largely in isolation from the rest of the transport network. They would have spent billions of pounds on a new rail link to the East Midlands that didn't directly serve any of the region's three main cities. TfN's⁴ preferred option for Northern Powerhouse Rail would also have seen us spend billions upgrading the conventional line between Leeds and Manchester – and then tens of billions more, straight afterwards, building a second line between the same two places.

Under those plans, many places on the existing main lines, such as Doncaster, Huddersfield, Wakefield and Leicester, would have seen little improvement or a worsening in their services. The fastest services to the East Midlands would have been concentrated on a parkway stop. Losing the convenience of city-centre stations, good connections to existing local public transport networks, and proximity to thousands of shops and businesses. There was nothing directly for wider improvements to local transport.

So when I announced the go-ahead for HS2 last year, I was clear that the plans – first drawn up 11 years ago – had to change. Since then, the case for change has become even stronger. COVID-19 has altered some of the assumptions on which these schemes were designed. Costs for the full HS2 Network, Northern Powerhouse Rail, Transpennine Route Upgrade, Midlands Engine Rail and other interventions would have risen to as much as £185 billion.

Most importantly, it has now become clear that under the original plan, high speed lines would not have reached the East Midlands and Yorkshire, until at best the early to mid 2040s, two decades from now.

Some have demanded that we rigidly stick to the old plans, however long they take, however much they cost and whoever they leave behind. Some have pre-emptively denounced any departure from those plans as a betrayal of levelling-up. But those who say these things are, in effect, condemning the North and the East Midlands to get nothing for ten years or more. Levelling up cannot wait that long. And it has to deliver benefits for everyone.

Our plan delivers high speed journeys, but also helps places on the existing lines. It creates new journey opportunities, but also serves the places people already want to go. It helps smaller places as well as big cities. It connects better with local public transport networks. It creates the capacity the rail network needs, in a way that can be delivered. And crucially, it brings benefit up to 10 years sooner.

Too often, the debate on levelling-up has been about schemes. Instead, we need to focus on outcomes – on delivering the greatest economic and transport benefits for more people, more quickly. That is what this Integrated Rail Plan does.

A handwritten signature in black ink, appearing to read "Boris Johnson". The signature is written in a cursive, flowing style.

Secretary of State for Transport Foreword



**The Rt Hon
Grant Shapps MP**
Secretary of State for Transport

Railways are not just about getting people from A to B. Planned properly, they can transform the prospects of the places they serve, helping businesses to grow, generating new jobs and opportunities, and improving the lives of people who live and work there. An investment in rail is an investment in more prosperous communities.

The plan outlined in this document is the largest and most ambitious Government programme of investment ever in the railway, outlining a £96bn strategy of rail construction and upgrades for the Midlands and the North to be delivered over the next 30 years. Transforming connectivity, this plan is designed to deliver increased capacity, faster journeys or more frequent services on eight out of the top ten busiest rail corridors across the North and Midlands. After decades of underinvestment, this package will overhaul and modernise rail connections across both regions, and help honour this Government's most important pledge – to level up our country.

The *Integrated Rail Plan for the North and Midlands (IRP)* marks a new beginning for the railway network from London to Newcastle, and from Birmingham to Leeds, as we Build Back Better from the pandemic. It is the first phase of a strategy focused on bringing communities in the North and Midlands closer together, boosting inter-city connections and improving east-west links, the journeys that people are most likely to make. It will create the kind of faster, greener and more frequent rail services that allow people to access many more jobs make towns and cities more attractive to business; and unlock housing opportunities for many families.

It includes plans to complete the Western Leg of HS2 to Manchester and build a new high speed line from Birmingham to the East Midlands. Today it takes an hour and a quarter to get from Birmingham to Nottingham. With the new link, the trip from Birmingham to Nottingham will be cut to less than half an hour, making travel between the two cities far easier for commuters and other passengers.

We will deliver a comprehensive package of upgrades on the East Coast Main Line to boost journeys between Leeds and the North East much sooner than planned, as well as services from Doncaster and Darlington. We will complete the electrification of the Midland Main Line, allowing high speed journeys from London to Chesterfield and Sheffield in the same times to those originally proposed by HS2, decarbonising the railway, and bringing a long overdue improvement to passenger services.

But most importantly, we will build the core Northern Powerhouse Rail network, which will include 40 miles of a new high speed line between Warrington and Yorkshire, and complete the electrification of the Trans-Pennine Route. These projects will transform east-west links across the North of England, which have been woefully inadequate for many decades, constraining growth.

They will dramatically improve connections between three of the great economic powerhouses of the North: Liverpool, Manchester and Leeds, with more frequent, faster and reliable services. And this is just the start: the IRP provides £100m to look at the most effective way to run HS2 trains to Leeds, including understanding the most optimal solution for Leeds station capacity, and start work on the new West Yorkshire Mass Transit System. Making rail travel more attractive will also help take vehicles off the regions' roads, cutting carbon emissions, improving air quality and reducing the impact on the wider environment.

In developing the IRP we have considered views from stakeholders, the Government's own analysis and the National Infrastructure Commission's (NIC) *Rail Needs Assessment for the North and Midlands*. We have adopted the NIC's suggestion of an 'adaptive approach' so that we can press on and deliver improvements to communities. Given the pressure on public finances, we believe that this is the responsible approach to take to investment.

The recently published Williams-Shapps Plan for Rail sets out the Government's plans to radically overhaul the way the rail sector works today, providing a single point of accountability for rail services in a town, city or region. Great British Railways will take on a leading role in delivering the benefits from the plans outlined here, and integrating HS2 and IRP schemes for the rail network.

This long term, integrated plan for rail investment delivers a modern network for the whole country, benefiting small towns alongside big cities sooner than previous proposals, and, gives clarity to local areas and certainty to the rail and construction industries, so they can plan ahead with confidence. But it will also give confidence to passengers, businesses and investors that historic weaknesses in the regions' rail network are finally being fixed. Just as the original railway did two centuries ago, this unprecedented Integrated Rail Plan will lay the foundation for a more resilient, more ambitious and more prosperous North and Midlands for future generations, better equipped to compete and thrive in the decades ahead.



Executive Summary

The Integrated Rail Plan – core projects

We will build three new high speed lines.

We will build High Speed 2 (HS2) from Crewe to Manchester...

on the route and line speed as previously planned with new stations at Manchester Airport⁵ and Manchester Piccadilly. HS2 trains will run from London to Manchester in 1 hour 11 minutes⁶, and from Birmingham to Manchester in 41–51 minutes⁷. This line and Northern Powerhouse Rail (NPR) will allow direct high speed services from Birmingham to Leeds, taking 79–89 minutes⁸. NPR trains between Liverpool and Manchester will also use part of this route. The Union Connectivity Review is considering the case for alternatives to the Golborne Spur for faster and higher capacity connections from HS2 services to Scotland. Our plans allow the Crewe Hub vision to be realised, with up to 5–7 HS2 trains per hour able to call at Crewe⁹ which would also enhance connectivity to much of the West Midlands, Cheshire and North Wales not directly served by HS2.

We will build HS2 from the West Midlands to East Midlands Parkway¹⁰ (HS2 East)...

about six miles southwest of Nottingham, on the route and line speed as previously planned (East Midlands Parkway is around 3 miles from the previously proposed Toton station site). From here, HS2 trains will continue directly to Nottingham, Derby, Chesterfield, and Sheffield on the upgraded and electrified Midland Main Line. Unlike the original plans, HS2 will serve Nottingham and Derby city centres. We expect trains to run from London to Nottingham in 57 minutes and from Birmingham to Nottingham in 26 minutes – significantly faster than the original HS2 plans, which would have required a change of train at Toton. HS2 trains will run from London to Sheffield in 87 minutes, the same as under the original HS2 plans. We will look at the most effective way to run HS2 trains to Leeds including the most optimal solution for Leeds Station capacity, and start work on the West Yorkshire Mass Transit System.

On Northern Powerhouse Rail (NPR), we will build a new high speed line between Warrington, Manchester and Yorkshire...

finishing east of the Standedge tunnels. In 2019, the Prime Minister promised to fund the Leeds-Manchester route of NPR. Of the three options for this section put forward by Transport for the North (TfN) at that time, we have chosen the first, a mix of newbuild line and upgrade via Huddersfield, and extended our commitment to Liverpool (giving 40 miles of new high speed line), and York. NPR trains will use fully electrified, expanded and upgraded conventional lines between Liverpool and Warrington, and from the east of Standedge tunnels to Leeds. Trains will run from Manchester to Leeds in 33 minutes, 22 minutes faster than now. We will also upgrade and electrify the line between Leeds and Bradford giving a non-stop journey time which could be as low as 12 minutes. We carefully examined the other options put forward by TfN, for full newbuild lines from Liverpool to Leeds via Manchester and Bradford. They would have made Manchester-Leeds journeys only four minutes faster than the option we have chosen, and cost an extra £18 billion.

We will electrify and/or upgrade three existing main lines.

We will fully electrify and upgrade the Transpennine Main Line between Manchester, Leeds and York.

Previous plans involved only partial electrification of the route, partial digital signalling, one section of four-tracking and very limited freight improvements. Recognising that the Transpennine Route Upgrade (TRU) will now be significantly expanded to enable NPR, it will be managed as the first phase of NPR. We will now electrify the whole route, install full digital signalling, and add longer sections of three and four-tracking to allow fast trains to overtake stopping services, leading to an initial increase in through passenger services of 20% compared with the pre-COVID-19 situation, with further additional services running once the new link to Manchester Piccadilly is in place. We will improve clearances for freight, allowing increased goods operation and taking thousands of lorries a month off the M62. This first phase will allow electric services between Liverpool and Newcastle, result in significant improvements to local services all along the line, and reduce journey times from Manchester to Leeds from 55 now to 41 minutes. Once the newbuild high speed line between the Standedge area and Manchester Piccadilly opens, under later NPR phases, it will further reduce the journey to 33 minutes and increase seat capacity by over 300%.

We will fully electrify and upgrade the Midland Main Line between London St Pancras, the East Midlands and Sheffield.

We will speed up, and decarbonise, services to benefit the whole of the East Midlands, including Leicester, Loughborough, Derby and Nottingham, which would have seen little improvement in city-centre journey times to London under the previous plans for HS2.

We will upgrade and speed up the East Coast Main Line (ECML).

DfT analysis shows it is unlikely HS2 would be able to serve York and North East England as previously promised without compromising existing services. However, unlike the West Coast Main Line, the East Coast Main Line from King's Cross has significant potential to further improve line speed increases and seat capacity. We will ensure digital signalling is delivered and also upgrade the power supply to allow longer and more frequent trains, increase maximum speeds up to 140mph on in some places, improve the capacity of stations, and remove bottlenecks

such as flat junctions and crossings. This will reduce journey times from London to York and Darlington by up to 15 minutes and to other parts of the North East and Edinburgh (subject to stopping patterns) by around 25 minutes compared to today, only a little less than the reductions that would have been delivered by HS2. It will reduce journey times from London to Leeds by around 20 minutes.

We will improve local services, integrate them properly with HS2 and NPR, and ensure benefits for places on the existing lines.

We will start work on the new West Yorkshire Mass Transit System...

and support West Yorkshire Combined Authority over the long-term to ensure that this time, it gets done. That commitment begins now with more than £200m of immediate funding to plan the Mass Transit System and start building it, with the first services operational in the second half of this decade. Bringing local transport systems outside London to the standards of the capital is a critical part of levelling up, driving growth and prosperity. Leeds is the largest city in western Europe without light rail or a metro. The IRP and Mass Transit System could transform local travel in and around Leeds, Bradford, Wakefield, Pontefract, Huddersfield and the whole of West Yorkshire; expand electrification of the local rail network; and directly improve the journeys which hundreds of thousands of people take every day. We will electrify the Leeds-New Pudsey-Bradford line and slash journey times.

We will introduce London-style contactless ticketing across the commuter networks of the Midlands and North...

allowing passengers simply to tap in and out with a debit or credit card, ending the need to queue at ticket offices or excess fare windows, automatically charging passengers the best fare, avoiding the confusion that many feel over tickets. Work will begin immediately for our 3-year programme of work, with many benefits being realised during this time. With seamless ticketing and improved customer service essential in attracting passengers back to rail, our investment delivers for taxpayers as well as benefiting over 100 million passenger journeys a year. It will also allow us to work with Local Authorities to unlock fully integrated ticketing with city buses and trams.

We will improve long-distance connections with HS2 and progress work on options to complete the Midlands Rail Hub (MRH).

New high-speed line from Birmingham to Manchester will enable improved onward connectivity to the South West and Wales. Much of North Wales would also be brought within two and a quarter hours of London, via interchange with HS2 at Crewe (based on the indicative train service). By redeveloping the Midlands Rail Hub business case it focuses on improving links to Hereford, Worcester, Coventry and regional links to South Wales and Bristol. This could give options for routing more services into Moor Street station, giving towns and communities much better links to the new HS2 station at Curzon Street, next door.

We will further invest in local transport at Toton and in the East Midlands.

HS2 will now serve Nottingham and Derby city centres directly rather than with a parkway stop between the two cities at Toton, which would have required passengers for Nottingham and Derby to change trains. The Government will also accelerate transport improvements at Toton, such as a station for local/regional services, with delivery subject to significant private sector investment – on a 50:50 match-funded basis with the taxpayer – coming forward at the site and developer contributions. We will accelerate plans for an East Midlands Delivery Vehicle covering Toton and other regional regeneration sites. We will look to exploit any linkages with other investment in Nottinghamshire, including the proposals for the Robin Hood Line Extension and reopening the Maid Marian line.

We will protect and improve services on the existing main lines.

Under HS2 and NPR previous plans, the Midland Main Line and Transpennine route would not have seen electrification completed and towns such as Kettering, Market Harborough, Leicester, Loughborough, Grantham, Newark, Retford, Doncaster, Wakefield, Dewsbury, Huddersfield and Stalybridge would have seen little benefit, or even a worsening in their service. Under the IRP, these and other towns could see improved services in terms of destinations served, electrified trains, higher frequencies, more seats and/or faster services.

We will complete planned upgrades on the Hope Valley Line...

between Manchester and Sheffield, which removes a key bottleneck, and makes improved provision for freight trains and, in the longer term, could help facilitate a 3rd fast Sheffield to Manchester service each hour. Elsewhere we are also electrifying the route between the West Coast Main Line and the Wigan – Bolton – Manchester commuter corridor.

Beyond the core network described above, we will take an adaptive approach...

as recommended by the National Infrastructure Commission (NIC). This will include an immediate £100m to start work on the new West Yorkshire Mass Transit System and look at options on how best to take HS2 services to Leeds. Safeguarding of the previously proposed high speed route north of East Midlands Parkway will remain in place pending conclusion of this work. We are committed to delivering core IRP schemes on time, and to budget. Any future development of further schemes (such as further electrification to Hull) will depend on this; and on how demand and economic growth recover.

Summary of benefits

To most destinations, journey times under the IRP to London and across the NPR core network will be similar to or faster than the original HS2 and NPR plans, with significant improvements also for Birmingham.



Journey times in minutes are estimated as follows:¹¹

	Now (typical)	Previous proposals	Integrated Rail Plan Core Pipeline
London–Nottingham	92	83	57
London–Derby	86	83	58
London–Sheffield	118	87	87
London–Manchester	126	71	71
London–Liverpool	132	94	92
London–Leeds	133	81	113
London–York	112	84	98
London–Darlington	142	113	125
London–Newcastle	169	137	148 (145 non-stop)
<hr/>			
Birmingham–Nottingham	74	55	26
Birmingham–Derby	34	30	30
Birmingham–Sheffield	75*	65	62
Birmingham–Manchester	86	41	41–51**
Birmingham–Leeds	118	49	79–89***
Birmingham–York	147 ^{xi}	57	110***
Birmingham–Darlington	175 ⁱⁱ	85	136***
Birmingham–Newcastle	206 ⁱⁱⁱ	117	167***

* Pre-Covid there were a smaller number of faster trains each day.

** Depending on whether train calls at Crewe.

*** Via NPR based on indicative train service and depending on whether train calls at Crewe.

i Typically 130 minutes pre-Covid, with a smaller number of faster trains each day.

ii 162 minutes pre-Covid.

iii Typically 194 minutes pre-Covid, with a smaller number of faster trains each day.



Journey times in minutes are estimated as follows:

	Now (typical)	Previous proposals	Integrated Rail Plan Core Pipeline
Manchester–Liverpool	50 [*]	29	35
Manchester–Leeds	55 ⁱ	29	33
Manchester–York	83 ⁱⁱ	51	55
Manchester–Darlington	115 ⁱⁱⁱ	77	81
Manchester–Newcastle	139		117
<hr/>			
Leeds–Liverpool	106 ^{iv}	61	73
Leeds–Manchester	55 ^v	29	33
Leeds–Bradford	20	8	12
Leeds–York	22	17	19
Leeds–Darlington	50	43	45
Leeds–Newcastle	81	74	76

Note: Figures are indicative and subject to change as schemes are developed. In some cases the capability of the infrastructure will be substantially greater than the proposals shown above.

All Manchester journey times in graphics throughout the report relate to Manchester Piccadilly, unless otherwise specified.

* Faster services run via Manchester Victoria

- i 48 minutes pre-Covid.
- ii 74 minutes pre-Covid.
- iii 108 minutes pre-Covid.
- iv 85 minutes pre-Covid.
- v 48 minutes pre-Covid.

The IRP will double and treble capacity.

The IRP will see more than double capacity between Leeds and Manchester; and more than treble capacity between Birmingham and Nottingham, Birmingham and Manchester, Liverpool and Leeds. Capacity will be more than doubled between London and Manchester. By addressing capacity constraints across the rail network in the North and Midlands, the IRP will make rail travel more efficient, reliable, comfortable and attractive. Increased capacity will also encourage greater integration and economic interaction between individuals and businesses, as well as potential environmental benefits from the modal shift to rail.

Reliable Services.

Reliable services are crucial for people's ability to plan their lives, and to the Government's ambitions to Build Back Better. As identified by the NIC, poor reliability risks holding back economic opportunities across the North and Midlands. Improvements in performance and operational resilience through the major investment outlined in the IRP will ensure train services are more reliable as passengers expect.

Capacity will be aligned with an ambitious view of potential future demand.

The IRP caters for transformational rises in rail use – recognising that in several cases, previous proposals would have been inflexible to future changes in demand. The IRP takes a holistic view of capacity, directing more funding to the places where it is most needed, including local journeys around Leeds and Birmingham.

Benefits will come up to 10 years sooner.

Under the previous plans, HS2 dedicated track would likely not have reached Leeds until at least 2041; under the full newbuild option, NPR would not have started running between Manchester and Leeds until 2043. Under the IRP, some NPR services will start running this decade; significant improvements will be delivered for the Midlands and South Yorkshire by 2030, and for Leeds and the North East in the 2030s.

Economic development will be accelerated, including at Toton.

The faster we can deliver transport improvements, the sooner we will see the transformational benefits they bring. In the East Midlands, following on from the Government's initial announcement in October 2019, we will accelerate plans for an East Midlands Delivery Vehicle to regenerate the three large opportunity areas, one of which – Ratcliffe-on-Soar – is next to East Midlands Parkway station and close to the second site at East Midlands Airport and Freeport. The Government will also accelerate transport improvements at Toton, such as a station for local/regional services, with delivery subject to significant private sector investment – on a 50:50 match-funded basis with the taxpayer – coming forward at the site and developer contributions.

Value for money is similar to or better than previous plans.

As the NIC identified in its 2020 Rail Needs Assessment for the Midlands and North, prioritising regional links, such as those from Birmingham to Nottingham and Manchester to Leeds, has the potential to deliver the highest benefits. On the Eastern leg, the IRP core pipeline offers better value for money than the full speed line as it delivers significant benefit at lower cost. The core NPR network delivers similar outputs in the Manchester-Liverpool and Manchester-Leeds corridor to TfN's preferred option but at lower cost.¹²

Trains will run to the places people want to go.

Under the original scheme, HS2 would not have directly served any of the East Midlands' three main cities, instead stopping at a new parkway station between Derby and Nottingham. Passengers for these cities would have had to change to a local train or tram, making the overall journey little quicker than now, and less convenient. After the pandemic, we need to build on key transport links and support city centres to aid their recovery.

There will be improvements to the local services which most people use, fully integrated with HS2 and NPR.

In Leeds, the IRP starts the transformation of the inadequate local public transport network by beginning work on a West Yorkshire Mass Transit System alongside the City Region Sustainable Transport Settlement. In Birmingham, we will progress work on options to complete the MRH. In Bradford, the IRP retains a conveniently-located city centre station, and links it more quickly to Leeds. London-style contactless ticketing will be extended to commuter networks across England. These are only the first of 20 years of improvements made possible by a rebalancing of spending between high speed rail and local transport.

High speed services will be integrated with improved local public transport networks, linking far more people and places and significantly increasing the value of the whole package.

The original plans saw HS2 services in the East Midlands isolated from the rest of the public transport network, limiting the scheme's usefulness for many people and journeys. The IRP sends HS2 trains to the heart of the existing regional public transport networks in Nottingham and Derby city centres, allowing a much wider range of connections, and delivers improved local rail services. Local and long-distance services must and will be planned together, rather than separately, as before. For instance, the future West Yorkshire Mass Transit System could have a bearing on station capacity in central Leeds, but was not considered in detail in previous assessments of capacity.

We will create transformational improvements of scale.

Economists have shown that larger cities have higher productivity per head than smaller cities, and that cities become more productive the more they grow – the so-called “agglomeration effect.” The effect is less pronounced in Britain (outside London) than in many other rich countries because our city and regional transport systems are weaker.¹³ By bringing Birmingham and Nottingham within 26 minutes of each other, Manchester and Leeds within just over 30 minutes of each other, Birmingham and Manchester within 41 to 51 minutes of each other – and by transforming city transport networks through the City Region Sustainable Transport Settlements – we will create real agglomeration within these cities, and across the Midlands and the North as a whole.

The schemes are more deliverable.

The engineering challenges on the Eastern Leg of HS2, particularly its northern sections, have always been high with a north-south line running through east-west contours with multiple motorway interfaces. The schemes in the core portfolio involve more predictable and understandable delivery challenges and costs.

There will be greater environmental benefits.

The electrification and new lines in the IRP will mean that more than 75% of Britain's main trunk routes are decarbonised. The plan will take significant volumes of passengers and freight away from petrol or diesel cars and trucks onto clean, electric trains. Better connectivity with local and regional services will allow more journeys to be made easily without a car. Trains in the East Midlands will reach city centre stations accessible by local public transport. A smaller construction footprint will reduce environmental damage and carbon emissions.

We will avoid disadvantaging existing transport users.

Under the original plans, whilst released capacity would have improved some journeys, for other's services on the existing main lines to more than a dozen towns and cities could have been reduced and/or slowed down. Instead, the IRP improves them. Local transport networks would need to have been reconfigured to serve the new HS2 parkway station in the East Midlands at significant inconvenience to some current users and further expense to the taxpayer. This will no longer be necessary.

There will be significantly less disruption to communities.

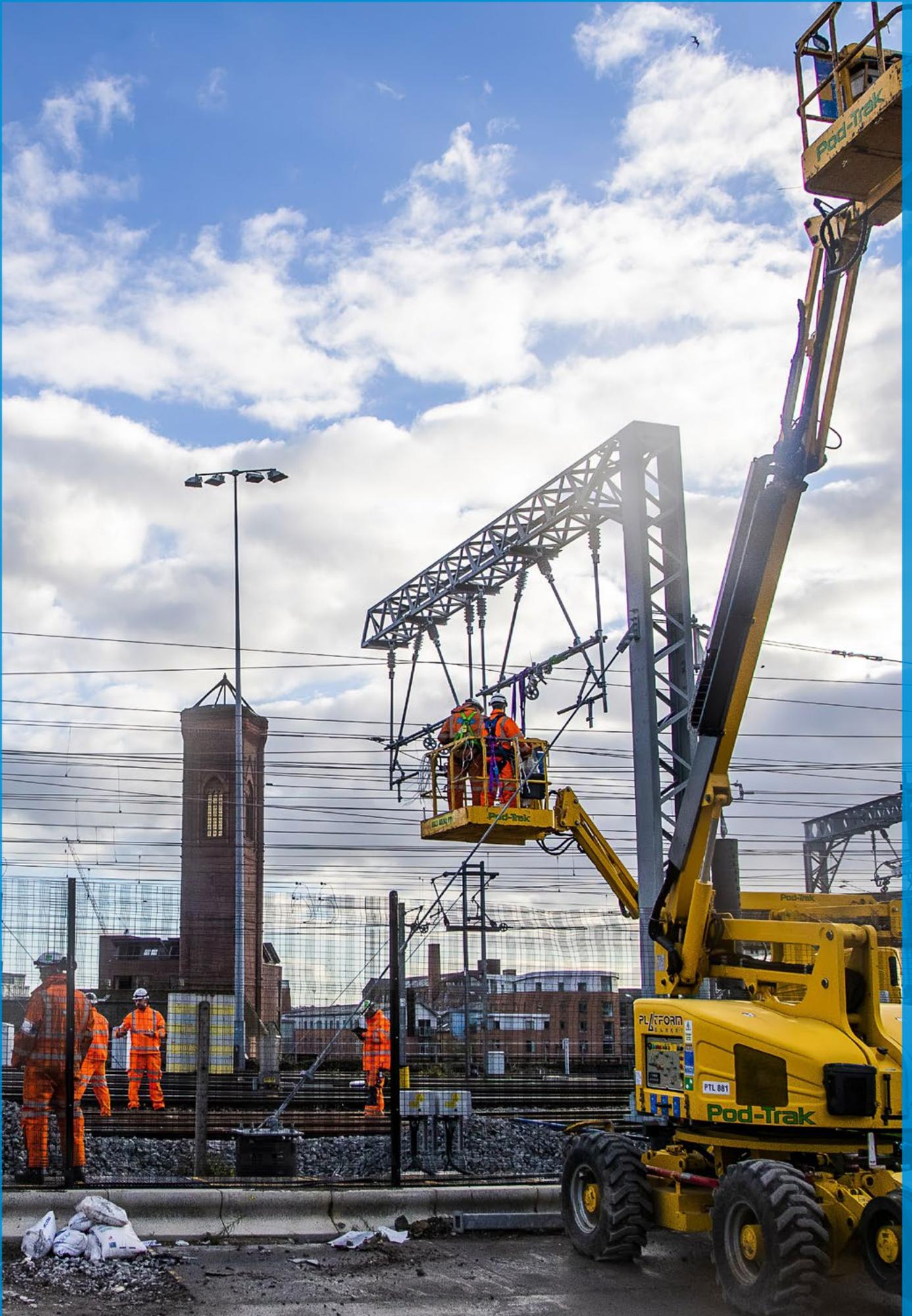
The reduction in the high speed construction footprint for NPR, compared with TfN's preferred option, would significantly reduce disruption and dislocation to communities across the Pennines. We will also ensure that we consider how best to avoid disruption, where possible, when looking at the most effective way to run HS2 services to Leeds, which under the previous plans would have crossed the M1, A1(M), M42 or M62 13 times.

We will learn lessons from previous projects

In line with the Government's existing approach to rail enhancements, commitments will be made only to progress individual schemes up to the next stage of development, subject to a review of their readiness. Business cases will reflect the new Green Book guidance and the Department will continue to embed lessons identified from Phase One and Oakervee in the development of the schemes.

In the remainder of this document:

- **Section 1** introduces the background to the IRP and its overarching vision.
- **Section 2** sets out the rationale for the IRP; how it has been developed; and what it seeks to achieve.
- **Section 3** further explains the scheme portfolio proposed and the alternative options that have been considered.
- **Section 4** discusses phasing, and the sequencing of proposed investments.
- **Section 5** sets out how the portfolio of projects will be managed going forward.
- **Section 6** presents overall conclusions and next steps.





1. Introduction

- 1.1 In 1830, the world's first intercity railway opened connecting Liverpool and Manchester. Stephenson's pioneering Rocket locomotive put boosters under the Industrial Revolution, transforming the movement of goods and people between these two cities in a feat of British engineering which would be replicated across the country and the world, stimulating economic growth and prosperity.
- 1.2 Whilst our rail network has changed significantly since then, it still fulfils a vital role in connecting communities, moving freight, supporting regeneration, driving productivity and economic growth, and reducing carbon emissions. However, there have been sustained increases in demand over the last two decades, more than any other public transport mode. There have also been an increase in rail services and lengthening of some services has mitigated the growth of crowding on trains. However, by the time of the COVID-19 pandemic, many trains were still crowded and the network was under significant pressure. More services are running, with – for example – weekday trains between Manchester and London having more than doubled since 1998, but the underlying infrastructure is under strain and operating at its limit. Today we are creating new timetables and developing infrastructure improvements but, with poor reliability and the serious service challenges in places such as central Manchester, there is much more to do.
- 1.3 The Government is already reforming how the railways are run. Our ambitious programme of reform set out in Great British Railways – the Williams-Shapps Plan for Rail, seeks to drive urgent and radical change to ensure the railways become more customer focused and financially sustainable, working in the national interest as a public service. This includes developing a Whole Industry Strategic Plan (WISP) to underpin the delivery of this 30-year strategy, and support future planning and decision making beyond the programme set out in the Integrated Rail Plan (IRP).
- 1.4 This is one part of the solution, but it will not take away the need for major investment. We have relied on the legacy of the Victorian engineers for too long, farsighted though they were. Railways in the North and Midlands have seen lower levels of investment than the South, which constrains their ability to support economic growth. Services are limited by slower, two-track, unelectrified lines, with infrequent services on older trains and too many cancellations. Though we have retired the bus-like Pacers and replaced them with new trains, many services remain diesel powered, and cannot run frequently enough to give a 'turn up and go' service, fast enough to connect modern economies, with enough seats to carry all those who want to travel, or the levels of reliability people need to plan their lives.



- 1.5 The COVID-19 pandemic has had a profound impact on the way many people live, work and travel. As we Build Back Better from the pandemic it is prudent to reflect on previous plans. The future may be more uncertain – which means we need a more adaptive approach that can respond to the trends we see. But the underlying case for investment in the rail network of the North and Midlands remains strong, and essential if we are to grow and level up the economy by improving capacity and connectivity, bringing the great cities and towns of the North and Midlands closer together, improving access to more and better jobs, helping companies compete globally, and so leaving a lasting legacy for future generations in the same way that the Victorians did for us.
- 1.6 Even before COVID-19, it was becoming clear there were serious opportunities to improve the plans we had inherited, and that a bold vision for the future of the railways in the North and Midlands was needed. Costs were one issue: those for HS2 had risen significantly prior to the Government decision to proceed with the scheme in early 2020, as set out in the Oakervee Review. Proposals for Northern Powerhouse Rail (NPR) were being made which would cost many billions of pounds more than alternatives for – in some cases – little additional benefit. The National Infrastructure Commission (NIC)'s *Rail Needs Assessment for the Midlands and North* – which has informed this Plan – found based on the information available at the time of the report, that previous proposals could cost up to £185bn by 2045, more than double what was originally allowed, and beyond what could be afforded without a major impact on other infrastructure investment.
- 1.7 More fundamentally, though, those plans were going to take far too long to deliver. Communities “in between” the major cities were in some cases due to see little gain – and in some places a real worsening of their services. Projects were not sufficiently integrated – which is why the Oakervee Review recommended this IRP be created. The Government agrees with the NIC's analysis that there are opportunities to better serve existing city centres and wider city regions for greater economic benefit, and better integration with existing transport networks.
- 1.8 This IRP is taking the opportunity to do things differently, to bring forward the benefits of major capital investment more quickly, spread those benefits more widely, and reduce construction impacts, while in most cases delivering better or similar outputs for journeys to London and on the core NPR network. The Plan seeks to address major capacity, frequency, reliability, and speed shortfalls on

The **Government** agrees with the National Infrastructure Commission's analysis that there are opportunities to **better serve existing city centres and wider city regions** for **greater economic benefit**.





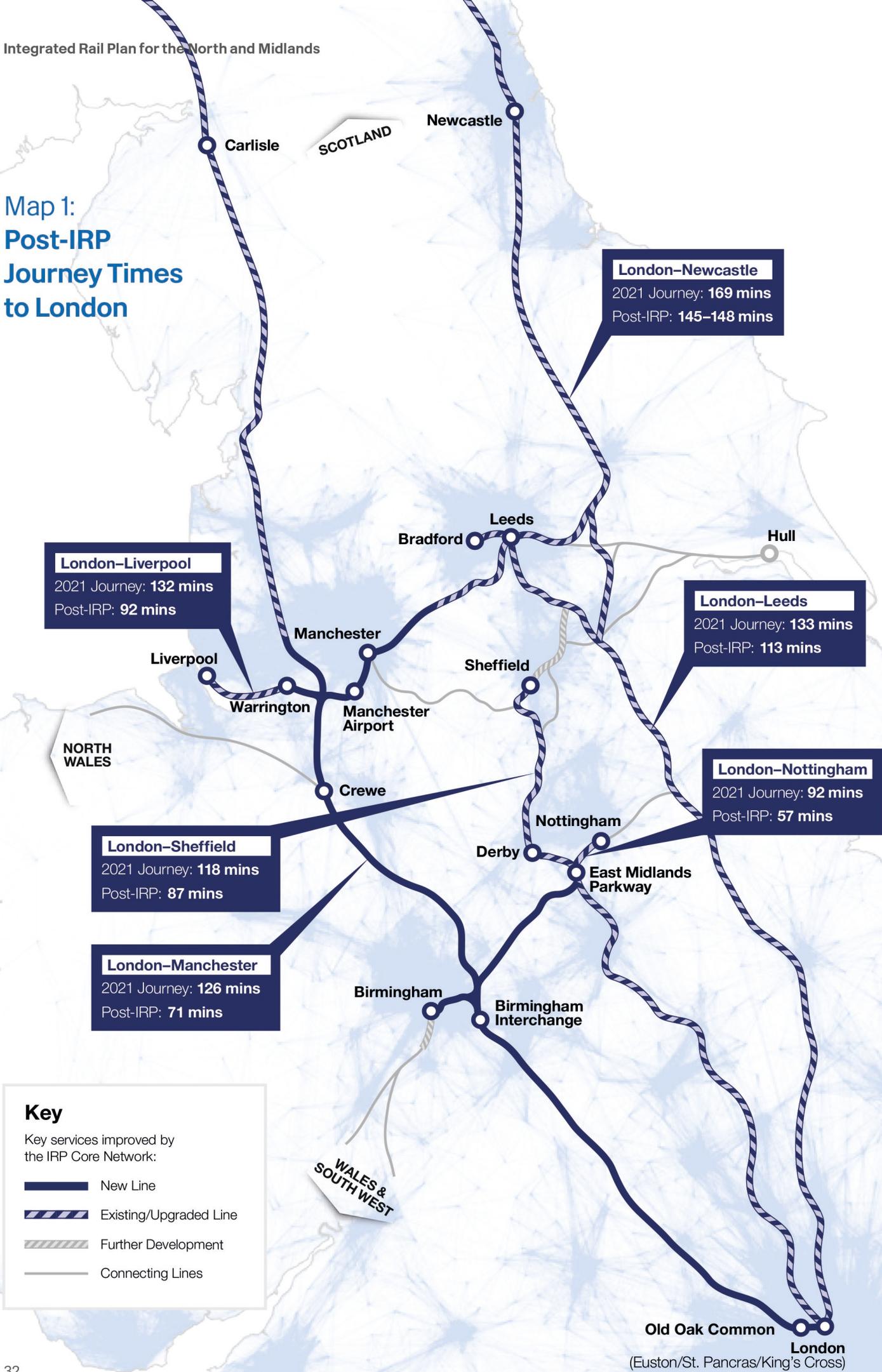
the existing network; maximise integration with existing local transport networks; serve destinations people want to reach; deliver carbon savings; avoid disadvantaging existing passengers and users; and minimise the impact on communities, especially those which don't benefit directly. It sits at the heart of the Government's plans to level up the whole country, Build Back Better, and move to net zero greenhouse gas emissions. It seeks to deliver the frequent and reliable services that millions of rail users in the North and Midlands deserve.

- 1.9 For too long, major infrastructure projects have suffered delays or increases in costs. The Government has sought to learn lessons from previous failures. In line with the NIC's recommendations, we intend to take an adaptive approach to investment, allowing the programmes set out in this Plan to evolve in the light of future demand and cost information. That means we are – as the Commission recommended – setting out a core pipeline of commitments now, recognising that other potential future, if these projects are delivered on time, to budget, and depending on how demand and economic growth recover. In developing the IRP, the Government has also taken a realistic approach to costs and benchmarking, with the aim to deliver the best possible value for the taxpayer.
- 1.10 The IRP therefore commits to a further £54bn of spending on rail and local transport in the Midlands and North. On top of funding to complete HS2 Phase One and 2a (from London to the West Midlands and Crewe). The core pipeline is estimated at £96bn (2019 price-base) over the period to 2050, an unprecedented scale of Government investment, on top of the £8.3bn already spent for HS2 up to March 2020. This commitment over three decades seeks to give confidence for the UK supply chain to invest in skills and capability; and for local places and developers to drive forward regeneration. It represents a comprehensive package of enhancements that will deliver significant benefits for passengers, freight customers and communities for generations to come.

Integrated Rail Plan core pipeline	Provision (2019 prices)
Completion of HS2 Phase One and 2a (March 2020 onwards)	£42.5bn ¹⁴
HS2 Phase 2b Western Leg (including Golborne link)	£17.0bn ¹⁵
Smaller rail schemes in the North and Midlands until 2024	£1.5bn
Transpennine Route Upgrade (TRU) base scope, including full electrification (Option F)	£5.4bn
HS2 East Core Network (including HS2 Eastern Leg, Midland Main Line and East Coast upgrade)	£12.8bn
NPR Core Liverpool–York (including TRU Option G enhancement)	£17.2bn
Total provision	£96.4bn
Previous spend on HS2	£8.3bn

- 1.11 The total amount is above the baseline spend (£86bn) in the National Infrastructure Commission’s Rail Needs Assessment. In line with lessons from previous major projects, we have also considered the appropriate range for cost estimates when many schemes within the IRP are at an early stage of development. The £96bn central estimate sits within an overall range of £85–104bn (in 2019 prices). Taking account of that range, the commitment is similar to NIC’s “baseline-plus-25%” (£108bn) option. However, the NIC’s +25% and +50% funding scenarios were in effect “full and final” settlements for rail in the North and Midlands to 2045.
- 1.12 These schemes form a key part of our plans to level up the country and ensure that no place is left behind, delivering benefits for more places. Under previous plans, there would have been little improvement – and in some cases a worsening – to services for places along the East Coast Main Line such as Newark, Retford, Grantham, Wakefield and Doncaster, and for those along the existing Transpennine Route line such as Huddersfield and Dewsbury. Under our proposals, they should see no reduction in frequency, and – in many cases – better journey times. Meanwhile Bradford, Nottingham, Derby, and other towns and cities could see more frequent and faster services to more places, sooner than under previous plans.
- 1.13 The investments envisaged in this plan will link the major cities and towns of the Midlands and North with each other, as well as with London. By integrating labour markets, people will have a wider range of job choices and firms will have access to a wider range of skills, driving growth and productivity, helping to create a single economic area.

Map 1:
Post-IRP
Journey Times
to London

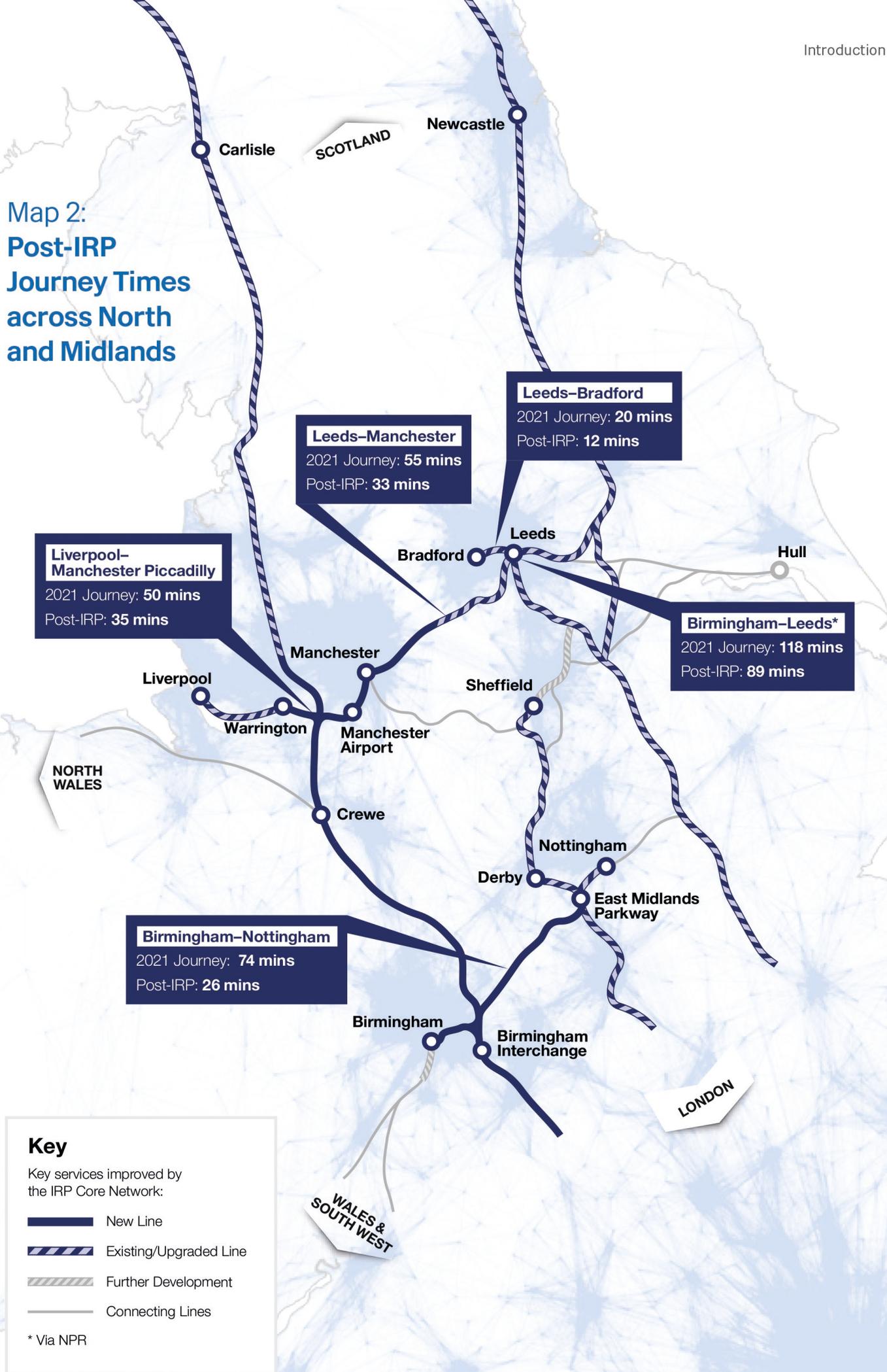


Key

Key services improved by the IRP Core Network:

- New Line
- Existing/Upgraded Line
- Further Development
- Connecting Lines

Map 2: Post-IRP Journey Times across North and Midlands



2. Development of the Integrated Rail Plan

What is the Integrated Rail Plan?

- 2.1 The Integrated Rail Plan (IRP) sets out a blueprint for the development of train services across the Midlands and North and towards Scotland and London, bringing together communities and strengthening the economy. It sets out how the Government will take forward and bring together the development of Phase 2b of High Speed 2 (HS2), Northern Powerhouse Rail (NPR), the Midlands Rail Hub (MRH), and other major Network Rail schemes and programmes for the North and Midlands over the period to 2050. It also considers how to deliver these schemes in the most efficient way, learning lessons from the sponsorship and delivery of other major programmes, seeking to deliver benefits more quickly than existing plans.

Why an Integrated Rail Plan?

- 2.2 The Government is committed to levelling up our country. For too long, we have had an economy that is over reliant on London and the South East – vital though they are. We have lower national productivity than a number of other countries, with some of the biggest regional gaps amongst developed countries. Productivity – crudely, the amount of value each of us creates per hour worked – is the critical determinant of our future prosperity and incomes. We cannot afford continued underperformance in the North and Midlands, either in terms of the life chances people enjoy, or of national competitiveness and wealth.

Figure 1: G7 Countries Productivity (2019)

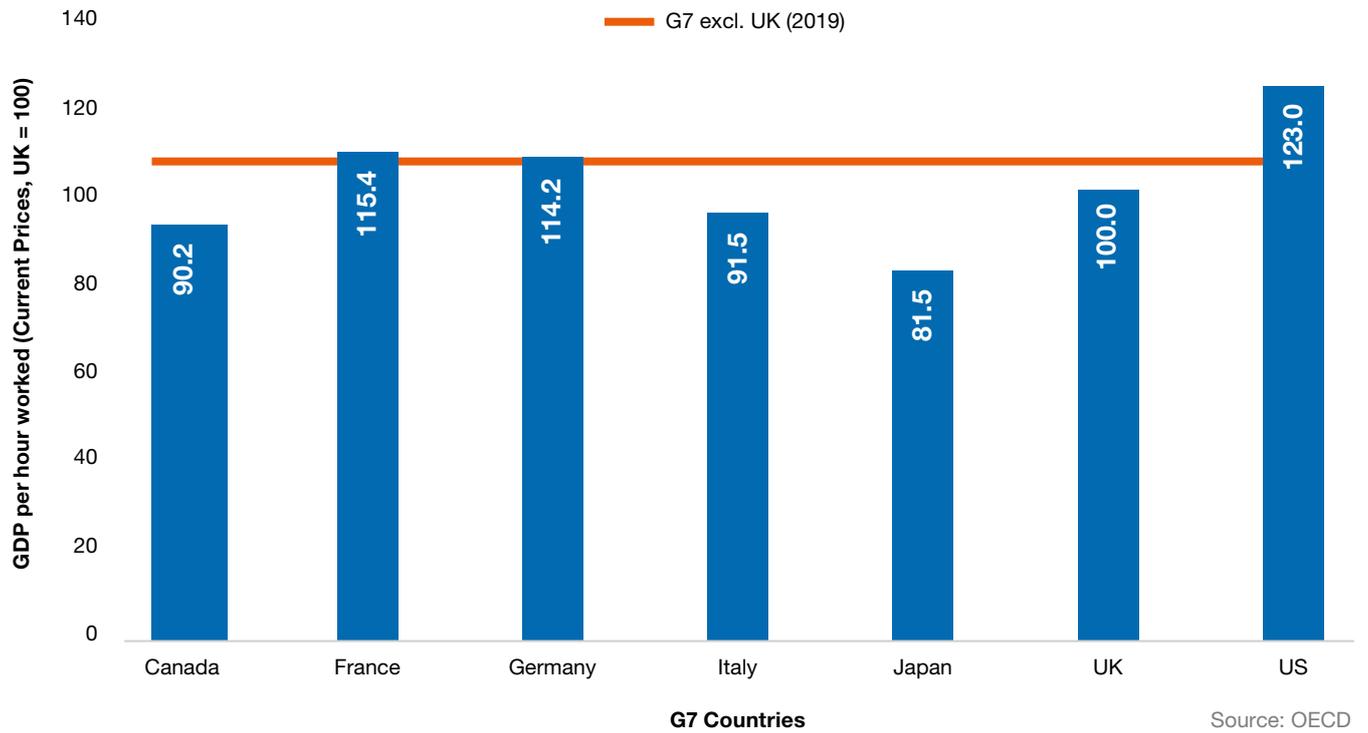


Figure 2: United Kingdom Regional Productivity (2019)

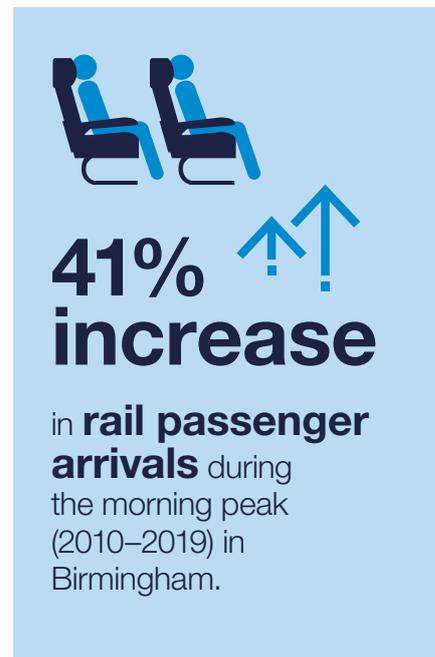


Source: ONS

- 2.3 However, we also have a major opportunity for action. As the National Infrastructure Commission (NIC) has recognised, significant productivity improvements could flow if the major cities of the North and Midlands functioned more like a single economy and individual city regions were supported to fulfill their economic potential.¹⁶ That means unifying labour markets, so that people can access a much wider range of jobs; bringing businesses closer together so that collaboration, competition and innovation improve; and improving access to key international gateways and markets so they become even more attractive locations for business investment, ensuring regions outside of London benefit from our Global Britain agenda.
- 2.4 Our rail network has a critical role to play in realising this vision. It remains the most effective way of moving large numbers of people into city centres, and transporting volumes of goods over long distances. It is a powerful asset that can enable people and businesses to prosper, expand opportunities and connect passengers with their families and friends. We have benefitted from an impressive Victorian legacy, which retains strong national coverage, despite the impacts of the 1960s' Beeching cuts, some of which the Government is now reversing. However, that legacy is operating at its limits, with the result that too many journeys are slow or unreliable. Rail capacity is used

inefficiently when a wide mix of different services – long distance passenger, commuter and freight – with different speeds, accelerations and stopping patterns use the same lines over long distances. That is why investing in the routes between cities can also free up space on existing lines for more local services, and more freight.

- 2.5 Many current rail services between major cities in the Midlands and the North run significantly slower than on similar distance journeys in the South. That limits the opportunity to realise the economic benefits of agglomeration, when businesses are able to cluster and learn from each other, and people are able to access a wider range of jobs in the same field. For example, the journey from Birmingham to Nottingham takes about 75 minutes to complete 45 miles, at an average speed of less than 40mph. By contrast London Paddington–Reading services complete a distance of 35 miles in about 25 minutes, at an average speed of over 80mph. In addition, too many train services in the Midlands and North are too frequently unreliable, performing worse than the national average.¹⁷
- 2.6 The number of rail passenger journeys has grown significantly in the last two decades, particularly in areas such as the Midlands and the North. From 2010/11 to 2018/19 demand grew at an average 2.8% each year for long-distance journeys, and 2.7% for regional journeys outside London and South East. Demand on the West Coast Main Line, linking London, Birmingham, Manchester and Glasgow grew faster still at 4%, as did some of the flows between major Northern cities such as Manchester–Leeds at 5% p.a. This growth in rail travel had led to overcrowding on services, especially during peak commuter travel times between major cities. In Birmingham there was a 41% and in Manchester a 36% increase in rail passenger arrivals during the morning peak (2010–2019)¹⁸, with passenger levels exceeding capacity in the typical 2019 AM and PM peaks by 5.1% in Birmingham and 2.3% in Leeds.¹⁹
- 2.7 The COVID-19 pandemic has seen a dramatic reduction in travel which is still to fully recover, for rail as well as other forms of transport. It has also seen a dramatic increase in home working. Some have argued this means future major transport investment programmes should be paused. The Government agrees with the NIC that it is unlikely that the pandemic will put an end to the desire or need to travel within and between our towns and cities over the longer term. The investments being considered here are long term, and typically take a decade or more to deliver. The results of historic ‘stop-start’ approaches to investment are still being



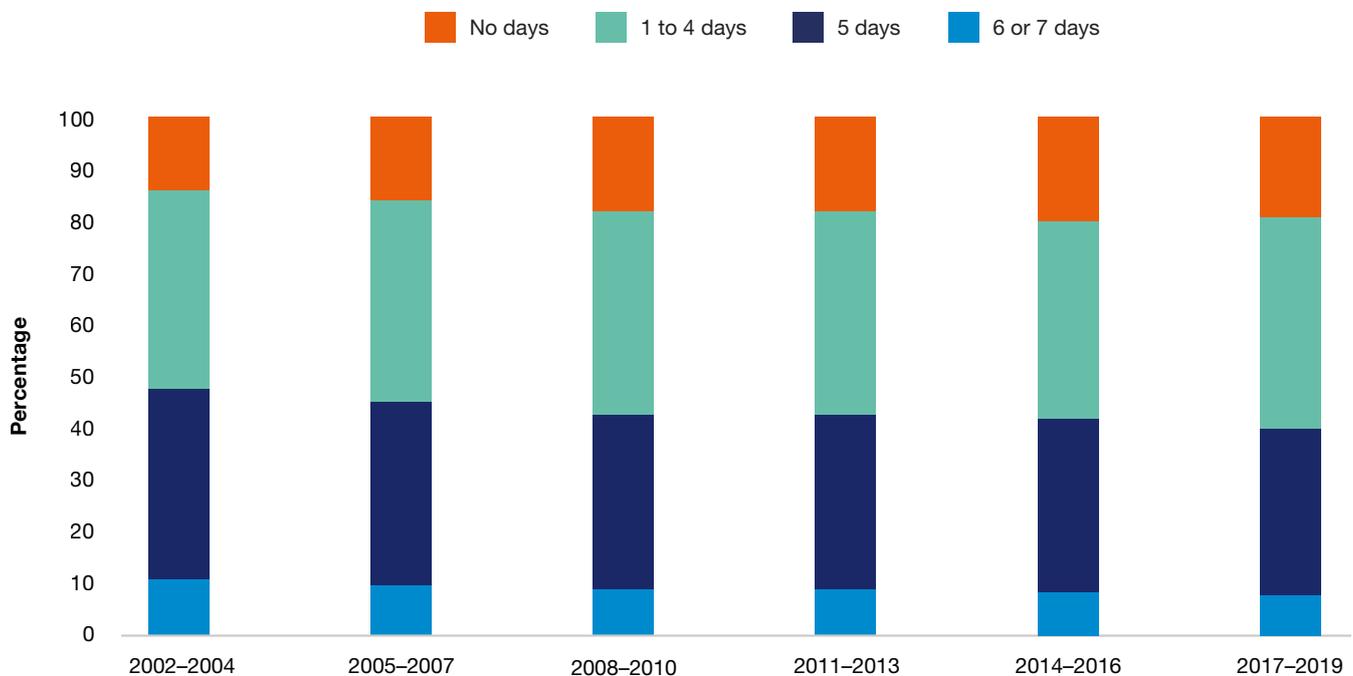


felt, both in terms of inefficient delivery in the supply chain and in delayed outputs. The impacts of the pandemic make the Government's commitment to levelling up more, not less urgent; and the Government believes that our major cities will, and must, remain the driving force for economic growth and future prosperity as we Build Back Better.

- 2.8 Over the last 50 years the time people spend travelling has remained relatively constant, though distances travelled have increased²⁰. The number of days that people commute to the office has also reduced.²¹ Overall, people have taken the benefits of better transport links as the ability to access a wider range of jobs, business and leisure opportunities, rather than to reduce total time spent travelling²². That widening of labour markets remains a key intent of the major schemes considered in the IRP.
- 2.9 It is inevitably the case that future demand forecasts will be more uncertain given the pandemic. Releasing space on existing railways for more commuter trains was one of the key justifications for building a wholly new high speed network. With likely lower – and more uncertain – levels of commuting in the future, there are strong arguments for proceeding in a more adaptive way with a mixture of new-build high speed track and upgraded existing lines instead. The Government's proposed approach to managing the IRP portfolio (see section 4), will allow the portfolio scope and timing to flex in the light of higher or lower than expected demand in the future.

2.10 The strategic case for major investment in the rail networks of the North and Midlands is therefore very strong. However, the Government wants to see benefits delivered more quickly, and to more places than previous plans. It also has to balance overall value for the taxpayer, capacity in the supply chain, and the other areas of infrastructure investment. As the NIC’s Rail Needs Assessment sets out, predicted costs for schemes in the IRP portfolio have risen significantly compared to the sums estimated in the Commission’s National Infrastructure Assessment in 2018.

Figure 3: Percentage of people commuting by number of days per week



Source: National Travel Survey

2.11 Against this background, there is no better time to set out the IRP, as part of the Government’s Building Back Better programme, and to help businesses and communities focus on future growth after the uncertainties of the COVID-19 pandemic. The IRP will help by:

- outlining the long-term plans for rail investment in the North and Midlands to help achieve levelling up in the UK;
- providing a coherent plan which caters for future demand growth and supports economic growth;
- identifying where benefits can be delivered faster and more cost effectively;



- making sure the rail network is playing its part in decarbonisation and our commitments on net zero; and
- giving local communities the basis they need to drive forward their own plans for local connectivity, development and regeneration.

2.12 The publication of the IRP demonstrates that HS2 will not be a project in isolation, creating a separate network, but more clearly considered alongside, and as an integrated whole with, other major rail projects in the North and the Midlands. Through the Plan, the Government has been able to look at ways to harness the benefits of HS2, NPR, MRH together, avoid duplicative investment, and identify interactions between projects. Integrating the network will allow better management of the portfolio and of costs, the opportunity to seek synergies in design and construction to minimise duplication and disruption, and more streamlined decision making.

2.13 Moreover, by providing a clear plan for the future, the Government will provide as much certainty as possible to the supply chain, allowing businesses sufficient time to develop capacity, innovate and boost skills assured of a consistent pipeline of work in the future.

2.14 Integration means improving connectivity between different rail services, as well as integrating rail with other forms of local transport, to give passengers a seamless journey. The Government recently published its 'Bus Back Better' strategy, outlining how buses will become more frequent, more reliable, easier to understand and use, better co-ordinated and cheaper. The Williams-Shapps Plan for Rail focuses on the creation of powerful regional divisions within the rail system allowing for more effective integration with local stakeholder aspirations. These strategies, alongside the IRP's focus on serving city centres, will allow more effective integration between rail and local transport systems and better connectivity for users.



How has the Integrated Rail Plan been developed?

The Oakervee Review into HS2

- 2.15 In 2019, in light of cost increases on HS2, the Government commissioned Douglas Oakervee to chair an independent review of HS2, to assess all existing evidence on the project and consider its benefits/impacts, affordability, efficiency, deliverability, and scoping/phasing including in relation to NPR.
- 2.16 Consistent with the key findings from the Oakervee Review (which was published in February 2020), the Government considers:
- there is a need for greater capacity and reliability on the rail network.
 - the primary requirement is capacity, and although reduced journey times are an important component of the economic benefits, speed should not be the sole decision-making factor affecting the choice of route;
 - the existing plans for HS2 were developed in too much isolation from the rest of the rail network and greater integration is needed with both the rail network and other forms of transport, to support transformational economic change at a national, regional and local level;
 - HS2 Phase 2b (the route to Manchester and Leeds) would be better legislated for in multiple hybrid bills;
 - an Integrated Rail Plan for the North and Midlands is needed to ensure that the benefits of HS2 are maximised, that there is an integrated rail investment programme for the North and Midlands, and that there is an optimised delivery model.²³
- 2.17 The IRP terms of reference were published in February 2020.²⁴ The Plan has been informed by:
- a Rail Needs Assessment, undertaken by the NIC, which was published on 15 December 2020²⁵ following an interim report, a series of stakeholder roundtables and evidence-gathering,²⁶

- consideration by the Infrastructure and Projects Authority of commercial lessons from HS2 Phase One; the approach and methodology for cost estimating; and of UK supply chain capability and capacity;
- work undertaken by Transport for the North (TfN) with the Department for Transport, Network Rail and High Speed Two Limited (HS2 Ltd) on NPR and statutory advice from TfN's Board to the Secretary of State;
- work undertaken by Midlands Connect and Network Rail on Midlands Rail Hub, and advice from the Midlands Connect Board to the Secretary of State;
- previous work and technical assessments by NIC and HS2 Ltd, and consideration of strategic alternatives undertaken for DfT;
- representations received from, and extensive engagement with, regional leaders, local authorities, rail industry, business groups and other stakeholders, including regional roundtables led by the Minister for HS2.

2.18 The Department is grateful for the input and time of all involved, and particularly for the advice of the NIC. In line with recommendations of the Williams-Shapps Plan for Rail, options have been developed through cross-industry collaboration, with the support of secondees from Network Rail and working closely with HS2 Ltd to make best use of technical expertise and knowledge, and ensure an integrated approach.

2.19 The terms of reference for the IRP also included consideration of how best to deliver rail connectivity with Scotland. Since these were published, the Government has asked Sir Peter Hendy to undertake a detailed review of how the quality and availability of transport infrastructure across the United Kingdom can support economic growth and improvements in quality of life. The Union Connectivity Review (UCR), launched in October 2020, is looking at how best to support the Government's strategic ambitions for connectivity between the nations of the UK, with a final report due to be published shortly.

The National Infrastructure Commission's Rail Needs Assessment for the Midlands and the North²⁷

- 2.20 The NIC's assessment recognised that improving rail services can support the economic growth of cities, the engines of our economy, by expanding labour markets so that people can access more jobs; and promoting agglomeration so that businesses can collaborate, compete and innovate more effectively. We need to maximise the opportunities for businesses to attract more people with the skills that they need to support further growth. The NIC also recognised how rail connections could support growth by facilitating access to a wider range of services, making places more attractive to live and work in. Without major new investment the combination of slow journey times and poor reliability risks holding back economic opportunities across the North and Midlands.
- 2.21 As well as inadequate journey times, the NIC also identified reliability as a key constraint, especially for trains serving the North. Northern Rail and Transpennine Express both had lower-than-average punctuality in 2019/20, with the percentage of trains arriving on time at 55% and 41% respectively, compared to the national average of 65%. The Government notes that attempts to run more services have foundered on the capability of the Victorian network, as seen in the timetabling problems of 2018. The cross-industry Manchester Recovery Task Force (MRTF) started in January 2020, is looking at interventions for addressing performance and reliability in and around the North West.
- 2.22 The Commission also found that existing plans to address these constraints – including HS2, NPR, the Transpennine Route Upgrade (TRU), and other schemes such as Midlands Rail Hub – could have a total estimated capital cost in the region of £140–185 billion in 2019/20 prices between 2020 and 2045. However, in its 2018 National Infrastructure Assessment, the Commission had allowed £86.2bn for these schemes within its fiscal remit of investment at a level of 1.0–1.2% of GDP. That means not all the currently proposed major rail schemes in the Midlands and the North can be afforded, at least not without a significant impact on investment in other important economic infrastructure. The Commission made the strategic case for increasing its previous allowance and considered funding scenarios of +25%(£107.8bn) and +50%(£129.3bn) to show how additional spending could transform rail in Midlands and the North.



Lower-than-average punctuality
in 2019/20

Northern Rail

55% of trains arriving on time

Transpennine Express

41% of trains arriving on time

National average

65%

2.23 The Commission considered five different packages:

- **focussing on upgrades** (baseline budget only)
- **prioritising regional links**, under both +25% and +50% scenarios
- **prioritising long distance links**, again under both +25% and +50% scenarios

2.24 The total amount is above the baseline spend (£86bn) in the National Infrastructure Commission's Rail Needs Assessment. The NIC's +25% and +50% funding scenarios, given the NIC's fiscal remit, were in effect "full and final" settlements for rail in the North and Midlands to 2045. At £96bn, this is the largest ever single Government investment in the rail network. The £96bn central estimate sits within an overall range of £85-104bn (in 2019 prices). The Plan will deliver benefits which are in most cases better or similar for both HS2 East and the core NPR network. Developing an integrated railway for passengers and freight users.

Developing an integrated railway for passengers and freight users

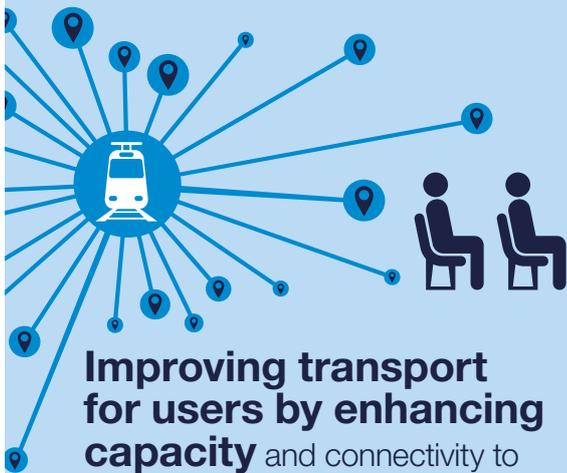
2.25 The Government has sought to improve rail services and economic outcomes across the North and Midlands as quickly as possible through the IRP, including an assessment of whether existing plans for schemes such as the HS2 Phase 2b and NPR can be accelerated. This integrated plan brings together HS2, Midlands Rail Hub, and NPR so that while individual project accountabilities remain clear, there is an overarching strategy to deliver an integrated suite of improvements.

2.26 The investment choices set out by the IRP include a mix of new lines and upgrades to the existing railway, which will transform services delivered across the North and the Midlands.

What are we seeking to achieve: strategic objectives

2.27 The Plan's proposed portfolio is of a major scale and complexity, vital for the future not just of the North and Midlands, but for prosperity of the UK as a whole. It is important the investment decisions are right, and development of the IRP has therefore been guided by the following four strategic objectives, developed to reflect the Government's overall priorities. They are consistent with the Government's National Infrastructure Strategy and DfT's Outcome Delivery Plan²⁸, the nine passenger needs identified in the Williams-Shapps Plan for Rail, and draw on the NIC's work.

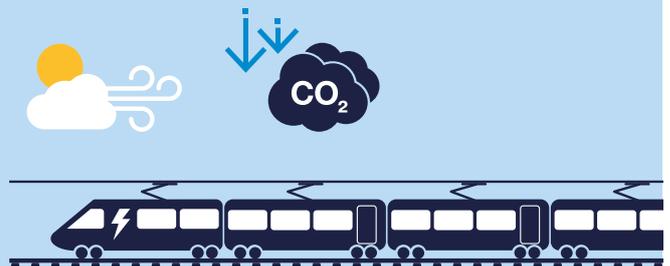
Strategic Objectives



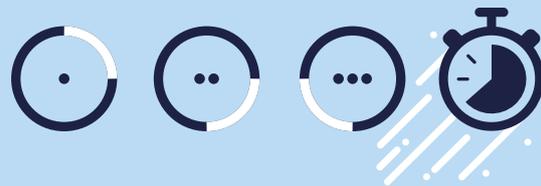
Improving transport for users by enhancing capacity and connectivity to meet long-term rail demand and make journeys faster, easier and more reliable.



Growing and levelling up the economy by creating opportunities for skills, employment, agglomeration and regeneration.



Reducing environmental impact by supporting decarbonisation of the rail network, and accelerating modal shift for passengers and goods.



Ensuring **value for the taxpayer** through **efficient delivery of rail infrastructure**, learning lessons from past projects to ensure that schemes are delivered effectively.

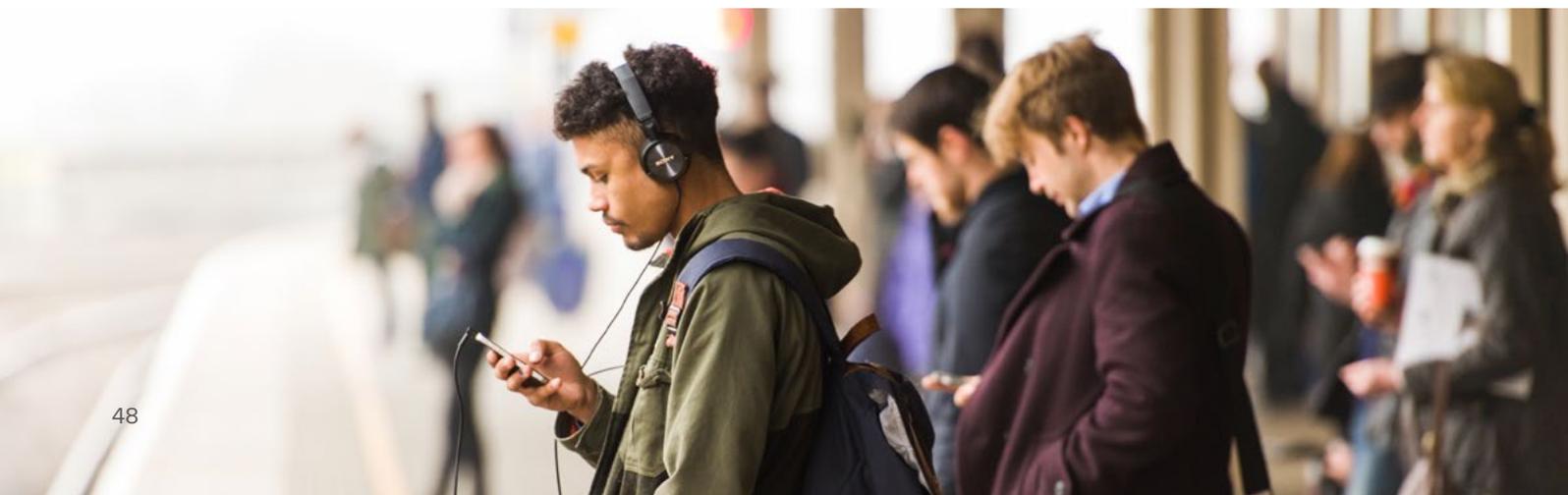
Improving transport capacity and connectivity

2.28 This objective seeks to capture the benefits to transport network users. Research by Transport Focus shows that passengers greatly value a reliable and accessible service; as well as being able to travel in reasonable comfort in a journey time that is competitive with other forms of transport.²⁹ Rail services are part of the wider transport network, and increasing the movement of passengers and freight by train can also benefit road users.

2.29 As outlined by the NIC's Rail Needs Assessment, existing crowding in the Midlands and the North demonstrates the long-term value of increased capacity. The IRP proposes to address capacity constraints and unlock connectivity improvements across the rail network for the North and Midlands. Most railways in the North and Midlands are two-track and carry a mix of traffic. Fast and slow passenger services, share the same lines as freight trains. Few opportunities for overtaking limit both journey times and the total number of trains that can be effectively accommodated, and many key routes are not electrified. Delivering hundreds of miles of new and upgraded track, and new trains, will make rail travel much more efficient, reliable, comfortable, and attractive.

2.30 In delivering frequent and reliable services for millions of rail users in the North and Midlands, the Government has sought to:

- address major capacity, frequency and speed shortfalls on the existing network;
- maximise integration with existing local transport networks;
- serve destinations people want to reach;
- avoid disadvantaging existing passengers and users; and
- minimise the impact on communities, especially those which don't benefit directly.



Levelling up and economic growth

- 2.31 This objective is central to the Government's wider aims and ambitions to reduce regional imbalance in the UK's economic activity. The relatively poor capacity, connectivity and reliability of the rail network serving the Midlands and the North contributes to more isolated labour markets, less economic interaction between individuals and businesses, and a reduced ability to compete for individuals and firms deciding where to locate. The Midlands and the North include some of the most deprived communities in the country, and better transport connections can open up a much wider range of jobs. The IRP is an integral part of the Government's 'Levelling Up' agenda, which will further be set out in the forthcoming cross-Government Levelling Up White Paper.
- 2.32 We are already seeing early signs from Phase One, especially in Birmingham, of HS2 influencing business location decisions. The Government therefore expects that clarity over plans for HS2 and NPR will encourage investors to back development opportunities creating businesses, jobs, and housing across the Midlands and the North. Whilst the IRP can catalyse this local growth, ultimately it relies on local places, with Government support, having the capacity, strategic vision and plans to attract investment. The Government will look to continue to provide support to local places through existing funding mechanisms and is undertaking a review of how best to support growth ambitions to build on the work we have already funded for local authorities to develop their HS2 Growth Strategies. We will also work with Homes England to ensure IRP-led regeneration is fully aligned with their work. This includes identifying the housing/growth opportunities catalysed by HS2.
- 2.33 As we learn to live with COVID-19, people and economic growth are returning to city centres. Rail provides the best transport solution for large numbers of people to access city centres. The IRP will enhance opportunities for more high productivity jobs in the cities of the Midlands and the North. Furthermore, by committing to a long-term pipeline of investment, IRP schemes will help local areas plan for regeneration and secure funding for complementary initiatives. Providing new and upgraded routes for longer distance journeys also frees up capacity on existing lines for local passenger and freight services. The IRP will therefore enhance both inter- and intra-city rail services.



Decarbonisation of the transport network

- 2.34 This objective recognises the crucial role that the UK's transport network plays in ensuring that we can meet our decarbonisation targets and commitments. Transport is responsible for around a third of the UK's Greenhouse Gas emissions.³⁰ The Government is committed to tackling climate change. In 2019, the UK became the first major economy in the world to legislate to end its contribution to global warming by 2050 by reaching net zero emissions.
- 2.35 The recently published 'Decarbonising Transport: A Better, Greener Britain' sets out the Government's plans to deliver emission reductions across all forms of transport and deliver associated benefits throughout the UK. Boosting the number of journeys made by public transport and active travel forms is one of the Government's priorities for transport decarbonisation. Shifting trips to rail can reduce emissions, even as the number of low and zero tailpipe emission vehicles on the roads increases. Rail freight is one of the most carbon efficient ways of moving goods over long distances. On average, freight trains currently emit around a quarter of the CO₂ emissions of HGVs per tonne km travelled, although only 8% of the 196 billion tonne kilometres of domestic freight moved within the UK went by rail in 2019.³¹
- 2.36 Decarbonising the railways is itself a critical component of the Government's plan to reach net zero and the IRP demonstrates how electrification will be sequenced across the network in the North and Midlands, while stimulating regeneration and creating greener job opportunities. The IRP will increase capacity, connectivity and sustainability of rail travel in a number of popular corridors to better help meet the growing passenger and freight demands and support a shift from road and air to rail.
- 2.37 However, the carbon and biodiversity impacts of building new high speed lines are greater than the impacts of upgrading existing lines. Any newbuild must, therefore, be rigorously justified. If similar, transformational capacity increases and journey time reductions can be achieved with a mix of upgraded and newbuild high speed lines that is clearly the option we should take New lines may still be necessary, for example to generate carbon savings via large scale modal shift to rail, where upgrades on existing routes are not capable of meeting future demand forecasts, or if the current infrastructure does not meet the standard required to unlock the benefits of better journey times and more frequent and reliable services.



In 2019, the **UK** became the **first major economy in the world** to legislate to



end its contribution to global warming by 2050

by reaching **net zero emissions**.

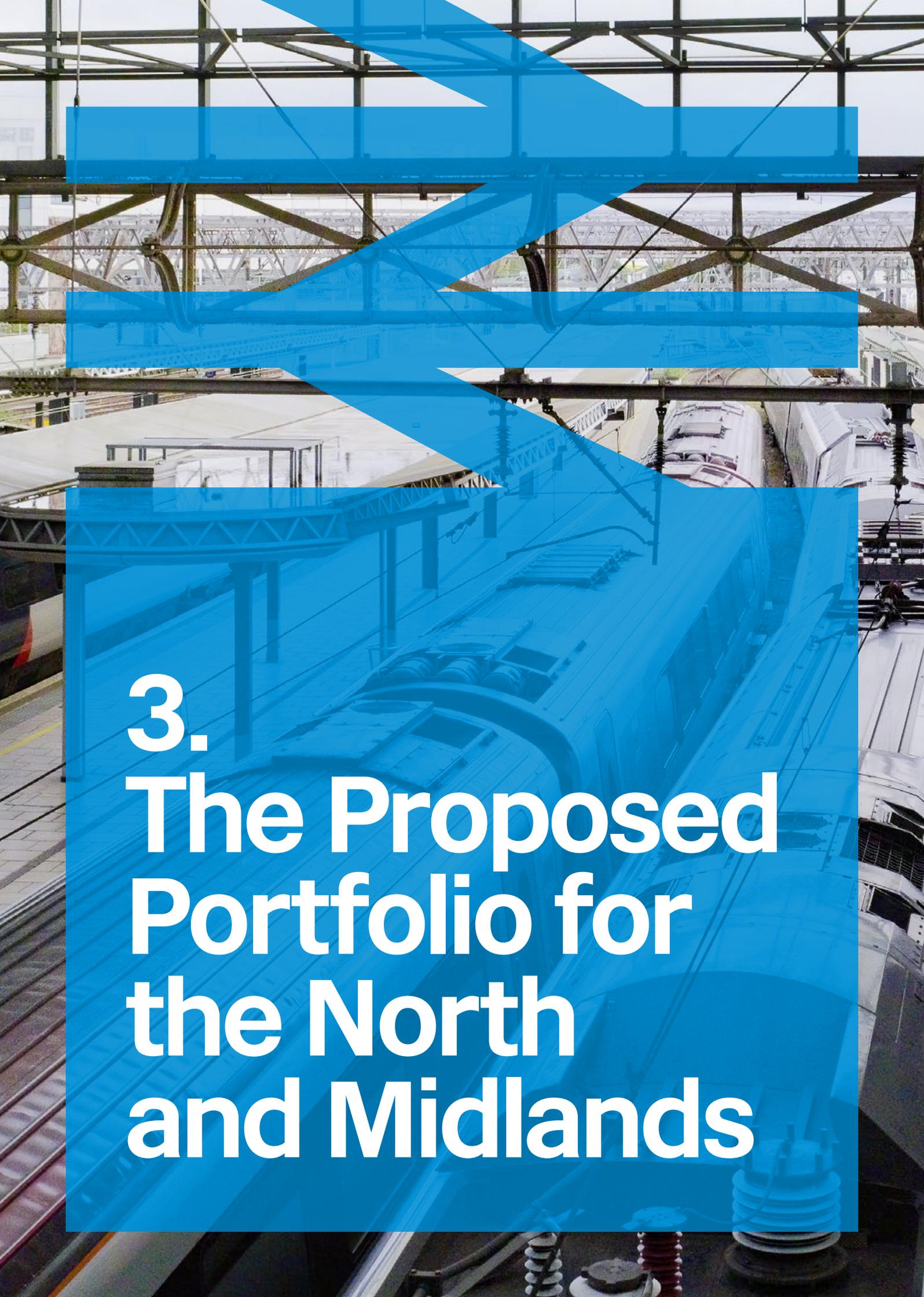
- 2.38 Recognising the climate change challenge, the IRP has identified solutions which look to maximise transport capacity and connectivity benefits, while minimising the carbon impacts of construction and maximising carbon benefits from modal shift from road and air to rail. DfT has initiated a Carbon Management Programme which seeks to manage and reduce the greenhouse gas emissions associated with its infrastructure projects.³²
- 2.39 Protecting the natural environment is at the heart of the IRP's decisions. It is imperative that the network is sustainably operated and managed, in accordance with the Government's 25 Year Environment Plan.³³ The Rail Environmental Policy Statement³⁴ set a clear direction for the rail industry on environmental sustainability. By setting the direction of travel for environmental policy on the railway now, we are building the foundations that will allow us to achieve a cleaner, greener railway that is fit for the future. In response to the Dasgupta Review and as part of its ambition to be one of the most environmentally responsible infrastructure projects ever delivered in the UK, the Government has moved from seeking 'No Net Loss' to aiming for a net gain in biodiversity for HS2 Phase 2b and making this a legal requirement for the other new lines, set out in this plan, classified as Nationally Significant Infrastructure Projects³⁵. HS2 Ltd and Network Rail have industry-leading commitments to environmental protection. Examples include Network Rail's net positive approach and the replacing of natural habitat along the Midland Main Line upgrades, and HS2 Ltd's commitments to no net loss to biodiversity (and to go further to net gain where possible) and to create a 'Green Corridor' along the HS2 route. As with HS2 Phases One and 2a, future hybrid Bills will be accompanied by draft Environmental Minimum Requirements, setting out the environmental and sustainability commitments that will be observed in the construction of the proposed scheme; and will continue to transparently report all relevant impacts in the Environmental Statement.
- 2.40 The IRP proposes to both upgrade existing railway lines and construct new lines. Upgrading existing lines will typically involve fewer carbon emissions than construction of a new line, requiring less emissions to be balanced out through modal and traction shift over the course of operation. We also anticipate that the IRP's greater use of city centre stations (rather than parkway stations) should reduce wider operational carbon emissions by connecting better to local public transport networks, allowing more sustainable travel to and from the stations at the beginning and end of trips.

2.41 Additional land requirements for upgrades are also typically less than for new lines, making it easier to protect existing biodiversity. Whilst there are environmental challenges when building new railway line, it typically requires less land than other infrastructure options. To mitigate against and compensate for the environmental impacts of new railway line, all schemes will include initiatives such as tree planting, new wildlife habitats and new woodlands as appropriate.

Efficient delivery of rail infrastructure

2.42 This objective acknowledges the importance of developing and delivering projects that maximise benefits whilst remaining affordable and keeping disruption to existing networks to a minimum. Major infrastructure projects are complex and high profile. Experience in many countries shows that costs often increase and timescales slip. This can mean plans are no longer affordable within the budgets originally set, and public confidence can be lost. The Government, with the support of the Infrastructure and Projects Authority (IPA), has incorporated lessons learnt on costings from a number of recent rail projects into the IRP, including the use of cost ranges for cost development at such an early stage. In addition to adopting an 'adaptive approach', the IRP provides supply chain visibility and the ability to encourage investment in innovation. The IPA has also helped inform phasing considerations within the IRP by taking a view on the capability of industry to deliver the programme. Some project risks may be genuinely unforeseeable, but good planning should anticipate others, such as consenting timings, supply chain capability, and disruption to existing passengers. These have been considered throughout the Government's decisions on the appropriate schemes and packages in the IRP.

2.43 The Government agrees there are advantages to taking an 'adaptive approach', allowing the portfolio to respond to future affordability and delivery challenges, as recommended by the NIC. In parallel, the Government is continuing its work on 'Project Speed', which aims to deliver vital infrastructure projects better, as set out in Section 5.



3. The Proposed Portfolio for the North and Midlands

Reaching our decisions

3.1 The Government has built upon the National Infrastructure Commission's (NIC) advice and taken a network-wide perspective in reaching decisions on the Integrated Rail Plan (IRP). It has used previous and ongoing analysis developed for the Department; input from regional leaders and other stakeholders, such as Midlands Connect (MC) and Transport for the North (TfN) about regional transport priorities; and technical support from HS2 Ltd and Network Rail (NR). Infrastructure interventions have been compared in light of the strategic objectives set out above, and an assessment of:

- **strategic and economic rationale:** what are the objectives for each intervention and which rail markets does it aim to serve;
- **current proposed/preferred options:** how these proposals meet the required outputs and how they perform in terms of strategic, financial, economic and deliverability considerations; and
- **possible alternatives:** what other options could be affordable, deliver passenger benefits and offer value for money while being phased sensibly;

Economic Uncertainty

3.2 At this time, there is uncertainty about future rail demand as a result of the COVID-19 pandemic. Lockdowns significantly reduced rail journeys in 2020, with April 2020 seeing a drop to between 4% and 6% demand of the previous year. By September 2021 passenger journeys had returned to around 65% of levels seen in the equivalent period for 2019.³⁶

3.3 The Government continues to believe that going forward, many firms and individuals will value the benefits of working face to face. Freight demand and leisure trips have already recovered substantially and commuter travel is growing back, although the overall pattern of demand may be different and varied across the country: for example, commuting every day of the week might reduce, but better connectivity could increase demand for business trips; longer-distance commuting as labour markets expand; and modal shift towards rail for leisure travel and local trips.



Lockdowns significantly reduced rail journeys in 2020

with April seeing a drop to between

4% & 6%
demand

of the previous year.

September 2021 saw **passenger journeys** at around

65% 

of levels seen in the equivalent period for 2019.

- 3.4 The Government has taken account of post-COVID-19 economic and transport demand forecasts in developing the IRP's long-term vision for the rail network of the North and Midlands to 2050. The long-term focus of the IRP means that shorter-term uncertainty is likely to be less relevant than longer-term trends in rail demand. However, under the adaptive approach proposed, as individual schemes are taken forward we will continue to test business cases under varying scenarios for future demand and in the light of the latest evidence available.
- 3.5 The COVID-19 pandemic led to a significant contraction in the UK economy, but this was not equal across sectors or places. Using post-COVID-19 forecasts from the Office of Budget Responsibility (OBR), some schemes within the IRP have a relatively weak economic case under conventional value for money analysis (given the assumptions of fixed land use, with population/employment growth constrained to historic trends). We anticipate that the economic and strategic cases for these schemes will be further strengthened with more detailed analysis of their impacts on the wider economy, including dynamic employment and changes in land use, which will be assessed as individual schemes are brought forward. To account for uncertainty around future demand for rail travel and other appraisal assumptions, options have been assigned value for money category ranges. In line with recent changes to the Treasury Green Book³⁷ the Government has considered value for money alongside the ability of options to deliver against the IRP's strategic objectives set out above.
- 3.6 The IRP has also considered the impact of two different rail freight scenarios agreed with the rail industry. They comprise a 'central case' and a scenario 'in favour of rail freight'. Both scenarios would see an increase in the number of freight trains relative to pre-pandemic levels. Whilst some corridors could benefit from new lines or significant upgrades to existing infrastructure which provides additional network capacity, these interventions must be planned in an integrated way alongside passenger services. This additional capacity could deliver reliability and connectivity improvements for freight operating alongside passenger services.

Building Back Better

3.7 It is crucial for our railways to deliver punctual and reliable services for passengers if we are to Build Back Better. Before the pandemic, national performance had been deteriorating for a number of years, with around half of trains in northern England and a third of trains nationally late in 2019/20³⁸. As with the Williams-Shapps Plan for Rail, performance has been considered in IRP decisions. Increased capacity and operational resilience on the network will ensure that the train services are as reliable as passengers should expect, encouraging greater use of a greener form of transport. Performance improvements are also vital for freight. Britain depends on quick and efficient supply chains, and with the rail freight sector growing, we need to ensure that there is the capacity in place to meet that demand.

An integrated plan for passengers and freight users of the railway

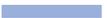
3.8 Although the IRP considers all schemes as a single set of train service improvements and associated programme of investments, this section categorises proposals by geographic scope based on previous plans to help understanding for the reader. It covers the Western Leg of HS2, the Eastern Leg of HS2, Northern Powerhouse Rail (NPR) and schemes within Midlands Rail Hub (MRH). Freight considerations are described alongside the passenger proposals for each corridor.

3.9 The map below outlines the proposed core pipeline of investments.



Map 3:
Core Network

Key

-  HS2 Phase 1 & 2a and WL
-  HS2 Services on WCML via Golborne
-  HS2 East
-  HS2 East Further Development
-  East Coast Main Line Upgrades
-  NPR Core
-  Midland Main Line Upgrades
-  Midland Rail Hub
-  Existing lines
-  New Line
-  Upgrades

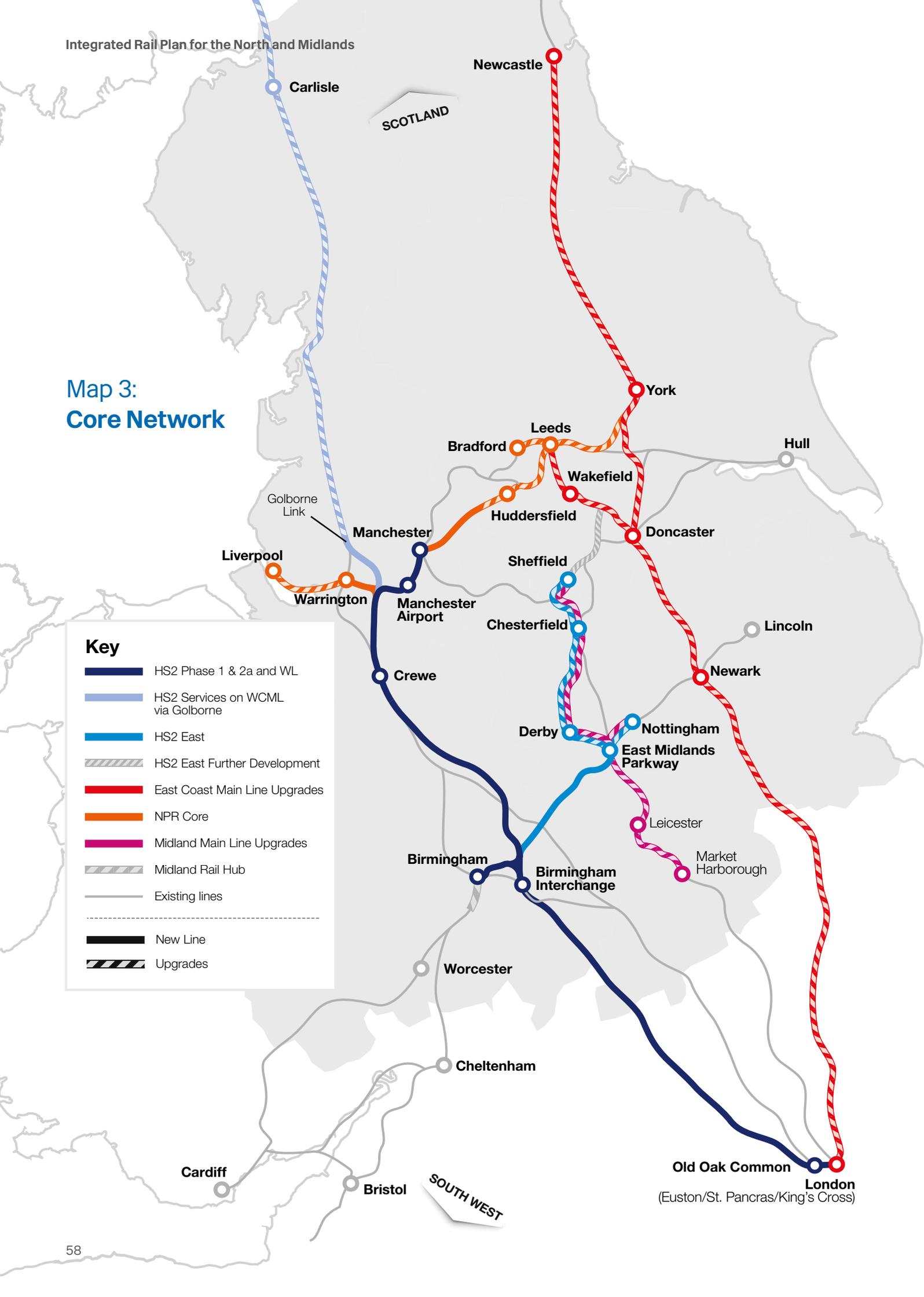
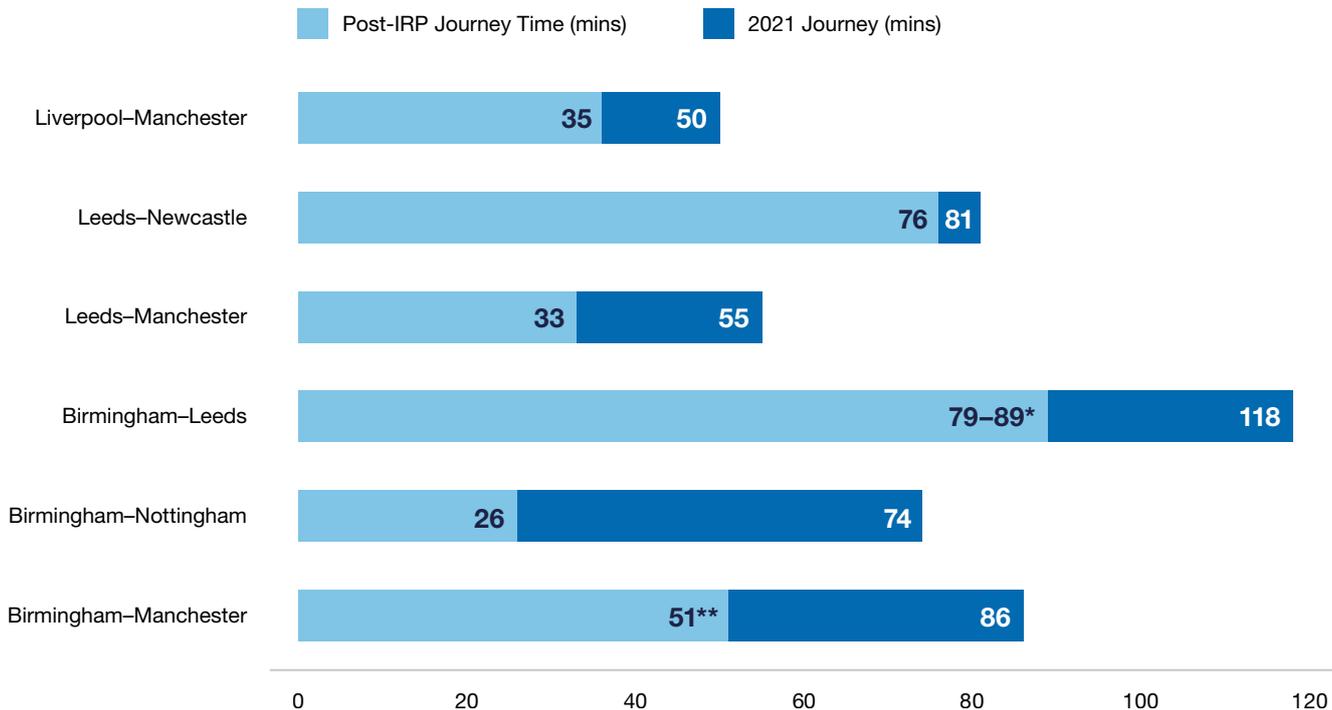


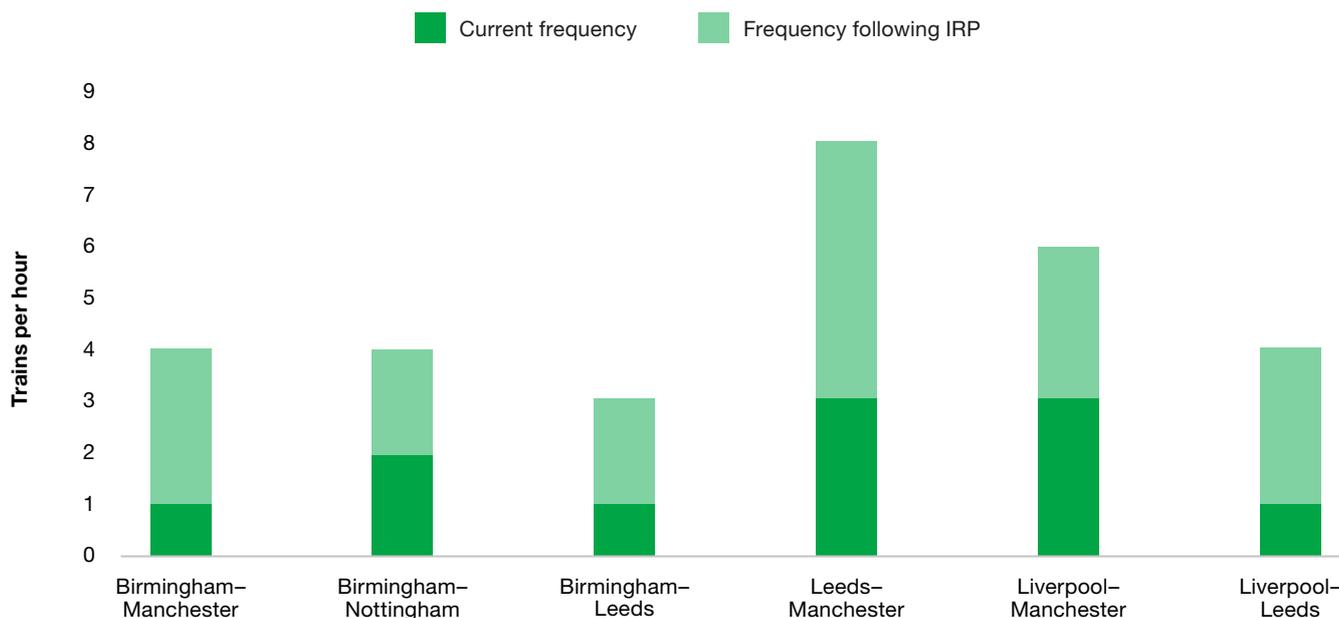
Figure 4: Potential Journey time reductions from IRP Schemes



*Via NPR based on indicative train service and depending on whether train calls at Crewe.

**If train calls at Crewe.

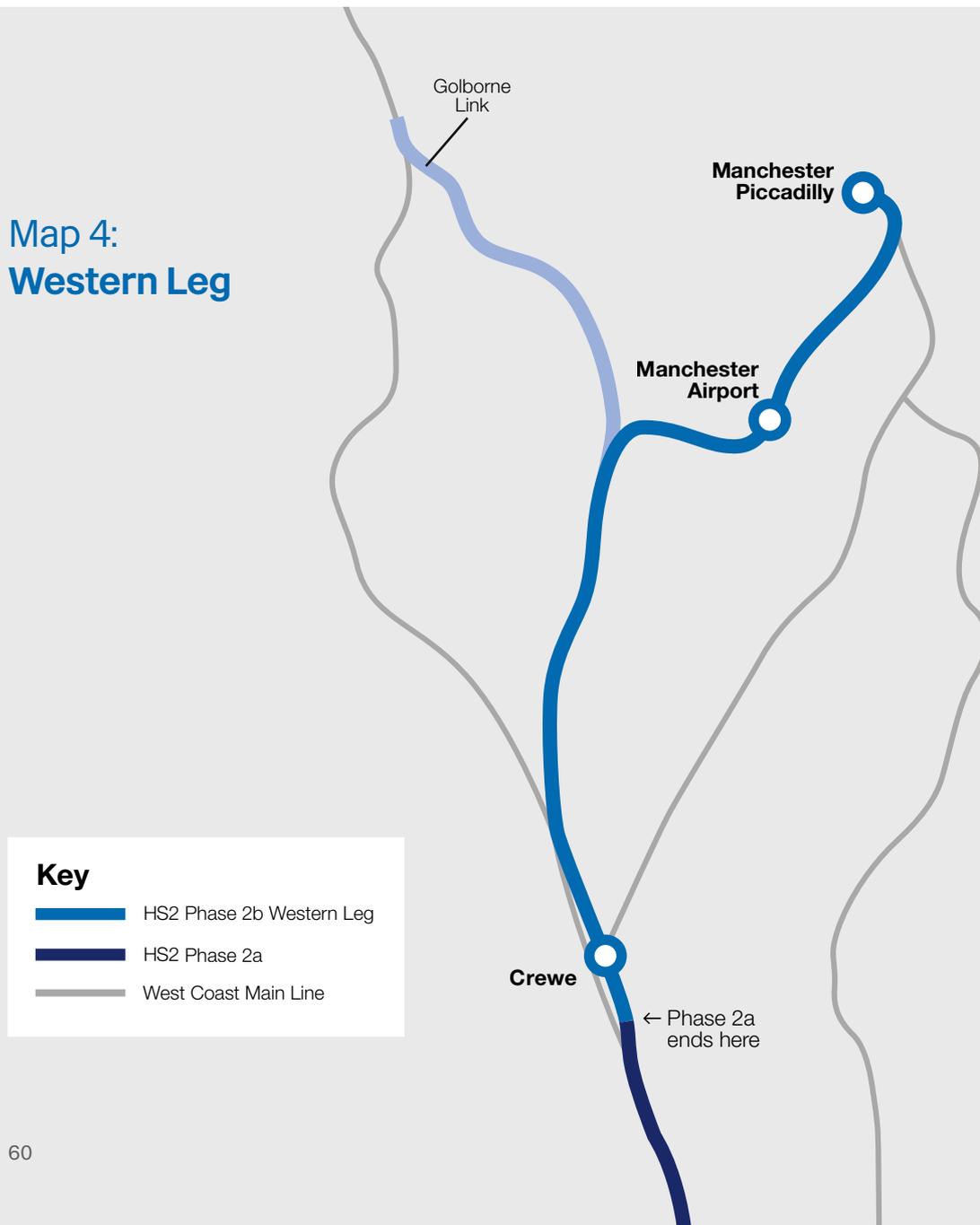
Figure 5: Potential frequency improvements from IRP Schemes



HS2 Phase 2b Western Leg

3.10 HS2 plans since 2012³⁹ have been based on a new line to Manchester city centre with a connection to the West Coast Main Line (WCML) for Scotland services. Following the Oakervee Review, the Government restated its commitment to building HS2, including a decision to split future legislation into smaller Bills to make construction more manageable. Construction of HS2 Phase One (to Birmingham) is now underway and with Royal Assent for the legislation for Phase 2a (to Crewe) received in February 2021, the decision for the IRP is whether to complete the Western Leg to Manchester Piccadilly as planned.

Map 4:
Western Leg



HS2 Western Leg: what the Government proposes in the IRP core pipeline (subject to confirmation in response to the (October 2020) Design Refinement Consultation)⁴⁰:

- to deliver our commitment to complete the high speed line to Manchester. The **Crewe to Manchester** section of the Western Leg of HS2 Phase 2b should proceed as planned. The proposals should include an HS2 station serving Manchester Airport, subject to final agreement of a local funding contribution, designed to enable future use by NPR services as well as HS2.
- the Government remains of the view that **Manchester Piccadilly** is the right location for an HS2 station for Manchester, and that this should be designed for future use by NPR services as well. It continues to consider that an enlarged (6-platform) surface station can meet these requirements at substantially lower cost and construction impact than underground alternatives.
- the Government continues to consider that the design of the Western Leg should include Crewe Northern Connection, so that trains can call at Crewe and re-join the HS2 line.

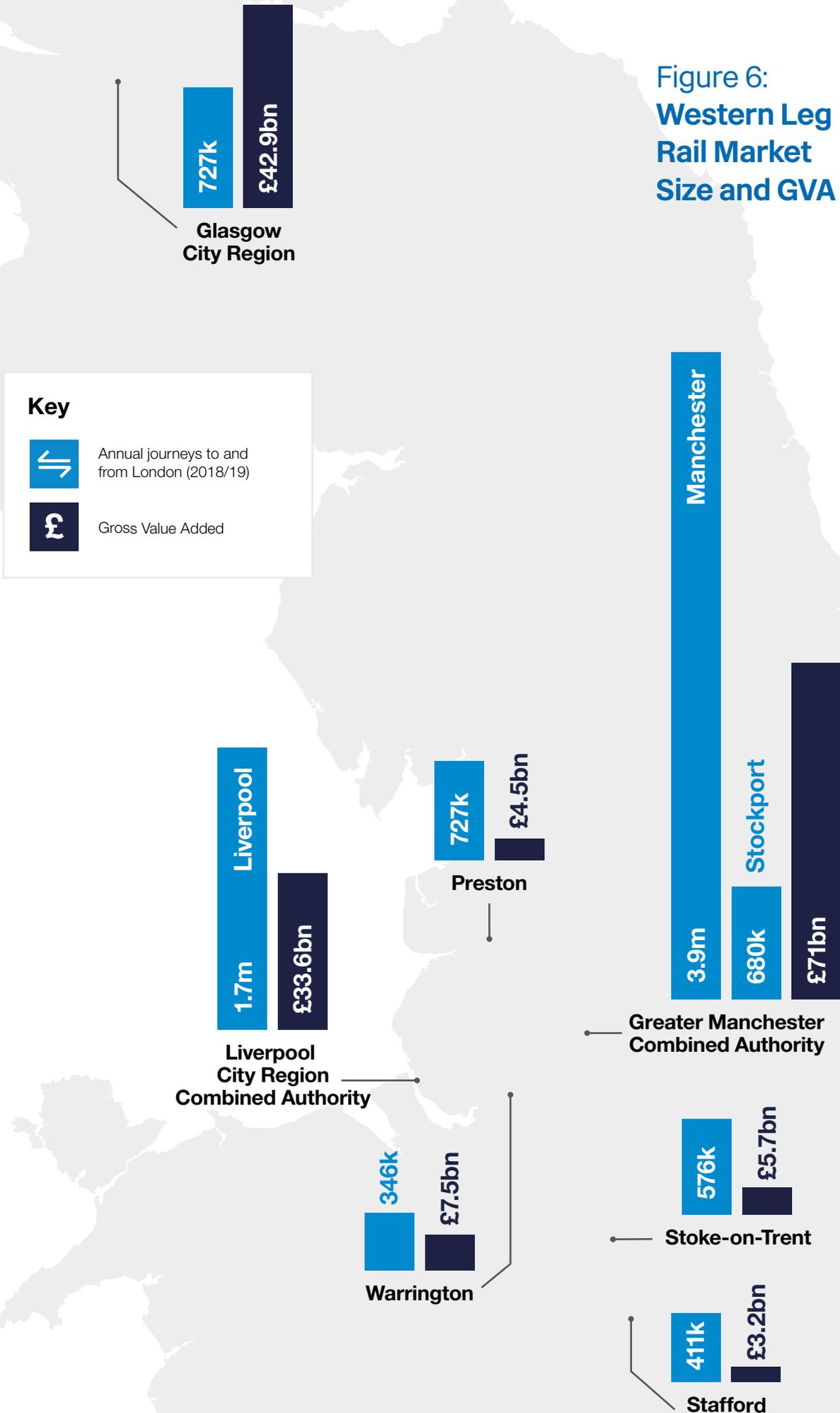
Future possibilities:

- The Union Connectivity Review⁴¹ is considering the case for further improvements for high speed rail services between these nations, including alternatives to the Golborne link from the HS2 Line to the West Coast Main Line.

HS2 Crewe to Manchester: rationale and alternatives considered

- 3.11 Parliament has already approved plans for building HS2 Phases One and 2a, bringing a new high speed line from London to Crewe. Once completed, these sections of HS2 will reduce Manchester–London journey times to 91 minutes from typically 126 minutes today, based on the indicative trains service. However, the 200 metre HS2 trains that can operate in Phase 2a will not provide more capacity into Manchester compared with the current Pendolino fleet, and there is no capacity for additional trains into the city. Only when a new line and new platforms at Manchester Piccadilly are built can more services including both NPR and 400m HS2 services be accommodated. Journey times between Birmingham and Manchester are currently poor compared with speeds to the capital. No improvement is possible without additional track capacity into Manchester, given the need to serve intermediate towns as well.
- 3.12 North of Birmingham, the greatest demand for journeys to London is from Manchester, as figure 6 shows. As set out in section 1, over the last decade⁴² demand on West Coast intercity services has grown significantly. Improving links to Manchester, as the centre of the largest conurbation in the North, is critical for improving the connectivity of neighbouring towns and cities for onward travel.

Figure 6:
Western Leg
Rail Market
Size and GVA



- 3.13 The Government agrees with the NIC that more capacity is needed at Manchester for future growth.⁴³ Alternatives to the current HS2 proposals have been considered extensively both in the route development process, and in the regular assessment of alternatives published by the Department.⁴⁴ Analysis to date has found no conventional alternative way of connecting Manchester to HS2 that is not unreasonably disruptive, whilst it has proved even more difficult to increase train speeds significantly or release new capacity. Alternatives would also not futureproof the railway for future NPR services, which rely on the new high speed line into Manchester.
- 3.14 An updated assessment of value for money of the Western Leg of HS2 Phase 2b will be published alongside the hybrid Bill deposit. No viable alternative to meet the overall strategic objectives of the Western Leg and support NPR has been found. In the consideration of possible alternatives to the current Golborne link in the Union Connectivity Review, the Government will be interested to understand affordable options that maintain, or improve, overall value for money.
- 3.15 The Government therefore intends to proceed with the proposed HS2 route to Manchester, and to bring forward legislation because:
- work has suggested that there are no alternatives which meet the strategic objectives;
 - it is the best available choice to serve Manchester Airport, which in 2019, had the largest number of passengers handled and air transport movements of any airport outside London⁴⁵; and could also dramatically improve access to the airport for NPR;
 - the new Airport station (subject to third party funding) would support regeneration and growth plans in Greater Manchester and Cheshire and provide convenient access for the South Manchester and Cheshire area to Birmingham and London;
 - it could more than double capacity between Manchester and London, from around c1800 to 3900 seats per hour in each direction, with journey times reduced (from the Phase 2a time of 91 minutes to as little as 71 minutes) based on the indicative train service;
 - it more than trebles capacity between Manchester and Birmingham (from 450 to 1,500 seats per hour) with journey times potentially halved (from 87 to 41 minutes, or 51 minutes if a call at Crewe is included);
 - this would deliver benefits as early and efficiently as possible;

X2+ 

More than doubles capacity

between Manchester and London, from c1,800 to

3,900 seats per hour

in each direction...

with journey times reduced

from the Phase 2a time of 91 minutes to

as little as 71 minutes.



- these plans could support: NPR proposals to more than treble seat numbers between Liverpool and Leeds; at least 8 fast trains each hour between Manchester and Leeds;⁴⁶.
- with NPR, they also allow direct, high speed trains between Leeds and Birmingham, via Manchester, in 79–89 minutes, approximately 30–40 minutes quicker than currently based on the indicative train service; and
- enhanced interchange at Crewe would improve connections from North and Central Wales to London, Manchester, and Birmingham and, in the future, Leeds (once NPR is constructed).

Manchester Piccadilly: rationale and alternatives considered

- 3.16 Manchester’s current stations do not have the capacity needed for the improved services planned, including high speed services to Birmingham and London (with the latter assumed to be operated with 400m trains), or for future NPR services. Following a careful sift and site selection process⁴⁷ which considered a wide range of route and station choices, and a public consultation in 2013,⁴⁸ a surface station alongside the existing Network Rail station at Manchester Piccadilly was identified as the best option for providing capacity for HS2. This also allowed the HS2 line into Manchester to serve the airport and was supported by local leaders.
- 3.17 Work by the Department, HS2 Ltd, Network Rail and Transport for the North, shows that an expanded version of the surface station (moving from 4 to 6 platforms) could support future NPR services, as well as HS2. It could be capable of facilitating up to 14 trains per hour from a combination of HS2 and NPR services, which HS2 Ltd judges the maximum practical capability of the HS2 line into Manchester.⁴⁹
- 3.18 Such a station would operate as a “turnback”, which is common in city centres. Several of the busiest through stations on Europe’s high speed networks, including the main stations in Frankfurt, Stuttgart, Zurich, Milan and Rome, operate on the same principle, with hundreds of high speed through trains each week reversing in their platforms during their journeys. There have been few, if any, calls for the Government to reconsider the proposed HS2 route into Manchester via the airport or the choice of Manchester Piccadilly as the station site. There have been calls for an



underground through station as an alternative, including in the Greater Manchester Growth Strategy.⁵⁰ Others, including Greengauge 21,⁵¹ have also proposed a through station for NPR in addition to (and likely separate from) the HS2 station.

3.19 As agreed with the Mayor of Greater Manchester, the Government has commissioned from HS2 Ltd a more detailed analysis of the optimum form of station at Manchester Piccadilly. Based on evidence currently available, the Government remains of the view that a combined HS2/NPR surface station is the right solution (subject to confirmation of the surface design following the 2020 Design Refinement Consultation) because:

- the likely timescales to prepare designs, seek consents, and then build an underground station would mean Western Leg opening benefits were delayed by a minimum of seven years compared with current proposals.



- this would also delay releasing adjoining plots for development compared with a surface station;
- the difference in passenger benefits between the two options is expected to be minimal: an underground station could be quicker for passengers making through journeys (by 2–3 minutes), but this could be at least partly offset by slower approach speeds in some scenarios, longer access times to platforms for passengers boarding or alighting at Manchester, and longer interchange times between HS2/NPR and existing Network Rail platforms at Manchester Piccadilly.
- an underground station is expected to cost a minimum of at least £4–5bn more than a surface station and demonstrate weaker value for money and the risk of increasing construction costs would also be higher;
- the additional costs could not be justified by the value of additional regeneration benefit;
- an underground station construction is complex and would require an excavation of around 1km in length through central Manchester, resulting in an increase in HGV journeys in and out of Manchester city centre of between 13,500 HGV journeys and 43,500 HGV journeys when compared to the surface station (even assuming 90% of excavated material from underground sites could be exported by rail). If this material instead needed to be removed by road it would generate 135,000 additional HGV journeys, in either case increasing congestion in the city centre, and making it difficult for adjacent businesses and retail to trade;
- underground options would likely cause greater disruption to Manchester City Centre in terms of property demolitions and the impacts of construction, including noise pollution and poorer air quality; and
- constructing an underground station at Manchester Piccadilly would be expected to generate a significant amount of additional carbon emissions.

3.20 The Government is therefore minded to consider, subject to confirmation of the changes to the surface level station following the Design Refinement Consultation on the Phase 2b Western Leg, that a surface station, integrating HS2 and NPR, should be retained in the Phase 2b Western Leg hybrid Bill design, on grounds of cost, construction safety and programme implications to the delivery-into-service date of HS2 to Manchester. Within

the total investment anticipated for the IRP, it would also be the case that additional expenditure at Manchester Piccadilly would require a reduction in investment on other schemes elsewhere.

Crewe Northern Connection: rationale and alternatives considered

- 3.21 In 2017 the then Government consulted on, and subsequently confirmed it supported, the vision for a Crewe Hub. Building on the recommendations in Sir David Higgins' Rebalancing Britain report,⁵² this could allow up to 5–7 HS2 trains per hour to call at Crewe, providing connections for passengers to and from Chester and Wales, as well as the local area. The plans would allow 400m trains from London to split at Crewe, with 200m units progressing to each of Liverpool and Lancaster. The reverse would occur with services from Liverpool and Lancaster. This could in turn release capacity on the HS2 core network to allow for an hourly service from London to Stafford, Stoke and Macclesfield.
- 3.22 As set out below, the Government, in seeking to create an integrated network from these investments, envisages a NPR link from the Western Leg of HS2 to Liverpool via Warrington. This will allow HS2 services to access Liverpool via new NPR infrastructure, relieving the existing network and improving journey times. To achieve that and the broader Crewe Hub vision requires the Crewe Northern Connection, so that trains can call at Crewe and re-join the HS2 line. This would also provide more journey opportunities for passengers and capitalise on the journey time and performance improvements delivered by Phase 2b of HS2 north of Crewe.
- 3.23 The alternative to including the Crewe Northern Connection in the scheme would either be to not construct it, or to construct it later. Subject to decisions on the recent Phase 2b Western Leg Design Refinement Consultation. The Government continues to consider that the strategic rationale for the Crewe Northern Connection is strong, and that it would be better constructed as part of the Western Leg scheme to Manchester, rather than subsequently. It has therefore been included within the IRP core pipeline.



Crewe Northern Connection
could allow up to

5–7
HS2 trains
to call at **Crewe**
each hour

Golborne Link and routing to Scotland: rationale and alternatives considered

- 3.24 The Government is committed to improving Union connectivity. Services to Scotland have always been an integral part of the case for HS2. In Phase 2a, an hourly service from London to Glasgow is proposed in the indicative train service, with a journey time of 228 minutes, approximately 40 minutes quicker than today. These trains would join the existing West Coast Main Line at Crewe. The Phase 2b Western Leg design includes the Golborne link, to provide a connection to the West Coast Main Line further north, near Wigan. With further work on the existing network north of Golborne, this allows a twice hourly London service to be introduced by avoiding a congested section of the WCML north of Crewe. This assumes 400m trains would split and join at Carlisle, serving both Edinburgh & Glasgow, and giving a significant increase in seating capacity compared to the hourly London-Glasgow HS2 service planned in Phase 2a. This service pattern allows both Edinburgh and Glasgow to be served from Euston.
- 3.25 The Union Connectivity Review is considering how journey times, reliability and capacity to Scotland could be further improved, over and above existing plans. Evidence from other high speed rail networks⁵³ indicates that as rail gets closer to a 3-hour journey time, it becomes significantly more attractive than air though pricing is also a factor. Such an outcome could support wider decarbonisation objectives.
- 3.26 In relation to the design of the Crewe–Manchester section of HS2, the Government notes that:
- there is a strong case for a connection to the WCML north of Crewe to resolve the capacity constraints which result from a mixture of services using sections of two and four-track railway; and
 - the number and mix of passenger and freight trains, including some services calling at intermediate stations, means the two-track section of the WCML between Winsford and Weaver is heavily congested which leads to reliability issues. The scope to ‘path’ fast trains through this section is limited by the different timing requirements north of Preston, when trains need to be sequenced into another order to address a different set of capacity constraints.

3.27 The Union Connectivity Review is considering whether any alternative approaches to the link to the West Coast Main Line could achieve faster and higher capacity connections for passengers from HS2 to Scotland.

Current and proposed outputs: Western Leg



Journey times in minutes are estimated as follows:

	Now (typical)	Integrated Rail Plan Core Pipeline
Manchester–Manchester Airport	15	7
Birmingham–Manchester	86	41–51*
London–Manchester	126	71
London–Liverpool	132	92
London–Preston	128	78
Birmingham–Preston	96	50
London–Glasgow	269	220
London–Edinburgh (via Preston)	270 ⁱ	228
Birmingham–Glasgow	242	200
Birmingham–Edinburgh	247	197

Note: Figures are indicative and subject to change as schemes are developed. In some cases the capability of the infrastructure will be substantially greater than the proposals shown above.

* Depending on whether trains call at Crewe

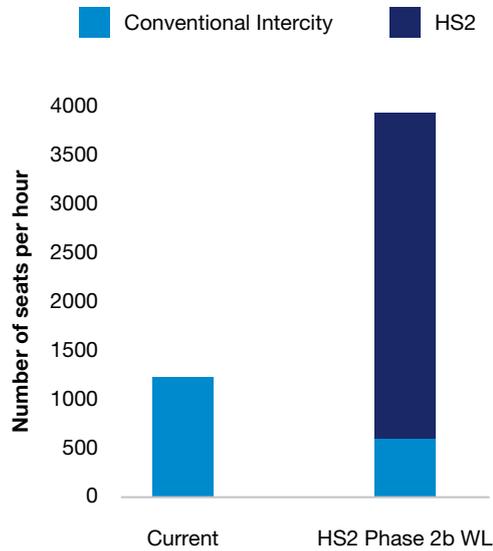
i 260 minutes pre-Covid.



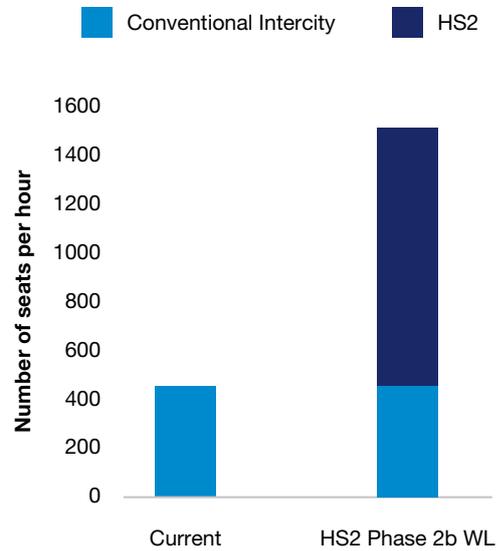


Seating Capacity

London to Manchester



Birmingham to Manchester



In summary, the Government considers these proposals for the HS2 Western Leg best meet the IRP strategic objectives as they:

- will boost **capacity and connectivity** by completing the links between the UK's three largest cities, and tripling capacity for some journeys. Unlike the HS2 Eastern Leg, where there are viable choices on the balance of new line and upgrades, this is not feasible on the Western Leg, as the West Coast Main Line is at capacity;
- will release capacity on existing lines and reduce journey times from Manchester to London and Birmingham. This will support **levelling up**, by encouraging investment and new skilled jobs to locate in the key centres and widen their travel to work catchments, bring the cities closer together. Upgrading existing lines would not deliver the same level of improvement;
- will provide new fully-electrified high speed rail links that will support mode shift onto rail from road and for the Western Leg of HS2 Phase 2b in particular, the significant aviation market between Scotland and the South East, supporting the Government's **decarbonisation** goals (which outputs could not be achieved by upgrading existing lines); and
- allow existing plans to proceed, maximising the pace for **efficient delivery**, and avoiding additional scope which is unlikely to be justified by the benefits obtained.

HS2 Phase 2b Eastern Leg

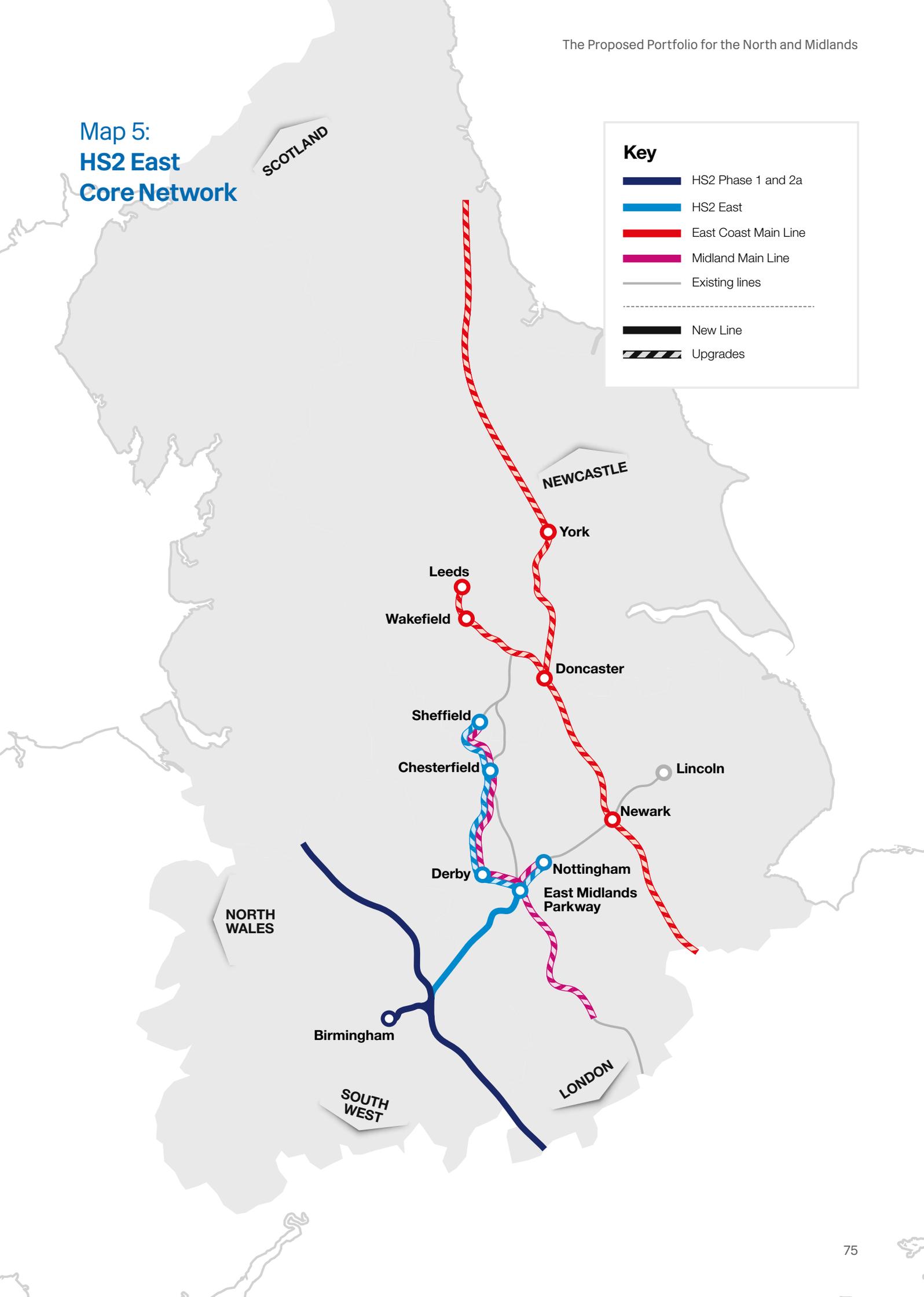
3.28 Under previous plans for the HS2 Y-network, the Eastern Leg was planned to run from the West Midlands to an East Midlands Hub station at Toton, one of three regeneration sites in the region. Trains would then continue north, serving Chesterfield and Sheffield via a spur to the Midland Main Line (MML), or continue on new high speed line to a new station at Leeds, with a spur to the East Coast Main Line (ECML) to serve York, Darlington, Durham and Newcastle. However, in the light of cost increases, concerns about intermediate markets, development of plans for other schemes and analysis indicating a longer delivery timeframe since the route was confirmed in summer 2017,⁵⁴ the Government has considered whether similar or better benefits could be obtained in a more affordable way, earlier and allow for an iterative approach to delivery.



Map 5: HS2 East Core Network

Key

- HS2 Phase 1 and 2a
- HS2 East
- East Coast Main Line
- Midland Main Line
- Existing lines
- New Line
- Upgrades



HS2 East Core Network:

- a **new high speed line from the West Midlands to East Midlands Parkway⁵⁵ (HS2 East)** to be developed by HS2 Ltd, based largely on the existing safeguarded route, but designed to allow trains to reach the existing stations in Nottingham and Derby, and to be capable of future extension. This should allow Derby and Nottingham journeys to London in less than 60 minutes, and Nottingham to Birmingham journeys in around 26 minutes, significantly faster than under previous proposals, which would have required passengers to change at Toton.
- completing **electrification of the Midland Main Line (already being electrified to Market Harborough) to Leicester, Nottingham and Sheffield via Derby.** Combined with the new East Midlands high speed line above, this would give Sheffield and Chesterfield almost exactly the same journey times to London as existing HS2 plans. Electrification will also bring forward decarbonisation of existing diesel services, which will speed up services and improve reliability to towns and cities on Midland Mainline, such as Leicester, Loughborough, and Long Eaton.
- taking forward an ambitious package of further investment on the **East Coast Main Line (ECML) from London to Leeds and the North East**, including elements identified for Northern Powerhouse Rail, with the aim of delivering benefits earlier. We will ensure digital signalling is delivered and also upgrade the power supply to allow longer and more frequent trains, increase maximum speeds up to 140mph in some places, improve the capacity of stations, and remove bottlenecks such as flat junctions and crossings. Because the ECML is more direct than the previously proposed HS2 route via the West Midlands, an upgraded ECML will deliver journey times from London to York and North East England similar to the proposed HS2 scheme (depending on stopping pattern, London to Newcastle and Edinburgh, for instance, could be 25 minutes faster than now, and only 8 minutes slower than under the full HS2 scheme) London–Leeds journeys will be 20 minutes faster than now.

Future possibilities:

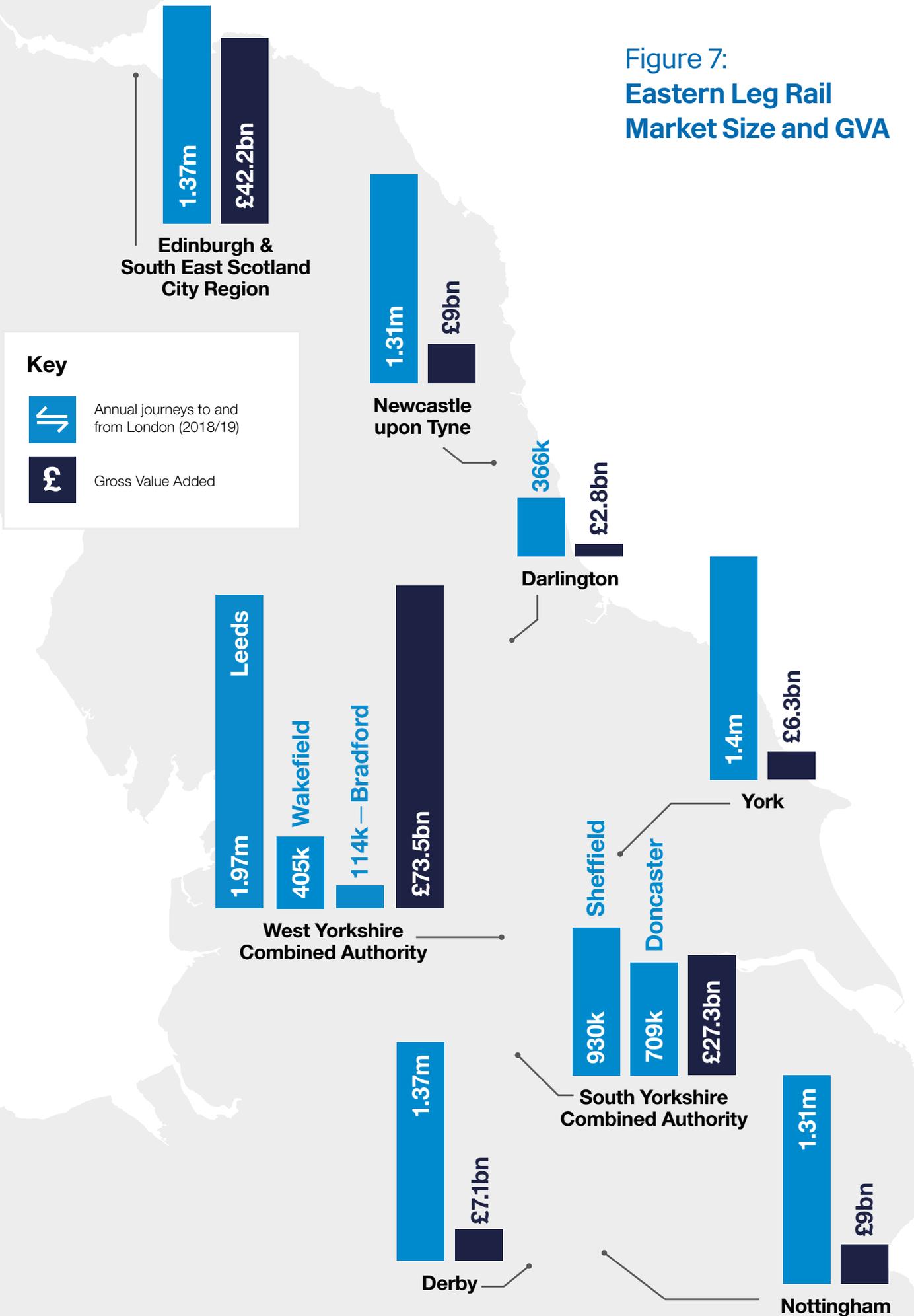
- **We will allocate £100m to start work on the West Yorkshire Mass Transit System** (with further additional funding – see below) and to look at options on how to take HS2 trains to Leeds. We will undertake a study to understand the most optimal solution for Leeds station capacity – particularly in light of post COVID-19 demand and our commitment to the Mass Transit System which could take a number of local services out of the heavy rail station at Leeds.
- **accelerating plans for an East Midlands Delivery Vehicle** following on from the Government's initial announcement in October 2019. The Government will also accelerate transport improvements at Toton, such as a station for local/regional services, with delivery subject to significant private sector investment – on a 50:50 match-funded basis with the taxpayer – coming forward at the site and developer contributions.

Rationale and alternatives considered

The first decision the Government has considered is whether to proceed with previous plans for the HS2 Eastern Leg as a single project and in a single hybrid bill.

- 3.29 Connectivity between key cities in the Midlands, Yorkshire and the North East is currently poor, particularly to Nottingham and Leeds. For example, Birmingham–Nottingham takes 74 minutes for a 45 mile journey; and Birmingham–Leeds 118 minutes. Improving these connections remains a strong opportunity to drive agglomeration, levelling up and future growth, and to bring benefits to passengers and businesses through improved connectivity. Our proposals significantly improve these connections.
- 3.30 Further north, however, local leaders have made clear that a key priority is better east-west links across the Pennines. The NIC's Rail Needs Assessment similarly found that prioritising regional links could bring the greatest overall productivity benefits for cities in the Midlands and the North, which are generally inferior today to the longer distance links to London. The Government has concluded that it is right to consider alternatives to current plans given that:
- cost increases seen on HS2 (including the Eastern Leg) mean fully funding the current proposals would limit the opportunity for other important investments, as set out in the NIC's Rail Needs Assessment +25% scenarios;
 - the size of different markets is more balanced than on the Western Leg (see figure 7 below), and – unlike the Western Leg – there are credible options for upgrading the existing sections of the rail network, combined with sections of new line, which could give similar benefits for many of these markets, as well as places not currently served;
 - unlike the West Coast Main Line, there remains potential to improve journey times and further increase capacity on the existing network (for example, lengthening Intercity East Coast Trains to up to 12 cars as examined in HS2 Strategic Alternatives work),⁵⁶
 - the Government agrees with the Oakervee review finding that it would be preferable to legislate through smaller, more focussed hybrid Bills; and
 - benefits from capacity and connectivity improvements would not be realised until the early 2040s at best if a high speed line was built in 'one go'.

Figure 7:
Eastern Leg Rail
Market Size and GVA



3.31 The consideration of alternatives has been undertaken in three broad sections (West Midlands to East Midlands (HS2 East), East Midlands to the North, and North East connectivity) given that the choices available, and interfaces with other schemes such as NPR and Midlands Engine Rail, are different for each. These sections will still form an integrated network once completed.

West Midlands to East Midlands (HS2 East): rationale and alternatives considered

3.32 Previous work for the Department⁵⁷ identified that the principal alternative to building a new high speed line between the West and East Midlands would be to upgrade the existing Burton–Tamworth line, and connect it to HS2 Phase One around Wilnecote. That could give broadly similar outputs for Derby, Chesterfield and Sheffield from London. However, connectivity to Nottingham would be significantly worse.

3.33 The main constraints with upgrading the Burton–Tamworth line option are:

- it would cause significant disruption to the existing railway;
- it offers only limited improvements in connectivity to Nottingham, which has the largest economy and rail market to London of the East Midlands cities;
- it does not provide flexibility around how the network might evolve in the longer term to serve Leeds and the North East, especially from the West and East Midlands.

3.34 The Government has therefore discounted the Burton–Tamworth option and instead believes that a high speed line from the West Midlands to the East Midlands should be developed.

Toton regeneration and East Midlands station options

3.35 Previous route selection work recommended an East Midlands Hub station at Toton, about 8 miles west of Nottingham and 10 miles east of Derby which was confirmed by the then Government in its 2017 Phase 2b

route announcement. The Government appreciates the level of support for regeneration plans based on a high speed station at Toton. However, there are a number of factors that impact the balance of judgements previously reached:

- Toton was predicated on a high speed line built as a single project to serve Leeds and York/Newcastle. The Government is instead proposing a new plan to directly serve the cities in the East Midlands. It would be preferable for this section of line to end – as with HS2 Phase 2a at Crewe – with a connection to the current rail network to bring more benefits to passengers.
- Updated analysis suggests that requiring passengers from Birmingham and London to change at Toton to reach Nottingham and Derby may in fact offer limited or no improvement for journey times.
- The original plans for the new HS2 interchange at Toton also required significant investment in local transport links to serve the site, including the reorientation of large parts of the East Midlands rail and public transport networks to centre increasingly on Toton rather than on Nottingham and Derby, as now. This could inconvenience local passengers who need to travel to Nottingham and Derby – much bigger local markets than Toton – and was unfunded in the original plans, making it a further risk to the delivery of the scheme. Most HS2 passengers would probably end up driving to Toton, but road access to the site is also relatively constrained. The main access route, the A52 Brian Clough Way, is also the main road between Nottingham and Derby and is severely congested at peak times.

3.36 The Government has considered whether Toton could be redesigned to allow HS2 services to connect to the existing rail network at this location and continue to Nottingham and Derby. Work to date has shown that this would be difficult to achieve without a significant redesign of the proposed station and additional environmental and community impacts. Services to both Derby and Nottingham would also be slower under this option. Derby trains would have to reverse in the station. Services to Nottingham would take a less direct route than if they used the line through Beeston and this would also require a relatively low speed connection, with the potential for multiple conflicts with other services.

3.37 We therefore intend to take forward other transport improvements at Toton, as described below, and for HS2 to serve East Midlands Parkway⁵⁸ an existing station on the Midland Main Line about three miles to the south,

instead. Unlike Toton, East Midlands Parkway is south of Trent Junction, where the lines to Nottingham (via Beeston) and Derby diverge, meaning that HS2 services, from London, could run direct to Nottingham and Derby and, from Birmingham, direct to Nottingham. Like Toton, East Midlands Parkway is next to one of the three planned major regeneration sites in the region, the Ratcliffe-on-Soar power station site. It is also closer than Toton to the third major development site, East Midlands Airport and Freeport.

3.38 However, we are clear that the regeneration planned at Toton will need effective transport links. Toton is another place for which HS2’s previous plans did little until the 2040s. We will accelerate plans for an East Midlands Delivery Vehicle, following on from the Government’s initial announcement in October 2019. The Government will also accelerate transport improvements at Toton, such as a station for local/regional services, with delivery subject to significant private sector investment – on a 50:50 match-funded basis with the taxpayer – coming forward at the site and developer contributions. We will look to exploit any linkages with other investment in Nottinghamshire, including integrating plans for Toton and proposals for reopening and extending the Maid Marian and the Robin Hood lines. A shuttle could also operate from Toton to the HS2 stop at East Midlands Parkway.

3.39 As our core commitment the Government is asking HS2 Ltd to develop a high speed line from the West Midlands to East Midlands Parkway (HS2 East) as the next hybrid Bill to be introduced following the Western Leg to Manchester, with the aim of allowing:

- direct HS2 services to both Derby and Nottingham, utilising Midland Main Line electrification, with an intended journey time of less than 60 minutes from London (**around 26 minutes faster to Nottingham and 25 minutes faster to Derby than under HS2’s original plans**) and less than 30 minutes from Birmingham to Nottingham (**around 29 minutes faster than under HS2’s original plans**, significantly improving agglomeration benefits between the two largest Midlands cities);
- the continuation of Derby services to Chesterfield and Sheffield, again utilising Midland Main Line electrification, with an intended journey time of around 90 minutes from London **to Sheffield (the same as under HS2’s original plans)**;



Nottingham to Birmingham
journey times

**will fall to
26 mins,
48 mins
quicker
than today.**

- a doubling in capacity between both Nottingham and Derby and London, and more than tripling capacity between Nottingham and Birmingham; and
- new paths on the Midland Main Line from St Pancras (as the fastest services to Nottingham and Derby would transfer to the new line, which would not be the case if only Toton was served) enabling more frequent services for intermediate stations.

3.40 Working with Network Rail, HS2 Ltd will be asked to consider options for future-proofing the East Midlands high speed line to allow for services to Leeds.

Serving Leeds, York and North East England

3.41 Under the original plans, HS2 trains would have served Leeds, York and North East England via the West Midlands, with the Eastern Leg branching off from the Phase One line just north of Birmingham Interchange. This is a significantly longer route than the current East Coast Main Line from King's Cross, which goes directly up the eastern side of the country. Due to capacity constraints north of Doncaster HS2 trains to Newcastle and York could also only be accommodated at the expense of existing services, potentially reducing or removing connections between the North East and Doncaster, Newark and Peterborough. Unlike the West Coast Main Line, there is also potential to lengthen existing trains by up to three carriages, increasing the number of seats on those trains by around 40%.

3.42 The IRP has concluded in favour of a significant package of upgrades to the East Coast Main Line which could deliver similar journey times to London and capacity improvements for York and the North East as the original proposals – but many years sooner, and with operational carbon savings because trains will be taking a shorter route.

3.43 We are therefore taking forward a substantial package of investment for the East Coast Main Line between London and Leeds and the North East, subject to future business case. Development work will consider interventions from both NPR designs undertaken by Network Rail, mainly focussed on York and northwards, and work undertaken by Mott MacDonald for the Department for Transport focused on the line south of York. North of York we will look to increase the number of paths for long distance high speed trains from 6 to 7 or 8 per hour. In addition to the already-planned roll-out of digital signalling, work is expected to include looking at opportunities to improve rolling stock

performance; power supply upgrades to allow longer and faster trains; route upgrades to allow higher speeds, including of up to 140mph on some sections; measures to tackle bottlenecks, for example south of Peterborough and at stations and junctions such as Newark, Doncaster, York, Northallerton, Darlington and Newcastle all of which limit speed and capacity; and to replace level crossings where needed. We will ask Network Rail to now take forward these proposals, including considering any alternatives which may deliver better outputs and/or more cost-effective solutions.

3.44 This package is intended to:

- cut journey times from London to a range of destinations, including Leeds, Darlington, Northallerton, Durham, and Newcastle by up to 28 minutes,⁵⁹ bringing journey times closer to those proposed by HS2, much earlier than previously planned;
- allow the introduction of longer trains, increasing the number of seats;
- provide 7–8 long distance high speed paths per hour north of York to Newcastle, compared to the current 6 paths (and so allowing a minimum of two fast Manchester to Newcastle services each hour alongside other ambitions); and
- improve performance and reliability, enabling faster and more reliable services for passengers.

3.45 Journey times from London to Newcastle under this plan could be as little as 2 hrs 25-28 minutes (subject to stopping pattern), about 21-24 minutes faster than now and 8 minutes slower than under the full HS2 plans. Journey times to York and Darlington under this plan would be about 15 minutes faster than now and 12-14 minutes slower than under the full HS2 plans. Journey times from London to Leeds, at around 1 hour 53, would be about 20 minutes faster than now, but 32 minutes slower than under the full HS2 plans.

3.46 Journey times from Birmingham to Leeds would be around 30 minutes faster than the current typical time, and, subject to further analysis, York and the North East could be around 30 minutes faster than the current typical time, via HS2 Western Leg, Manchester and NPR (based on indicative train service).⁶⁰



IRP will cut journey times from London to a range of destinations, including Leeds, Darlington, Northallerton, Durham, and Newcastle by up to 28 mins



East Midlands to Leeds: rationale and alternatives considered

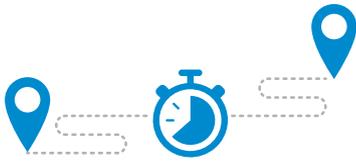
- 3.47 In the light of the cost increases seen on HS2 since the Phase 2b route was confirmed in 2017, as identified in the Oakervee review, the Government believes a wider range of options need to be considered. As well as the improvements to the East Coast Main Line above, and the new high speed service from Birmingham to Leeds and the North East via Manchester, **we will look at the most effective way to run HS2 trains to Leeds.** We will allocate £100m, along with additional sums going to West Yorkshire Combined Authority, to start work on the metro, as well as looking at options on how to take HS2 trains to Leeds. We are funding quick-win upgrades around Leeds station. On top of this, we will carry out enhancements at Leeds station as part of NPR. We will undertake a study to understand the most optimal solution for Leeds station capacity – particularly in light of post COVID-19 demand and our commitment to the first phase of the West Yorkshire Mass Transit System.
- 3.48 We will look at the most effective way to run HS2 trains to Leeds and start work on the new West Yorkshire Mass Transit System
- 3.49 This work will inform decisions about future-proofing to be reflected in the hybrid Bill design for the East Midlands high speed line (if necessary, during its passage) to minimise the risk of costly changes later; and on safeguarding of the current route. However, pending conclusion of the work set out above, the Government does not intend to lift safeguarding on the previously proposed HS2 route at this time. Safeguarding Directions are kept under review and updated periodically to reflect the latest route design, and keeping the current provisions in place this will ensure that affected residential property owners retain access to the various support schemes.



West Yorkshire Mass Transit System

- 3.50 Leeds is the largest city in western Europe without light rail or a metro. By any standard, it and the wider West Yorkshire conurbation need better local transport as well as better, faster trains to other cities. West Yorkshire Combined Authority has drawn up exciting plans for a West Yorkshire Mass Transit System, which could involve tram-trains (as in Sheffield), conventional light rail, prioritised bus rapid transit corridors or a mixture of these technologies. As with Manchester's Metrolink, the system would improve transport both within Leeds and to other towns and cities in West Yorkshire.
- 3.51 The IRP and West Yorkshire's new City Region Sustainable Transport Settlement (CRSTS), announced at the 2021 Spending Review, will together commit more than £200m from central government to further develop and start work on delivering these plans, alongside the assessment of how best to get HS2 services to Leeds. We intend for some parts to be in service by the second half of this decade. The cost for the initial network, over ten years, is expected to exceed £2bn. There are inter-relationships between the Mass Transit System and the other schemes in the IRP, particularly at Leeds station, where the metro could free capacity by removing some local services, as Metrolink did from Manchester Piccadilly. The mass transit system and the other schemes in this Plan must, therefore, be planned and delivered in a co-ordinated fashion, rather than separately, as now. As in other light rail schemes in the West Midlands, South Yorkshire, Nottingham and Greater Manchester, we will also expect local taxpayers to make a contribution to the system's capital costs.

Current and Proposed Outputs: Eastern Leg



Journey times in minutes are estimated as follows:

	Now (typical)	Integrated Rail Plan Core Pipeline
London–Nottingham	92	57
London–Derby	86	58
London–Sheffield	118	87
London–Leeds	133	113
London–York	112	98
London–Newcastle	169	148 (145 non-stop)
Birmingham–Nottingham	74	26
Birmingham–Leeds	118	79–89**
Birmingham–York	147 ^{*i}	110**
Birmingham–Newcastle	206 ^{*ii}	167**

Note: Figures are indicative and subject to change as schemes are developed.

* Pre-Covid there were a small number of faster trains each day.

** Via NPR based on indicative train service and depending on whether train calls at Crewe.

i 130 minutes pre-Covid.

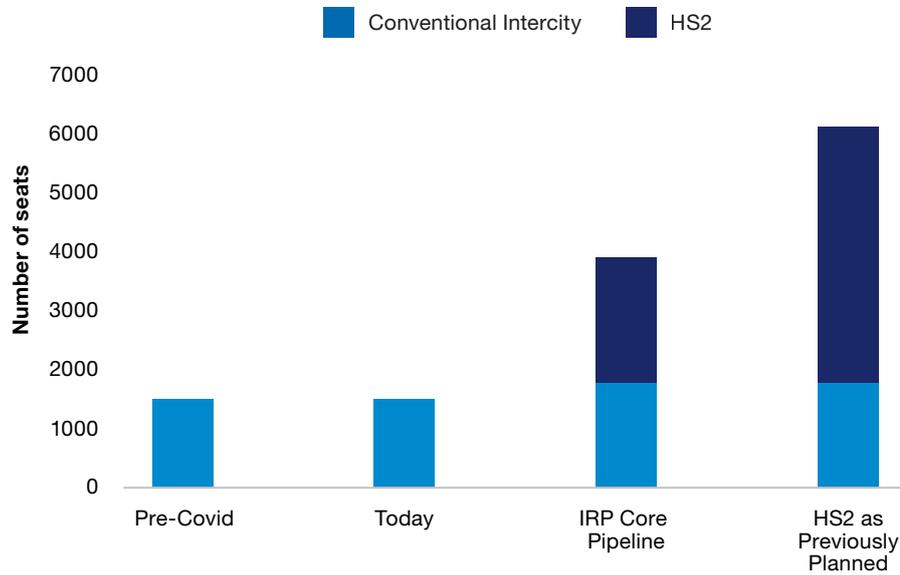
ii 194 minutes pre-Covid.



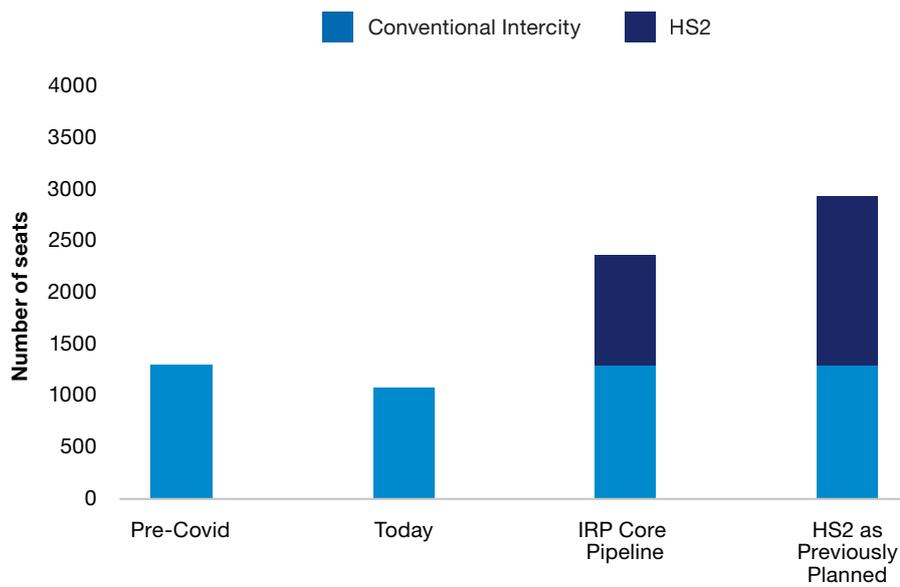


Seating Capacity

London to East Midlands

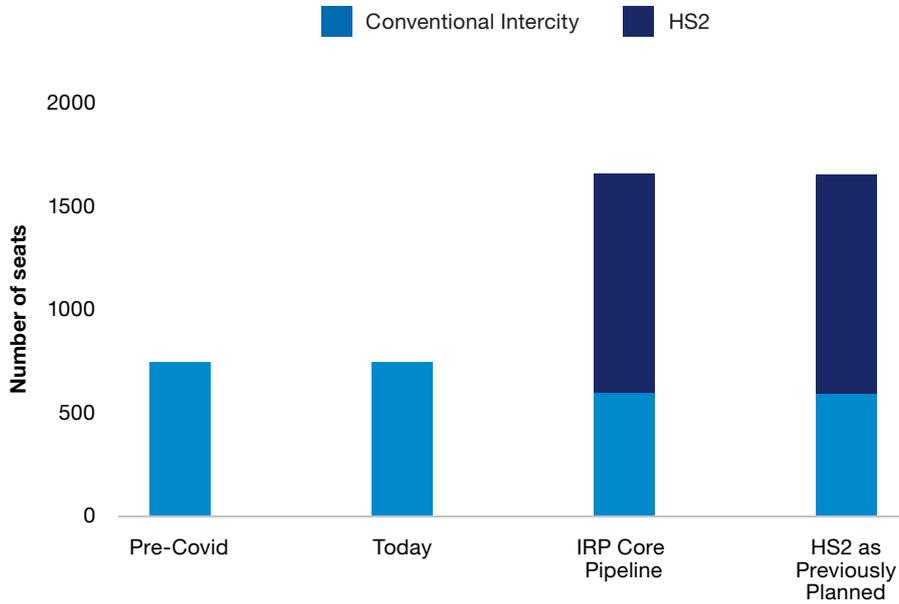


Birmingham to East Midlands

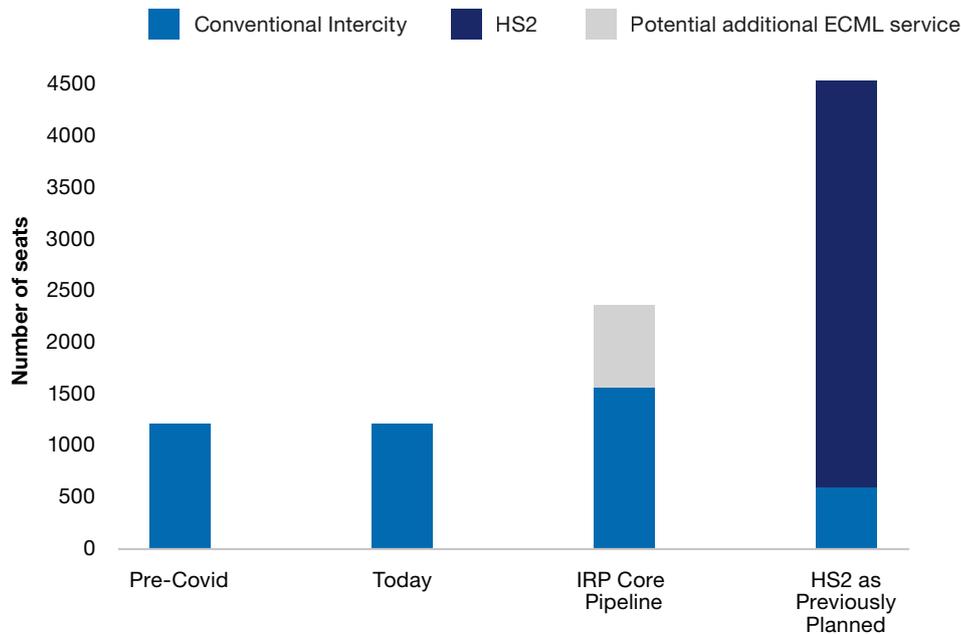




London to Sheffield



London to Leeds⁶¹



In summary, the Government considers these proposals best meet the IRP strategic objectives as they:

- will bring benefits to the East Midlands, Sheffield and Chesterfield, Leeds and the North East more quickly;
- will transform connectivity and capacity across the Midlands, bringing key cities closer together, increasing the size of the catchment area that employers and employees can efficiently and sustainably travel within;
- ensure the Government delivers value for money.
- can still support major regeneration plans at Toton, while allowing additional opportunities at East Midlands Parkway to be considered;
- deliver electrification of the MML, with the potential to continue further north of Sheffield over a network that currently has many diesel trains, contributing to our decarbonisation targets and commitments; and
- support an adaptive approach, capable of adjustment in the light of future demand and costs.



Northern Powerhouse Rail

3.52 The Northern Powerhouse Rail (NPR) vision was established in 2015⁶², to radically improve connectivity between the major cities of Liverpool, Manchester, Leeds, Sheffield, Hull and Newcastle, and with Manchester Airport. In 2019, shortly after he came to office, the Prime Minister promised to fund the Manchester-Leeds section of NPR. For this section, and for Manchester to Liverpool, Transport for the North presented us with three different options.

- Option 1 was a mixture of new-build high speed line, covering roughly half the route from Liverpool to Leeds, and upgrades to the existing lines into Leeds (via Huddersfield) and Liverpool (via Warrington Bank Quay) for the rest of the route.
- Option 2 was for an entirely new-build high speed line between Leeds and Manchester, including a new station on the outskirts of Bradford; a new line from Warrington to Liverpool (with a parkway station at Warrington); and an underground Piccadilly station with a connection allowing it to be used for Sheffield services.
- Option 3 was the same as Option 2, but with a new central station underground at Warrington (still offering less convenient interchange to Bank Quay); and an underground station in the vicinity of the existing Bradford Interchange station.

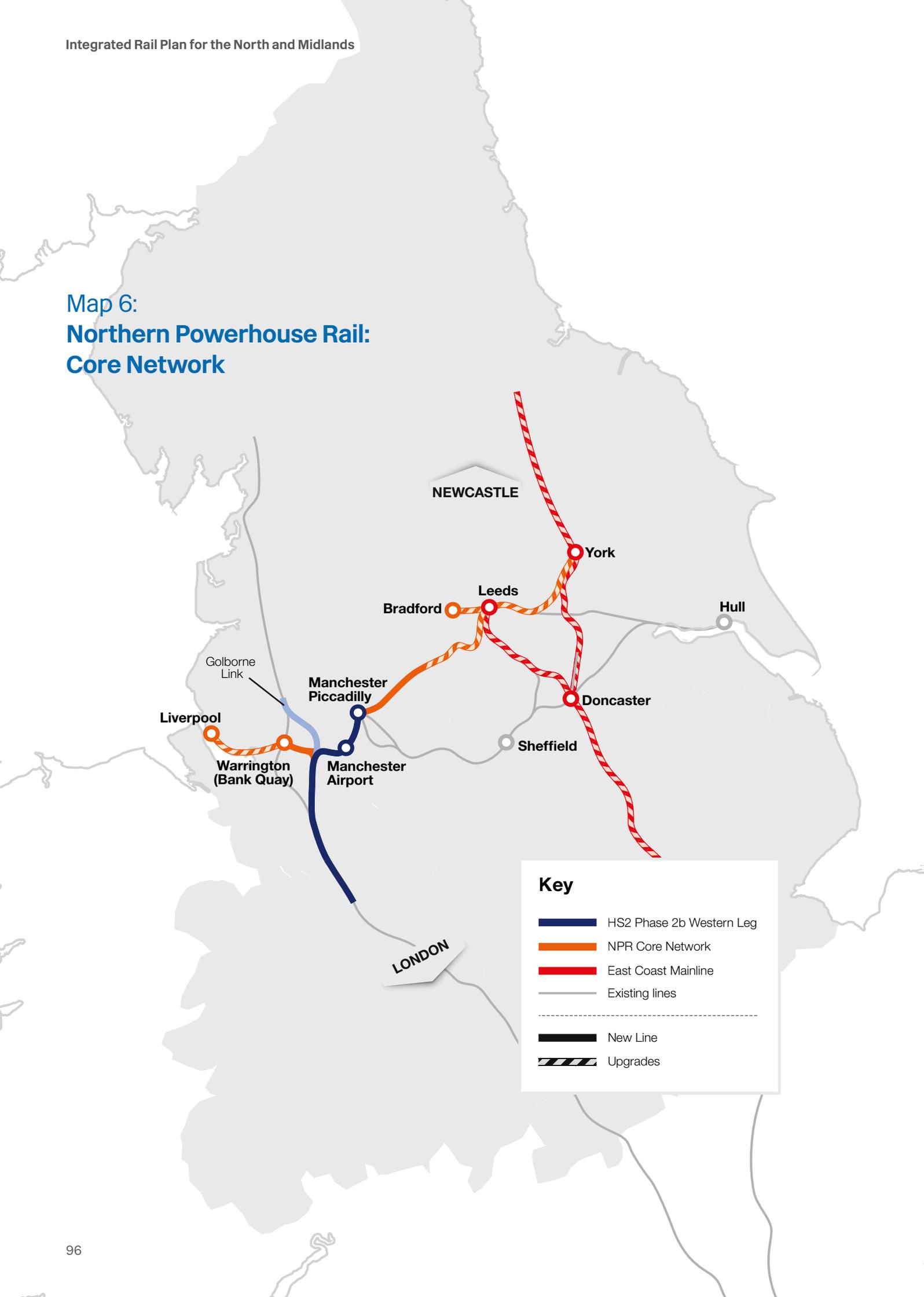
3.53 All options also included significant upgrades (and, where appropriate, electrification) of the existing railways to Sheffield, Newcastle and Hull, with the scope of these works somewhat greater in Options 2 and 3. TfN's preference was for Option 3. Since 2019, extensive work has been done to refine these options and consider the costs and benefits of different choices. TfN's statutory advice to Government has remained in favour of a station in central Bradford although Bradford Metropolitan District Council has since published proposals for a new surface station in Bradford on the site of St James' Market as an alternative.

3.54 The assured cost estimates from Network Rail and HS2 Ltd for the latest versions of the different networks suggest Option 1 would cost £22bn, Option 2 £31bn, and Option 3 £36bn,⁶³ but that the options would deliver similar journey times. Having carefully considered the scope and affordability of the IRP portfolio, the Government has concluded that it is right to focus on the core NPR network now, connecting Liverpool, West Yorkshire and Greater

Manchester as the three largest economic areas in the North, where unifying labour markets will create the most new job and business opportunities. These corridors have also been considered together, because the fundamental decision the Government faces on NPR is whether or not to invest in new East-West capacity through Manchester using the HS2 line and Manchester Piccadilly station. This extra capacity will still benefit cities and towns across the North, such as Hull, Darlington and Newcastle. Any development work on other NPR corridors should come later, depending on the affordability and deliverability of the core portfolio.

- 3.55 In the light of the Government's plans for HS2 East set out above, proposals for improvements between Sheffield and Leeds, and York and Leeds, will need revisiting, as work to date has assumed the HS2 line to Leeds is constructed (and used for both Sheffield-Leeds and Leeds-York services). NPR will be optimised as a result of our improved plans.
- 3.56 The full new-build schemes (Options 2 and 3) were not well integrated into the rest of the rail network. In particular, they made little reference to – and would have undermined the business case for – existing plans, known as the Transpennine Route Upgrade (TRU), to improve and partially electrify the current Transpennine Main Line between Leeds and Manchester via Huddersfield. Two projects for rail services between the same two places were effectively being proposed in isolation from each other, and when the NPR new line opened, the number of services through Huddersfield would have reduced, even though billions had been just spent on upgrading its railway.
- 3.57 Under either Option 2 or 3, the proposed NPR stations in Bradford and Warrington would be further removed from the existing public transport network. A through station at or close to St James Market, now put forward as Bradford Council's preferred location, would create journey time savings and facilitate wider regeneration, but would be further from the city centre than the current integrated bus-rail interchange, would be severed from the centre by a six-lane highway, and would be poorly connected to other local rail services, including those running to other parts of the Bradford metropolitan area, such as Shipley, Keighley and Ilkley.
- 3.58 A parkway stop at Low Moor on the southern outskirts, would have been still more isolated from the rest of the public transport network. Poorer access to these new NPR stations would to some extent cancel out the quicker journeys available from them. Either a new underground station, or a parkway, at Warrington would also have offered worse connectivity than now with local rail services at the existing Bank Quay station, and with local buses.

Map 6: Northern Powerhouse Rail: Core Network



NEWCASTLE

York

Leeds

Bradford

Hull

Golborne Link

Manchester Piccadilly

Doncaster

Liverpool

Sheffield

Warrington (Bank Quay)

Manchester Airport

LONDON

Key

- HS2 Phase 2b Western Leg
- NPR Core Network
- East Coast Mainline
- Existing lines
- New Line
- Upgrades



3.59 Of the three options, all were low to poor value for money. Option 1 had the strongest business case, but even it had only a marginally positive benefit cost ratio, whereby under standard appraisal assumptions the infrastructure delivers more benefits than it costs to build. Rail schemes in the North are at increased risk of being considered poor value for money when applying conventional cost-benefit analysis. This is driven in part by smaller city populations in the North, different travel patterns, as well as the general high cost of building rail infrastructure. However, with recent reform to Green Book guidance, the Government has also considered the strategic intent of the schemes such as levelling up and net zero.



Northern Powerhouse Rail: what the Government proposes in the IRP core pipeline:

- **between Liverpool and York, to build NPR in line with the 2019 Option 1 developed by Transport for the North.** This will see:
 - 40 miles of newbuild high speed line between Warrington, Manchester and Yorkshire (to the east of Standedge tunnels);
 - upgraded and electrified conventional line for the rest of the route;
 - significant improvements to the previous Transpennine Route Upgrade (TRU) plans between Manchester and Leeds, including electrification of the whole route, digital signalling throughout, significantly longer sections of three and four-tracking, and gauge upgrades to allow intermodal container freight services. This will now form the first phase of NPR;
 - electrification of **Leeds–York** with some sections of four-tracking;
 - upgrades and electrification of the **Leeds–Bradford** section of the Calder Valley Line; and
 - reinstatement of Warrington Bank Quay low level station; upgrading and electrifying existing lines between Warrington and Liverpool; and enhancing Liverpool Lime Street station.

Future possibilities:

- The Government has identified a core pipeline of schemes and any further schemes (such as Hull upgrades) will be subject to affordability, delivering commitments on time and to budget, and complementary investments being made. Given the scale of the IRP core portfolio, the Government considers that this – alongside the development work at Leeds and on the Midlands Rail Hub – needs to be the immediate focus for the supply chain and delivery bodies.

- 3.60 As noted by the NIC's Rail Needs Assessment, problems of slow, unreliable services and commuting capacity issues may have contributed to restricted growth in the North and surrounding towns. There is, therefore, a strong strategic case for progressing with the NPR programme to significantly improve journey times and capacity across the North of England. Delivering NPR would substantially improve connectivity between key northern cities, yielding benefits through economic agglomeration and community regeneration that would help the North to realise its economic potential and maximise opportunities for international travel and trade.
- 3.61 Strategically, NPR would also enable the North to deal with increased rail demand across the region. The enhanced rail service would substantially improve business and leisure travel across the North and provide a green and sustainable public transport helping the country to reach its 2050 net zero carbon target.

Liverpool to Manchester, Leeds and York overall approach: rationale and alternatives considered

- 3.62 We are focussing on delivering the core of a NPR network now, as Liverpool City Region, West Yorkshire and Greater Manchester represent the three largest economic areas in the North and better connecting them will deliver the majority of the benefits of the NPR scheme. These regions will substantially benefit from improved links, and unifying labour markets will create new job and business opportunities. The core pipeline will also deliver benefits to towns and cities across the North including Darlington, Hull, Newcastle and Halifax. These corridors have been considered together, because the fundamental decision the Government faces on NPR is whether or not to invest in new East-West capacity through Manchester using the HS2 line and Manchester Piccadilly station.
- 3.63 Through fast services between Liverpool and Leeds are currently limited to one train per hour (2tph pre-Covid) via Manchester Victoria. These currently give a journey time of around 37 minutes from Liverpool to Manchester. After a long dwell at Manchester Victoria, the train takes 55 minutes from Manchester to Leeds (pre-Covid saw faster journey times). However, access to Manchester Airport is poor, at around 71 minutes from Liverpool and 90 minutes from Leeds. In addition, local authorities and TfN have wanted to

see NPR services concentrated at Manchester Piccadilly, not split with Victoria, to enable easy interchange. Current journey times to Manchester Piccadilly are slower at 50 minutes from Liverpool and 55 minutes from Leeds.

3.64 Prior to the COVID-19 pandemic, there had been significant demand growth over the previous decade between Liverpool, Manchester and Leeds. Passenger journeys between Liverpool and Manchester grew at an average annual rate of 8% between 2010/11 and 2018/19. Between Manchester and Leeds, this figure is 5%.

3.65 An extensive assessment of rail options by Network Rail and Transport for the North, with economic analysis undertaken by TfN, has shown that:

- the most cost-effective way of increasing the number of fast services from Liverpool to, and through Manchester, is to use spare capacity on the proposed HS2 line into Manchester. Any alternative approaches would likely mean digging an extra tunnel into and through Manchester instead, which would be more expensive.
- this would have the added benefits of: allowing an NPR route to Liverpool to also be used for HS2 London–Liverpool services, freeing up capacity on the existing West Coast Main Line through Runcorn for additional local passenger or freight services; transforming connectivity from both Leeds and Liverpool to Manchester Airport; allowing services to be concentrated at Manchester Piccadilly; and allowing services from Leeds to Crewe and Birmingham.
- there is a strong business case for serving **Warrington**, in terms of both conventional transport appraisal and supporting economic growth.
- there is also a strong business case for serving at least one of **Bradford or Huddersfield** (as set out in paragraph 3.74).



- it is possible to accommodate NPR services in the existing stations at Liverpool Lime Street and Leeds with expansion at both. We are funding quick-win upgrades around Leeds station. On top of this, we will carry out enhancements at Leeds station as part of Northern Powerhouse Rail. We will undertake a study to understand the most optimal solution for Leeds station capacity – particularly in light of post COVID-19 demand and our commitment to the first phase of West Yorkshire Mass Transit, which could take significant numbers of local services out of the heavy rail station at Leeds.
- it would be beneficial for services to continue beyond Leeds at least as far as York both to provide interchange to other destinations on the East Coast Main Line; and because the logistics of terminating more trains at Leeds would likely trigger further major expenditure.

3.66 This overall approach is consistent with the advice provided by Transport for the North to the Secretary of State. Transport for the North's Board also set out a strong preference for serving Bradford and noted that the Mayor for Liverpool has commissioned separate work on alternative station choices for the city.

3.67 The Government agrees with TfN that alternative approaches are likely to be more expensive, or less effective, or both. Whilst other options have been considered between Liverpool and Manchester, these would either extend journey times to Manchester Airport, fail to serve Warrington; or lead to a reduction in the level of local services on the existing Cheshire Line Committee (CLC) and Chat Moss lines.

3.68 One alternative would be to seek a separate, almost certainly tunnelled, route into Manchester from the existing Chat Moss line via Newton-le-Willows, as has been proposed by Greengauge 21.⁶⁴ Although this could allow a faster headline journey time from Liverpool to Manchester, it would not improve access to Manchester Airport or serve Warrington, contrary to the ambitions of TfN's Strategic Transport Plan.⁶⁵

3.69 Any option that follows the proposed IRP strategy would require a section of new line from the current HS2 route to the Warrington area. The Government has therefore instructed HS2 Ltd to include passive provision for a future connection to Warrington in its design for the HS2 Phase 2b Western Leg route to Manchester.



Manchester Recovery Task Force

- 3.70 In recent years, train performance in the North of England has been significantly disrupted. The ‘Manchester bottleneck’ between Deansgate and Piccadilly is the key location where problems appear, which are often caused by delays to services on their way into the centre. This is why Secretary of State commissioned the Manchester Recovery Task Force (MRTF) in 2020 to tackle the reliability and congestion issues in Greater Manchester and the North.
- 3.71 This entirely new cross-industry workforce drawn from organisations across the rail industry including Network Rail, Train Operating Companies, Transport for Greater Manchester and Transport for the North is considering both infrastructure and operational solutions. From December 2022, passengers can expect a revised and more reliable timetable, and we are assessing the case for infrastructure interventions.
- 3.72 Making the Manchester timetable perform reliably is essential both as something that customers prioritise and can rely upon. It is also essential to support reliable timetables as the network is disrupted during the construction of TRU, HS2 and NPR and to support delivery of outputs in years to come. During the 2020s, assets on the network in the Deansgate to Stockport area become life expired. How this work is phased, delivered and scoped is subject to further development and business case work.
- 3.73 Work is ongoing to develop options to improve capacity and reliability of trains in the centre of Manchester and these recommendations will be considered in the context of core schemes proposals of the IRP.

Manchester to Leeds and Bradford route choices: rationale and alternatives considered

- 3.74 As noted above, there is broad agreement between the Government and advice from Transport for the North’s Board that NPR services between Leeds and Manchester should:
- **use the proposed HS2 line into Manchester Piccadilly** in order to facilitate through journeys to Manchester Airport; Liverpool/Warrington; and Birmingham/Crewe;

- **use the existing station at Leeds, expanded as necessary;** and
- **serve at least one of the main intermediate markets** (Bradford and Huddersfield), with Transport for the North's Board having set out a strong preference for Bradford.

3.75 The Government agrees with the conclusion reached in Transport for the North's initial strategic outline case for NPR, that options which attempt to serve Leeds and Sheffield on a single new line from Manchester meeting the HS2 Eastern Leg in a delta junction should not be pursued.

3.76 Considering the choice between Bradford and Huddersfield. Bradford Metropolitan Council's area has a greater number of people than Kirklees, the district around Huddersfield and Dewsbury, but around 23 per cent of them live in communities such as Keighley and Ilkley which are some distance from Bradford itself. Because of the design of Options 2 and 3, they would not be connected to an NPR station in Bradford by rail (though they will be directly connected to the NPR station at Leeds). At Dewsbury and Huddersfield, NPR would use the existing stations, which are in the town centres and well connected to other public transport routes.

3.77 In response to the preferences outlined by Transport for the North, the Government has examined options:

- **for a wholly new line serving Bradford** (and not Huddersfield);
- **that build on the delivery of the existing core pipeline of TRU projects**, routing the fast Manchester-Leeds services via Huddersfield (but not Bradford); and
- **capable of serving both Bradford and Huddersfield.**

3.78 Having regard to the available evidence, it is the Government's view that:

- taking forward a section of new line from Manchester, which in conjunction with the upgrades to the Transpennine main line (upgraded to form NPR Phase 1) on the route towards Huddersfield, would provide the quickest and most cost-effective route to delivering close to a 30 minute Manchester-Leeds journey time;
- the scenarios tested indicate there is no demonstrable business case for a new underground station in Bradford. The existing Interchange station site has an excellent central location and integrates well with

the existing bus station; however, the approach and orientation leads to slower journey times. A new surface station at the St James' wholesale market site, Bradford Council's proposed solution, could offer journey time savings, and facilitate wider regeneration. However, it is separated from the centre of Bradford by a major 6-lane highway (Wakefield Road), and risks poorer interchange with other local rail and bus, services without additional unfunded interventions. A station on the former avoiding line to the south would be further from the city centre than St James's Market and would likely require some further local transport investment to make it viable.

- 3.79 Recognising that TRU will now be significantly expanded to enable NPR, the Government is proposing to manage the Transpennine Route Upgrade as the first phase of NPR. This will include full route electrification and so bring forward benefits for passengers and freight users and communities along the route. It is asking HS2 Ltd to take forward route selection for a section of new line from the new HS2 station at Manchester Piccadilly to join the Transpennine route to Huddersfield, with the aim of bringing forward a hybrid Bill covering this (and a connection to Warrington discussed below).
- 3.80 Network Rail is also being asked to take forward an upgrade of the line between Bradford and Leeds via New Pudsey to include speed improvements and electrification. The aim would be to deliver a non-stop journey time between the cities potentially as low as 12 minutes (subject to business case). This could also deliver earlier benefits including journey time savings of 5 minutes or more for trips between Halifax or the Upper Calder Valley and Leeds.
- 3.81 Work done by Network Rail for TfN has already considered in detail the case for a new line from Manchester to Bradford. The Government considers that, on the basis of available evidence, it is unlikely that a case for such a new line could be made.
- 3.82 The Government considers that this approach could:
- deliver IRP strategic objectives and benefits sooner, including decarbonisation of the key Transpennine corridor;
 - improve Bradford–Leeds sooner;
 - better improve connectivity between more of the West Yorkshire towns and cities;
 - offer better value for money than alternative costlier packages of investment;

- allow for a more staged approach to construction, which is of value given the greater uncertainty over future levels of rail demand following the COVID-19 pandemic; and
- also support the introduction of hourly freight paths across the Pennines via Huddersfield. If a third track is delivered between Huddersfield and Marsden in the first phase of NPR, then it would be possible to introduce an hourly off-peak freight path before the rest of the NPR infrastructure and services are in place, once wider gauge clearance works in the programme are delivered.

Liverpool to Manchester route choices: rationale and alternatives considered

3.83 Liverpool City Region and Greater Manchester represent the two largest markets⁶⁶ in the North West and better connectivity between these two key northern cities would also benefit nearby communities. There is also the potential to significantly free up capacity for freight movement via the existing Chat Moss route and south via Runcorn. This would help facilitate travel and trade opportunities not just for Liverpool and Manchester but the country more widely by enhancing UK connections to the Port of Liverpool and Manchester Airport.

3.84 Work undertaken with TfN has shown a strong case for serving Warrington. Starting from the premise of a connection from the HS2 line to the Warrington area, a wide range of options have been considered for the route from the Warrington area to Liverpool. The principal choices are:

- **Warrington station:** new parkway, new city centre (underground), or reinstating the low-level platforms at Warrington Bank Quay;
- **Warrington to Liverpool:** wholly new line, or upgrade and electrification of the Fiddlers Ferry freight route; and
- **Liverpool station and approach:** expansion of Lime Street, or construction of a new station (in the same general area); use of existing West Coast Main Line approach or construction of more segregated route.



3.85 The Government has noted the expressed view of Transport for the North's Board in favour of a full new line,⁶⁷ underground station at Warrington, and new station at Liverpool. However, analysis undertaken with and by TfN shows that this would cost significantly more (c. £6bn) than other recommended IRP options; deliver only a modest 3 to 4 minutes faster compared to the lowest cost option improvement in journey times; would support the same level of NPR and HS2 train service; and would give similar economic (GVA) benefits. The environmental and carbon impacts of creating a new line rather than using an existing alignment can also be expected to be greater, given that outputs are similar. The Fiddlers Ferry line is now virtually disused following closure of the coal-fired power station and so its upgrade will not generate significant disruption. Network Rail analysis also shows that Liverpool Lime Street station can be altered largely within the boundary of existing railway land to accommodate the proposed service levels resulting from HS2 and NPR, at significantly lower cost and impact than alternatives. The West Coast Main Line from Ditton to Lime Street is expected to have sufficient capability to accommodate intended services. Further work is needed to confirm the precise scope of interventions.

3.86 Subject to final decisions, and future anticipated route consultation, the Government therefore considers that development work should focus on:

- **reinstating the low level platforms at Warrington Bank Quay station** in Warrington town centre, which would allow passengers to interchange with WCML services on the High Level platforms, and better align with regeneration plans compared with alternative options;
- **electrifying and upgrading the Fiddlers Ferry route** to Liverpool; and
- **altering the existing Lime Street station and approaches.** Any proposals for a new station being considered by Liverpool City Region would need to be locally funded.

3.87 The Government is asking HS2 Ltd to take forward route selection for the section of new line from the existing HS2 route to Warrington, for inclusion in a future hybrid Bill.

3.88 The Government has noted concerns raised about the potential disruption, operational performance and reliability impacts of using the existing WCML for the final approach to Liverpool city centre. It considers these impacts should be capable of acceptable mitigation in further design development, and is therefore asking Network Rail to optimise the design of this option. Judgements in relation to any credible alternatives will continue to be tested at each business case decision in line with Green Book requirements.

Manchester to Sheffield: rationale and alternatives considered

3.89 The Government's commitment on NPR related only to Manchester-Leeds, but the IRP has also considered Manchester-Sheffield links. Currently, the journey between Sheffield, one of the core cities in the Northern Powerhouse and the centre of the South Yorkshire region, and Manchester, takes 50 minutes, despite the cities being 30 miles apart.

3.90 The Government agrees with Transport for the North that any further future improvements to Manchester–Sheffield would best be based on an upgrade and electrification of the existing Hope Valley Line.

3.91 The Hope Valley route has also been identified as a potential candidate for electrification by the Traction Decarbonisation Network Strategy. Moving heavily loaded freight trains using electric traction would enable journey times to be reduced and make best use of the available network capacity. Work by Network Rail has shown that – if combined with a connection to the HS2 station at Piccadilly – electrification and upgrade of the existing Hope Valley line between Manchester and Sheffield could give a journey time of between 30 and 35 minutes and support up to four trains per hour (2 via Marple and 2 via Stockport). The scope of interventions that need to be delivered within the Peak District National Park will need careful design to ensure environmental impacts are mitigated and reduced as far as possible.

3.92 The main alternatives that have been considered are:

- a new route from Manchester to the HS2 Eastern Leg, capable of serving both Leeds and Sheffield; this has been rejected for the reasons set out in paragraph 2.28 above; and



- a new alignment focussed on Sheffield to Manchester; this was rejected as likely to have a poor business case and unacceptable impacts on the Peak District National Park.

- 3.93 Works to improve the Hope Valley line are already underway, including line speed and capacity works, the removal of a bottleneck at Dore, and provision of a freight loop at Bamford. These works could help facilitate a possible future third fast Sheffield to Manchester service each hour.
- 3.94 Network Rail's capacity analysis suggests that three NPR trains per hour between Manchester and Sheffield can be operated via the Hope Valley Line with trains continuing to Stockport through targeted investment, using the existing Network Rail station at Manchester Piccadilly. This would likely require the doubling of the Hazel Grove chord (to enable three trains to be evenly spaced, around every 20 minutes) and restoration of a third line between Dore and Sheffield, although more detailed analysis is needed to confirm this. The infrastructure required on the Hope Valley route itself is potentially similar if four fast NPR trains are planned. However, operating a fourth train via Stockport into the existing Piccadilly station would require either a major package of interventions on the existing railway or a reduction in other services in the Manchester area.
- 3.95 The feasibility of a connection from the Hope Valley line to the HS2 station at Manchester Piccadilly has also been explored. This could use a section of the Marple Line, and then join the Leeds approach line to the new Manchester Piccadilly station. Strategically, this would have benefits in terms of faster journey times from Sheffield to Manchester, Manchester Airport, Warrington and Liverpool, and could allow a 4tph fast service between Sheffield and Manchester: two via Stockport and two via the Marple route. This would also mean some long-distance NPR services would not need to use the Castlefield corridor. However, costs for the initial designs of the Marple connector appear high, raising challenges in terms of affordability and value for money; and there are potential conflicts with Transport for Greater Manchester's longer-term ambitions to extend Metrolink services onto the Marple line.
- 3.96 Recent work has suggested there may be potential to significantly reduce the cost of options so far considered. Any future development work will therefore focus on an upgrade of the Hope Valley route, including capacity and

line speed improvements, and route electrification; and an assessment of whether there is a case for moving from three to four trains per hour taking account of demand, costs, and service options at the Manchester end of the corridor. As noted above, the Government has identified a core pipeline of schemes and any further schemes will be subject to affordability, delivering commitments on time and to budget, and complementary investments being made.

Sheffield and Leeds to Hull: Rationale and alternatives considered

- 3.97 Connections to Hull from Sheffield and Leeds are currently poor, with journey times of 77 and 57 minutes respectively. Hull is a key port and integral to the regional economy.
- 3.98 The Government agrees with TfN that any future development work on routes to Hull should focus on electrification and line speed improvements to improve journey times from Hull to Leeds.

Sheffield to Leeds: rationale and alternatives considered

- 3.99 Sheffield and Leeds are the two largest cities in Yorkshire, and the core of their respective regions. However, despite being 39 miles apart by rail, connectivity is poor, with the fastest journey time currently being 40 minutes, which is only achieved once per hour for most of the day. Connections will be further considered within the work on how best to take HS2 services to Leeds.

East of Leeds to York route options: rationale and alternatives considered

- 3.100 The rail corridor between Leeds and York is a constraint to boosting capacity and reliability from Leeds to Manchester as well as Leeds to Newcastle (because it is difficult to terminate more trains at Leeds). Previous plans have looked at using the HS2 Eastern Leg Church Fenton link to the East Coast Main Line. However, given the Government's intended approach to the Eastern Leg set

out at paragraph 3.28, it intends to instead seek a scheme capable of being implemented earlier than previous plans, which will improve reliability and resilience, as well as future proofing for NPR.

- 3.101 The Government will therefore ask Network Rail to assess options for short-to-medium term interventions and a preferred package of journey time improvements to be integrated with electrification proposed under the existing Transpennine Route Upgrade between Leeds and York.
- 3.102 A potential package could comprise timetable changes to simplify the service pattern; improved signalling to allow trains to run closer together, and a section of 4-tracked railway to allow fast trains to overtake stopping trains and line speed improvement works. This could be implemented along with TRU electrification of the Leeds to York route and appears – subject to further work – capable of supporting the intended outputs and future proofing for NPR.

York and the North East: rationale and alternatives considered

- 3.103 Stakeholders in the North East, and TfN's work on NPR, have set out aspirations for nine passenger trains per hour (including proposed HS2 services) in each direction between York and Newcastle, compared with the current service levels of 6 trains per hour. This aspiration needs to be considered in the light of current and future forecast demand; the commercial and economic case for the 7th, 8th and 9th trains; and operational performance.
- 3.104 Standard industry analysis suggests that extending the 8th and 9th services per hour beyond York towards Newcastle (from Liverpool) would generate insufficient revenue to cover the incremental operating costs and could increase overall performance risk. Analysis has also identified two packages of works required north of York: a package of interventions to support 7 or 8 tph to Newcastle, and a further package to support 9 tph to Newcastle. However, the 9th train in particular is unlikely to be needed to cater for overall demand. As set out at paragraph 3.43 above, the Government is therefore asking Network Rail to develop a package of interventions on the East Coast Main Line from London to Newcastle to deliver benefits earlier to the North East, and support 7 or 8 tph to Newcastle. This will involve assessing the case for:

- improvements at York, discussed at paragraph 3.43 above;
- extending the current 4-track railway so it ends just north of Northallerton, rather than just south of the station;
- an additional through platform on the eastern side of Darlington station, with bays to reduce the number of local services that cross in front of fast trains. This is consistent with the existing proposals being developed by Network Rail with Tees Valley Combined Authority;
- upgrading the Stillington route, to allow more freight to use it, and restoring a 3rd track north of Chester-Le-Street and a former chord at Bensham to enable a greater degree of segregation between freight and fast passenger trains; and
- lengthening some of the bay platforms at Newcastle to enable NPR trains to terminate in the station.

3.105 The NPR programme has identified further options for improving journey times north of York. As part of the option for interventions along the East Coast Mainline in the North East, the Government has carefully considered proposals to reopen the Leamside line (the mothballed 21 mile line between Pelaw in Gateshead and Tursdale in County Durham). On the basis of available evidence and value for money analysis, the Government considers that the case for re-opening the Leamside route would be best considered as part of any future city region settlement.

3.106 Planning has to date been based on the existing two freight paths per hour through York in each direction. However, with fewer services on the Leeds lines given the potential changes the Eastern Leg, it may be possible to accommodate freight growth beyond this level in the future. The detailed scope for further upgrade of the East Coast Main Line between London and Leeds and the North East, including elements identified by the NPR programme, will be confirmed following a further study.



Current and proposed outputs: NPR Core Network



Journey times in minutes are estimated as follows:

	Now (typical)	Integrated Rail Plan Core Pipeline
Liverpool–Manchester Piccadilly	50*	35
Liverpool–Manchester Airport	71	26
Leeds–Manchester	55 ⁱ	33
Bradford–Leeds	20	12
Liverpool–Leeds	106 ⁱⁱ	73

Note: Figures are indicative and subject to change as schemes are developed.

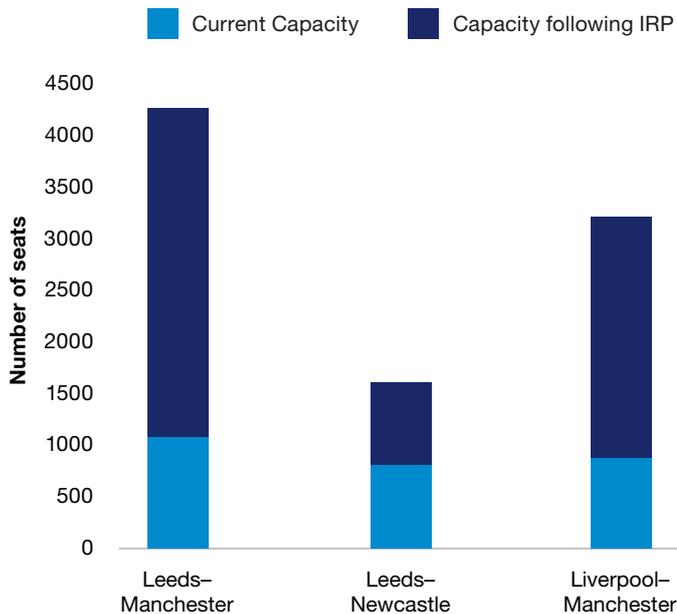
* Faster services run to Manchester Victoria.

i 48 minutes pre-Covid.

ii 85 minutes pre-Covid.



Seating Capacity



In summary, the Government considers these proposals for NPR best meet the IRP strategic objectives as they:

- will improve journey times and increase capacity, bringing closer together the three largest economic areas in the North (Manchester, Liverpool and Leeds), enhancing access to Manchester Airport and supporting regeneration in Warrington;
- would be capable of future possible options to improve services to Sheffield, Rotherham, Hull, Newcastle, Bradford depending on decisions beyond the IRP core pipeline;
- will see ongoing electrification of the existing rail network contributing to our decarbonisation targets and commitments;
- can better link more towns and cities, increase capacity, and provide similar outputs at lower cost and with earlier benefits than alternative options, ensuring better value for taxpayers; and
- can be delivered in stages allowing plans to be modified if necessary in the light of future evidence on costs and demand.

Midlands Rail Hub

Midlands Rail Hub: what the Government proposes in the IRP core pipeline:

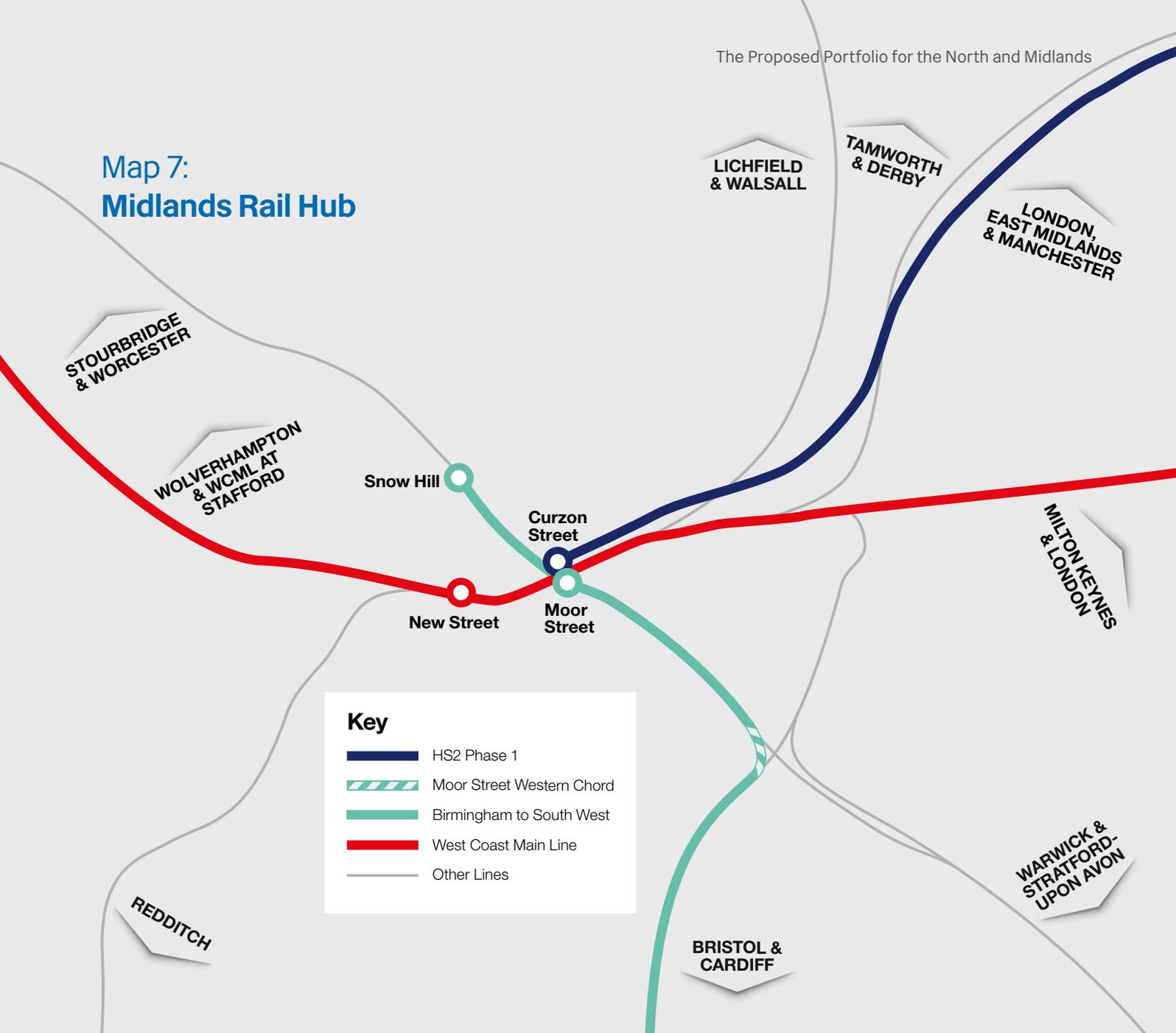
the **high speed line between the West and East Midlands** will give greater connectivity benefits than previous plans, with **Birmingham** and **Nottingham** journey times expected to reduce to under half an hour.

Midlands Rail Hub: future possibilities:

We will progress work on options to complete the Midlands Rail Hub, focusing on improved services to **Hereford, Worcester, Coventry**, and allowing more services to access Birmingham Moor Street station. This could give passengers from **Bristol, Cardiff and beyond** easy interchange to HS2 at the adjacent Curzon Street station, deliver increased capacity at Birmingham Snow Hill Station, and additional commuter services on the Camp Hill Line.



Map 7: Midlands Rail Hub



- 3.107 A key constraint to improving local and regional services in the East and West Midlands is the lack of rail capacity through central Birmingham, in particular at New Street, the main city centre station, where many local and regional rail services are concentrated. HS2's Curzon Street station will be an 8–10 minute walk away from New Street.
- 3.108 The Government's plans set out above, could realise many of the intended benefits of the MRH Eastern Section by offering very fast journey times between Birmingham and Nottingham, and potentially an increase in frequency between Birmingham and Derby. The Government is asking Network Rail to work with Midlands Connect to review the Midlands Rail Hub proposals.

- 3.109 MRH will focus on enabling improved services to Birmingham Moor Street, which is next to the HS2 terminus at Curzon Street. This could see more trains per hour passing through Moor Street with more local and long-distance services into Moor Street. The Rail Hub could enable improved services to Hereford, Bristol and Cardiff, plus the transfer of commuter services on the Birmingham 'Camp Hill' line from Kings Norton.
- 3.110 The Government will continue to work with Midlands Connect on some of the wider Midlands Engine Rail proposals. For example, proposals to improve connectivity at Coventry are complementary to the objective of improved connectivity set out in this report.

The Government considers its proposals for Midlands Rail Hub best meet the IRP strategic objectives as they could:

- help improve connectivity and increase capacity by creating new opportunities for services into Birmingham from the South West, and interchange with HS2 at Curzon Street. This would not be possible with existing plans;
- improve access to Birmingham and interchange to HS2, supporting levelling up of economies more widely across the country;
- provide new, faster cross-country links, encouraging mode shift away from road;
- improve air quality and reduce carbon emissions; and
- ensure new infrastructure maximises value for money by complementing the new high speed line to the East Midlands.

Freight

- 3.111 Increasing the amount of goods moved on our railways has important economic benefits, by reducing congestion on our roads, improving connectivity, delivering cost, time and reliability benefits for freight customers, and helping level up our country.
- 3.112 By increasing capacity and capability of the railways for freight, the IRP will help accelerate modal shift of goods from road to rail, a key part of our decarbonisation strategy: freight trains currently emit around a quarter of the CO₂ emissions of HGVs per tonne-km travelled. Electrification will help further reduce the emissions from rail freight and will support rail freight operations to be even greener, enabling faster and more reliable movement of goods across the country and to/from mainland Europe. Rail freight has a key part to play in moving materials to build infrastructure around the country in a low carbon way, representing a key element of the Government's commitment to minimise the carbon impacts of construction.
- 3.113 The IRP will help to free up capacity on parts of the existing network. This will deliver improved capacity and capability to benefit rail freight travelling across the Midlands and North. This will support growth to major hubs including locations in the Midlands, Trafford Park in Greater Manchester, plus Merseyside, Yorkshire and Scotland, as well as ports on both east and west coasts.
- 3.114 Two future year scenarios were specified for the IRP (a central case and an 'in favour of rail' scenario). The outputs from the IRP programme will help to support this future growth by alleviating capacity constraints, for example, between Crewe and Manchester Piccadilly for flows to Trafford Park, the Chat Moss route for flows to and from Port of Liverpool, or the Diggle route between Manchester and Leeds for cross-Pennine traffic.
- 3.115 Further work is needed to confirm that the forecast growth can be accommodated on the wider network beyond these corridors reviewed in the IRP. Some further interventions may be required for locations when the impact of end-to-end freight journeys is taken into account.

The Value of Rail Freight



£2.45bn

pa: **Benefits to UK economy** from rail freight (£800m social / £1.65bn to customers)



76%

Reduces carbon emissions by 76%
c.1.4m tonnes of CO₂ removed.



7M

Prevents 7m lorry journeys per year



90%

of benefits brought by rail freight **support communities** outside of the South East and London

Source: Rail Delivery Group, "Rail Freight: Building a Stronger, Greener Future for Britain"



4. Phasing

Approach to phasing

- 4.1 The Integrated Rail Plan (IRP)'s terms of reference set out that the Plan would outline a recommended way forward on the phasing and sequencing of delivery for HS2 Phase 2b and other major rail programmes in the North and the Midlands, so that benefits of the core investment programme are realised as quickly as possible, as part of its commitment to Building Back Better.
- 4.2 Given the complexities and scale of the multiple major programmes that make up the IRP, not all schemes can be delivered immediately. The approach to investment will need to ensure schemes are properly developed and to provide a sustainable pipeline for the rail supply chain which can be delivered efficiently, avoiding previous 'feast/famine' cycles of investment while providing benefits to passengers and freight users as quickly as possible.
- 4.3 In March 2018, the then Government introduced the Rail Network Enhancements Pipeline (RNEP) to create a rolling programme of investment and allow schemes to proceed through investment gateways as they are ready. The IRP seeks to build on this approach, with individual schemes proceeding subject to future approval at key gateways to ensure ongoing control of costs and value for money.
- 4.4 By further adopting an adaptive approach, as recommended by the National Infrastructure Commission (NIC), the Government has identified a core pipeline of schemes and any further schemes will be subject to affordability, delivering commitments on time and to budget, and complementary investments being made. Progress on these wider schemes will be subject to future affordability, demand, and progress with efficiency in the portfolio. This is discussed in more detail in Section 4.
- 4.5 Whilst some schemes, such as the HS2 Western Leg, Midland Main Line electrification and Transpennine Route Upgrade (now Northern Powerhouse Rail Phase 1) are already at a relatively detailed stage of development with construction planned or in some cases already underway in the 2020s, many schemes are at a very early stage of design. Dates for delivery will be subject to ongoing development and approval of these schemes' business case and relevant consents.

Constraints

4.6 The following key factors have been considered in developing proposed phasing for the IRP, reflecting upon input from the Infrastructure and Projects Authority (IPA), NIC and the Department's Project Delivery Improvement Programme:

- **supply chain** readiness and capacity to deliver;
- overall affordability and the desirability of a **steady pipeline** of investment;
- how **mature** schemes are and their **interdependencies**;
- how long **securing statutory consents** will take (planning, hybrid bills etc); and
- how much **disruption** is created for passengers and freight users during construction.



Supply Chain Impacts

- 4.7 In 2018/19, just under £20bn was spent in the transport construction sector, which is the supply chain that will need to deliver schemes within the IRP and other major projects.⁶⁸ The supply chain can grow capacity over time, but ramping up work too quickly risks inflating costs, and a saw-tooth profile is inherently inefficient.
- 4.8 The Government spent £5.9bn on rail enhancement projects including HS2 in 2018/19⁶⁹, and the annual amount spent is due to increase to around £8bn p.a. in 2022/23 with the delivery of HS2 Phases One and 2a. The IRP seeks to provide greater certainty for the supply chain.
- 4.9 The Government aims to provide as much certainty as possible to the supply chain through the IRP, allowing investment in skills and planning for the future. The economic impact of COVID-19 has caused a shock to the supply chain resulting in severe short-term impacts and a reduction in private sector-led construction activity. Though private sector demand is expected to return to pre-COVID levels by 2022–23, well before most IRP schemes are expected to be in scope, there still could be a future shortfall of capacity due to increased demand for resources.
- 4.10 The Government will continue to monitor the supply chain and ensure to review actions to mitigate potential disruptions. In December 2020, the Government published the Construction Playbook, which sets out commercial best practices and specific sector reforms relating to how contracting authorities and suppliers, including the supply chain, should engage with each other.⁷⁰ These reforms encourage innovation and Modern Methods of Constructions (MMC) to create a more productive, sustainable and resilient industry with a well-trained workforce for the future. The Infrastructure and Projects Authority (IPA)'s Transforming Infrastructure Performance: Roadmap to 2030,⁷¹ sets out the transformation required to achieve this vision.

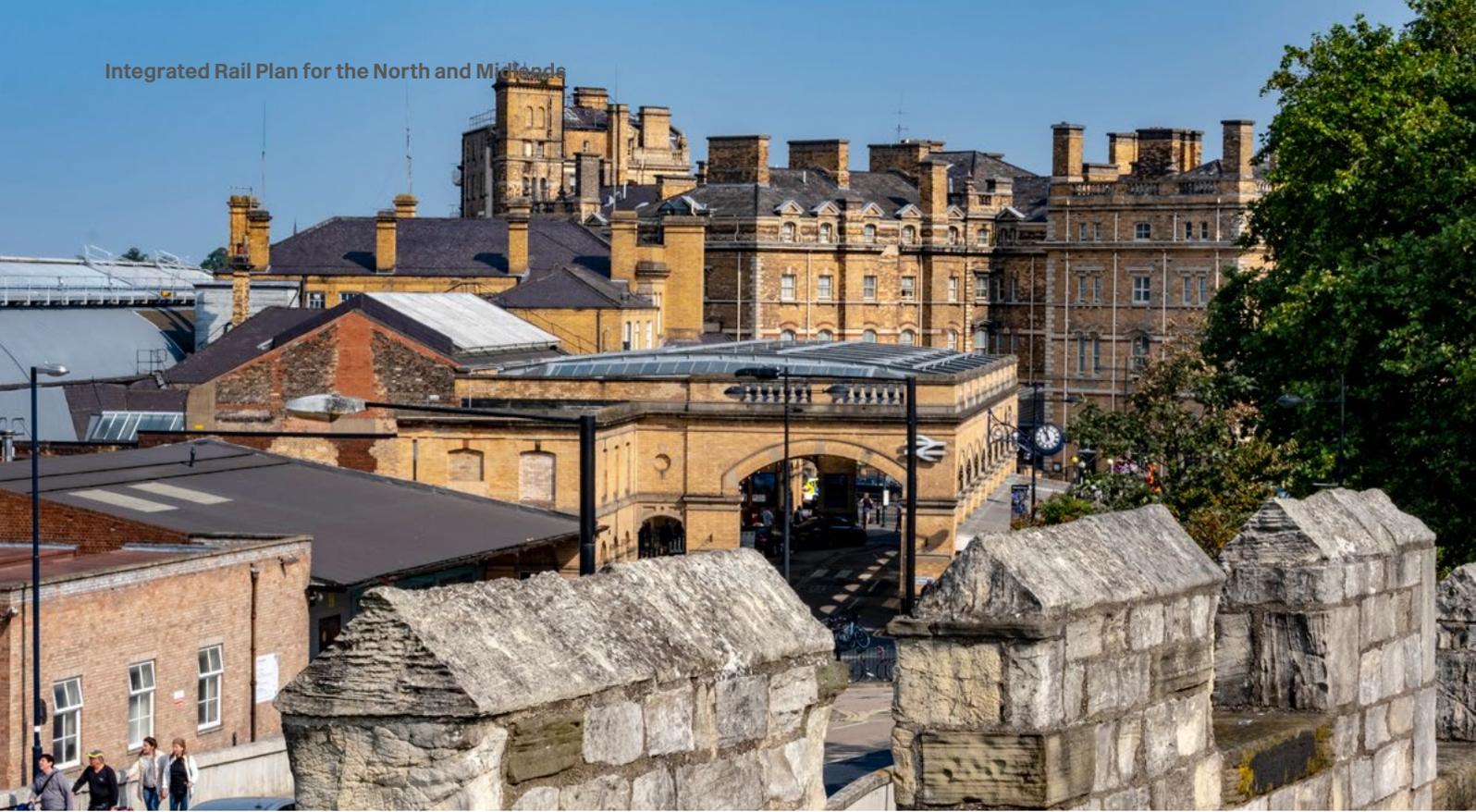
The **Government** spent
£5.9bn
 on rail enhancement
 projects

including HS2 in
 2018/19, and the **annual
 amount spent is due
 to increase** to around

£8bn

p.a. in 2022/23





4.11 We recognise that building the right skills capacity in the supply chain needs advance planning and certainty for private companies to invest. Early engagement gives industry greater confidence as set out by the Rail Sector Deal.⁷² By providing greater visibility of the work pipeline to the supply chain now, we hope to encourage private sector investment in the skills that will be needed in the future and plug skills gaps in specific regions and areas of engineering. Through the certainty provided by the IRP pipeline, the supply chain and skills capacity across the North and Midlands should develop as an additional benefit to long-term investment. This will create more high-quality jobs in the region and boost the competence of the region’s small to medium-sized enterprises.

4.12 The rail supply chain has an estimated workforce of over 35,000 in the North and Midlands – over a third of the Great Britain total – but it will need to recruit additional workers, not least to deliver the projects set out in this plan. 28% of the workforce is aged over 50 and nearing retirement and the Government has already taken steps to address this, setting out a ‘Midlands pilot’ of shared apprenticeships and school engagement in the Rail Sector Deal. This plan will alleviate uncertainty over the phasing of HS2 and conventional rail projects in the North and Midlands and enable the supply chain to plan so that it can have the right capacity in place. By taking an integrated approach to phasing, the Government will aim to smooth the demands on the supply chain to aid the planning of skills and development.



The **rail supply chain** has an **estimated workforce** of over **35,000** in the **North and Midlands** – **over 1/3** of the Great Britain total.

Investment pipeline

- 4.13 Given the early stage of development of some schemes, there is a need to create a transparent and sustainable programme and allow cost risk to be managed within a portfolio. Passenger demand over the period between now and 2050 is inevitably uncertain, and while the Government's key assumption is that rail demand will continue to grow, the long-term implications of the COVID-19 pandemic on rail travel are yet to be seen. Managing the portfolio of schemes allows a more flexible response to future circumstances, and through transparency, supports supply chain visibility and encourages wider investment. All IRP schemes have been considered in the context of the overall funding portfolio rather than as purely standalone interventions to reach a financially sustainable and affordable pipeline of rail investment.
- 4.14 Looking for opportunities to roll out investment sooner can reduce the risk of infrastructure failures and improve efficiency. In addition, delivering interventions at the right time in a coherent strategy, minimises the risk of needing to upgrade the same infrastructure more than once within the 30-year programme.
- 4.15 Further assessment of the synergies and sequencing of IRP schemes alongside existing renewal and maintenance programmes will be done at the stage of detailed design help to drive down costs and limit disruption. This also gives the opportunity to deliver some IRP schemes under the same possessions as planned maintenance, avoiding the additional costs and disruption from separate interventions on the same line.

Scheme maturity, integration and interdependencies

- 4.16 The Government has identified certain schemes that can be delivered sooner because substantial work has already been undertaken. Some of the schemes to be delivered before 2030 have already entered the Rail Network Enhancement Pipeline (RNEP). In addition, some interventions have fewer interactions with other schemes, which means delivery can be sequenced more easily.

4.17 The IRP has significant implications for rolling stock, depots & stabling, and the rollout of digital signalling on the rail network. Work will begin soon to develop strategies in each of these areas, to support the realisation and maximisation of IRP benefits and minimise delivery risks, and to inform the forthcoming Whole Industry Strategic Plan (WISP).

Consent routes

4.18 Scheme development and consenting processes are key factors in the delivery schedule for major projects and can impact upon their timescales. Consenting processes require participation by interested parties and can take a number of years to complete.



- 4.19 Given their scale and complexity, the Government continues to believe that the most appropriate consent route for the most significant stretches of new railway would be a hybrid Bill, as has been used for HS2 Phases One and 2a, Crossrail, and will be for the HS2 Phase 2b Western Leg. This would recognise the major impacts of such schemes on individuals and businesses, as a hybrid Bill allows residents and other local interest groups to petition Parliament for changes to the project.
- 4.20 The phasing approach assumes the new high speed line to the East Midlands; and sections of NPR new line would be approved via this route. The Government has agreed with the recommendation of the Oakervee Review that smaller hybrid Bills can be a more effective way of proceeding; it is also taking action to end the presumption that Parliament can only deal with a single hybrid Bill at a time to expedite the process. Hybrid Bills generally take around three years from Bill deposit to Royal Assent, although timescales can vary and running Bills concurrently is likely to realise consents more quickly.
- 4.21 For other schemes, including improvements to existing lines and shorter sections of new track, there is a choice of consent route. Network Rail is able to undertake certain improvements to existing lines via Permitted Development Rights. For larger investments but where the continuous length of new track outside of existing Network Rail boundaries extends for less than 2km, a Transport and Works Act Order can be used. A Development Consent Order would be required if the new track extends for more than 2km beyond boundaries.
- 4.22 Each form of planning and consent is subject to statutory process and decision-making timeframes. Though the suggested phasing approach has considered how overall delivery time can be sped up through taking the most suitable process, it is important to note that for major schemes there is a limit as to how far such statutory processes can be accelerated.
- 4.23 The Government set out reforms in the National Infrastructure Strategy to be delivered through Project Speed. A key area for reform has been the role of planning and environmental consents with a National Infrastructure Planning Reform Programme having been established to look at improvements to the Nationally Significant Infrastructure Projects (NSIP) regime; and further reform being planned for environmental assessments.

Disruption

- 4.24 No civil engineering project is without disruption, but the approach taken by the IRP will cause less disruption than the previous plans. Building HS2's Eastern Leg in full would cause significant disruption to the motorway network, which it would cross 13 times. Its interfaces with the existing rail network, would also have meant significant disruption. Enhancements to existing lines, of course, also generally bring disruption for the existing railway's passengers and freight users, and railway neighbours.
- 4.25 In addition to direct interactions between the road network and the proposed rail routes, during construction much of the machinery, materials, spoil and workforce has to be transported on the roads. Once new or improved rail routes are in operation, passenger journeys to and from the station can also create additional demand on surrounding road network. For Phase One of HS2, the Government developed a route wide Traffic Management Plan to effectively manage disruption.
- 4.26 The Government has considered the wider transport network as part of the design and assessment of schemes, including national and local road networks. Detailed sequencing plans will continue to consider the effect of interventions on the existing network and delivery partners will continue to work with National Highways during the development of their detailed plans to minimise disruption to road users.
- 4.27 Subsequently, effective planning will ensure replacement services for passengers, for example using alternative rail routes where possible. For example, the Government will look to sequence work across the Pennines to be sequenced such that services on the three main routes, the Calder Valley, Diggle and Hope Valley, are not disrupted simultaneously and sufficient rail alternatives for passengers continue. Freight services are also expected to be impacted; again, we will aim to maintain diversionary routes wherever possible so the commercial viability of operations is not affected.

Project Speed and Rail SPEED

4.28 Launched in 2020 and led by the Chancellor and HM Treasury (in collaboration with the Infrastructure and Projects Authority and Cabinet Office), Project Speed aims to deliver vital infrastructure projects 'better, greener and faster'. The National Infrastructure Strategy (NIS), published in November 2020, sets out the scale of ambition for Project Speed. Aligned to Project Speed is Rail SPEED (Swift, Pragmatic and Efficient Enhancement Delivery), a set of principles now applied throughout the lifecycle of a rail project to ensure development, design and delivery is done quicker and more efficiently. Rail SPEED encourages a culture of efficient project management and delivery within the early stages of a project life-cycle to minimize the risk of high cost additional scope being introduced at the later stages. In conjunction with Rail SPEED, Network Rail have also developed the PACE (Project Acceleration in a Controlled Environment) framework to replace their Governance for Railway Investment Projects (GRIP) process to significantly reduce the time and cost associated with the development, design, and delivery of infrastructure investment projects onto the rail network.



- 4.29 The application of Rail SPEED principles occurs in three main stages. First, 'Scope Challenge', attempts to ensure project overspecification is prevented and ensures project planners clearly outline project outcomes and what is needed to deliver these. This includes a consideration of what needs to be done on the ground and how those actions relate with one another. Next, 'Schedule Challenge' ensures delivery is as quickly as possible, for example by early resolution through challenging issues regarding the access strategy of the project. For example, would it be quicker and more efficient to deliver the main works in a single large blockade rather than multiple weekends and could works on neighbouring projects be aligned to the same blockade? The third stage, 'Cost Challenge' follows to challenge and ensure cost estimates are not being overly optimistic or inefficient.
- 4.30 Project Speed continues to be a Government priority for making improvements to the way we deliver infrastructure upgrades and enhancements. Whilst these reforms are being delivered, we expect to be able to identify further opportunities that can be made. The Government plans to apply the principles of Rail SPEED and the wider Project Speed to the IRP schemes. In particular, as designs are finalised there will be work to be done at the Scope Challenge stage to ensure detailed alignment between projects.

Case Study: Transpennine Route Upgrade (proposed to form NPR Phase 1)

- The Transpennine Route Upgrade (TRU) is a major programme of interventions on the Transpennine (Diggle) Route between York and Manchester via Leeds to enable faster, more frequent services. Revised governance arrangements between DfT and Network Rail are being implemented to strengthen oversight and create an integrated environment for delivery. The early inclusion of NPR scope, supported by Ministers, enables efficient delivery of wider NPR outcomes.
- Independent cost challenge of the programme has identified real opportunities for cost savings, and are now being developed into a programme of work to realise these; we expect to see significant savings emerge in the coming years.
- Network Rail also strengthened the leadership of the programme by recruiting a new TRU Director. In the future, scope assessment will be conducted to identify value management opportunities.

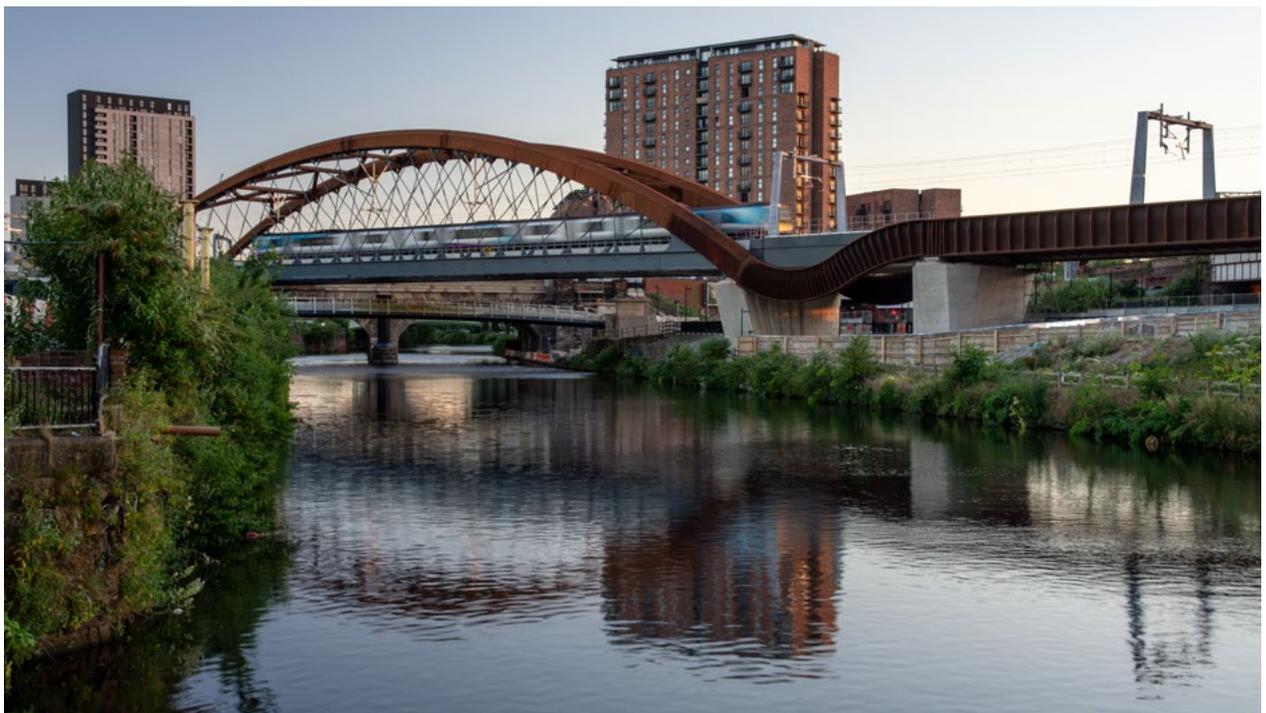
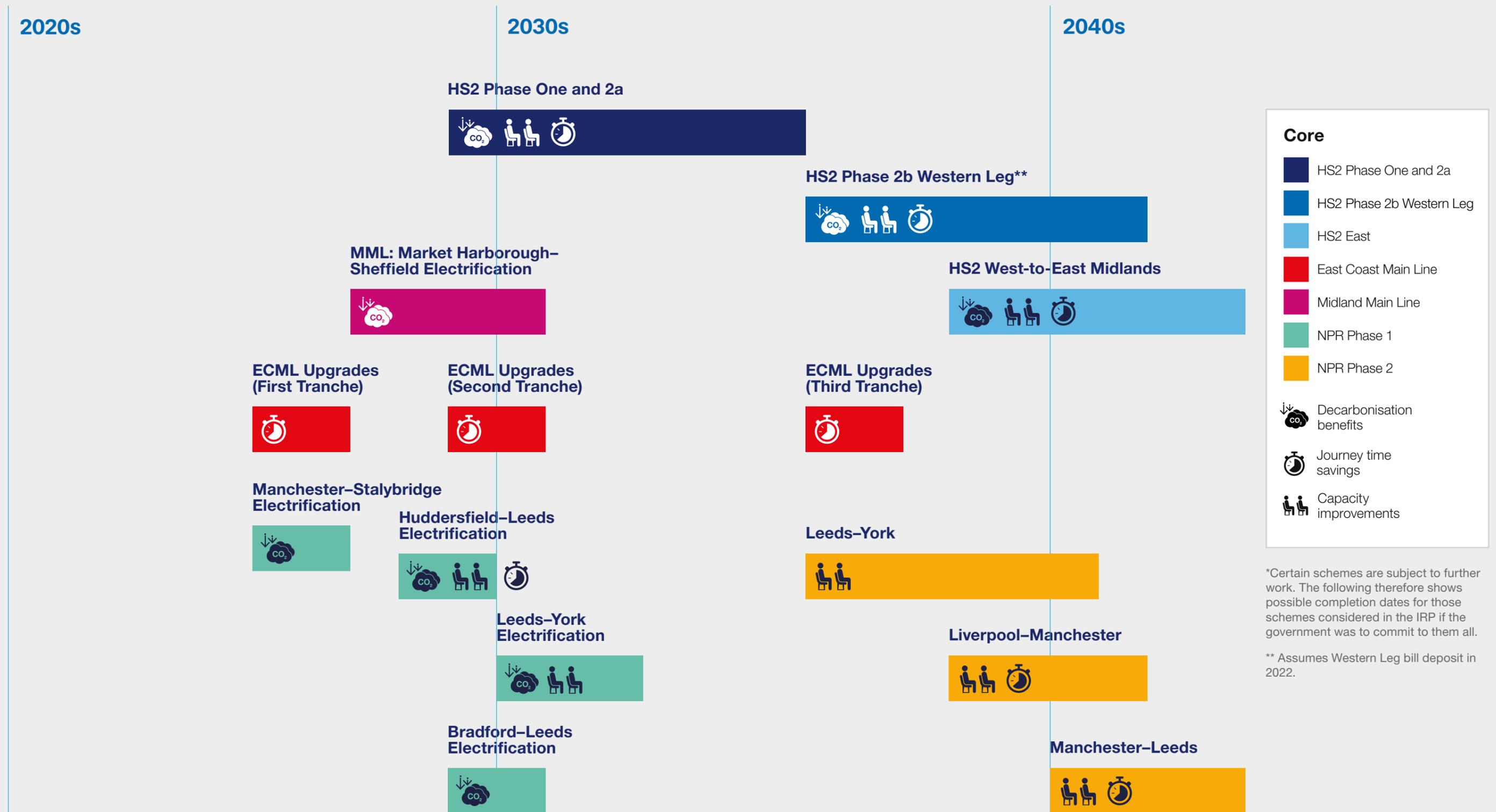


Figure 9: IRP investment blueprint for the IRP Core Pipeline*

The table that outlines the potential delivery timescales for schemes in the IRP, consistent with the level of commitment given (see Section 4).



We would expect these schemes would be delivered within the next ten years if progressed, aligning to Network Rail's Control Periods 7 (2024–2029) and 8 (2030–34). The early delivery of these schemes provide the foundations for future benefits to come from HS2 and new lines and upgrades from NPR.

By around 2030 (at the end of Control Periods 7 and 8), passengers could see:

- **Electrification of the remaining sections of the Midland Main Line** to Leicester, Nottingham, Derby, Chesterfield and Sheffield, bringing forward decarbonisation of existing diesel services, laying the ground for future high speed rail services to Nottingham, Derby, Chesterfield and Sheffield, and ensuring that key routes to the East Midlands and South Yorkshire will be contributing to achieving net zero.
- The introduction of NPR services on the **Transpennine Route from Leeds and York to Manchester**, with improvements to journey time, capacity and full electrification of the existing line via Huddersfield will be delivered by 2030-32. Further elements of scope designed to facilitate future NPR phases will be completed subsequently.
- **Benefits from early upgrades to the East Coast Main Line** to boost connectivity along the route from York to Newcastle, including station upgrades at Darlington, York, Newcastle and Northallerton.
- **Electrification and improvements to the Bradford to Leeds line**, reducing journey times and preparing for further enhancements in the Bradford area. This represents an acceleration on current proposals from Transport for the North.
- **Completion of existing work on Sheffield to Manchester.**

By around 2035, passengers could see:

- **Completion of HS2 Phase One and 2a (London to West Midlands and Crewe)** will bring faster journey times to the North West and Midlands with London.
- **Completion of upgrades on the East Coast Main Line** from London to the North East and Leeds.

Future Possibilities (if agreed to proceed):

- Progress with work **Midlands Rail Hub**, building new connections and track allowing us to run many more trains through Moor Street station, improving links to Hereford, Worcester, and Coventry and linking them better to the new HS2 station at Curzon Street.



The following investments are indicatively forecast to be delivered into service over Control Periods 9 and 10. By the end of the 2030s, we will begin to realise the benefits of the NPR Phase 1, improving speeds and capacity between Leeds and Manchester, and HS2 Phases 1, 2a and 2b Western Leg, significantly improving capacity and journey times between London, the Midlands and the North.

By the early-mid 2040s, passengers could see:

- Completion of the **high speed line from Crewe to Manchester (Phase 2b Western Leg)** This will broadly halve journey times between Manchester and Birmingham and reduce the journey time to London by around 50 minutes, acting as a hub for onwards connectivity between the North West and Midlands / South East.
- The new **high speed line connecting the West Midlands to the East Midlands**, providing improved connectivity to Derby, Nottingham, Chesterfield and Sheffield. The new line would reduce journey times between London and Derby, Nottingham and Sheffield, as well as Birmingham and Nottingham, and free up capacity on the Midland Main Line south of East Midlands Parkway.
- Completing the new high speed line between **Manchester Piccadilly and the Transpennine route to Huddersfield**, which could support an increase from five (pre-COVID-19) to eight fast trains per hour between Manchester and Leeds, building on the benefits provided by TRU, and reducing journey times to approaching 30 minutes. These improvements also provide wider improvements to the NPR frequency and capacity across the network from Liverpool to Newcastle.
- Connecting Liverpool to the core NPR network with **Manchester to Liverpool NPR**, boosting journey times and capacity between the key locations in the North West.
- Further **interventions East of Leeds to York** to boost capacity from Manchester to Leeds and Newcastle. Interventions may be delivered earlier depending on development of NPR Phase 1.

By 2050, the Government expects the transformational benefits of HS2, NPR and MRH to have been realised, levelling up the potential of the Midlands and North through significant connectivity improvements.

- Subject to further work, any different HS2 connection to the WCML for services to Scotland.





Securing approval from Parliament

4.31 The Government intends to prepare three hybrid bills; one for the high speed line from Crewe to Manchester, followed by one for a high speed line connecting the West and East Midlands. The Government then intends to introduce a hybrid Bill for the section of NPR new line from Warrington to the HS2 line, and then Manchester to the Transpennine route.





5.
**How we will
deliver the
Integrated
Rail Plan**

- 5.1 The Integrated Rail Plan (IRP) presents the largest Government investment in our rail network, and it is essential that schemes within the portfolio are developed and delivered efficiently, maximising value for the taxpayer. Many major infrastructure schemes have suffered from cost increases and delays in construction. The Government is committed to managing these risks within this programme, working with Network Rail and HS2 Ltd to ensure design work is driven by affordability and that trade-offs are considered where pressures arise.

Adaptive Approach

- 5.2 The National Infrastructure Commission (NIC)'s Rail Needs Assessment and the Infrastructure and Projects Authority have both identified the need for the Government to take an adaptive approach as a way to mitigate these risks.
- 5.3 In line with the Government's existing approach to rail enhancements, commitments will be made only to progress individual schemes up to the next stage of development, and a re-authorisation will be required at that point. This allows the future scope and pace of delivery to be adjusted depending on a range of factors, including how quickly demand returns to historic levels, and how efficiently they can be delivered.
- 5.4 Overlaying that, the IRP schemes have been divided into a core committed pipeline, and a wider set of schemes under development. Schemes under development may be added into the core pipeline in the future; decisions on this will be informed by overall affordability at the time, whether core schemes progress on time, and to budget; and the evolution of demand and business cases.
- 5.5 As part of Project SPEED, Network Rail has replaced its previous "GRIP" methodology for developing projects with a more streamlined approach known as "PACE". The IRP commits to a core set of proposals however, schemes are currently at different stages in the PACE lifecycle, reflecting their relative maturity. The relationship table below summarises the position (to aid understanding, schemes delivered by HS2 Ltd have also been assigned an approximate PACE category, although subject to a different development cycle):

Tranching of Schemes

IRP tranche	Core pipeline	Future Options
Under Investigation PACE1: Strategic Development and Option Selection	High speed line East Midlands* NPR core network ECML upgrade	Options for HS2 Leeds services Midlands Rail Hub
PACE2: Project Development & Design	HS2 Western Leg to Manchester* Midland Main Line electrification TRU enhancement (NPR Phase 1)	
PACE3: Project Delivery	TRU base scope (part) HS2 Phase One and 2a	

*HS2 Ltd uses a different project development cycle to the PACE framework, geared to new line development. Its schemes are shown here at broadly equivalent stages of development.

Ensuring efficiency, including specification challenge, benchmarking

5.6 The Infrastructure and Projects Authority (IPA) was asked by the Government to undertake a review of the cost estimate approach and methodology of both HS2 Ltd and Network Rail for their respective elements of interventions included within the IRP, and whether these could be relied upon. This work was not an independent estimate of cost for the IRP or an assessment of estimated costs.

5.7 The IPA concluded that despite using different methodologies, the technical cost estimation work by both HS2 Ltd and Network Rail had been carried out to a good level of coherence and consistency. The IPA highlighted that estimates of cost were suitable to inform decisions about which route options might be further developed through to Strategic Outline Business Case (SOBC) level. However, they suggested that costing work was not yet mature enough to set fixed budgets, particularly at the level of individual schemes. As such, HS2 forecast costs are produced as ranges and Network Rail has reported cost estimates using Low Confidence-High Confidence ranges.



- 5.8 Attention was also drawn to the treatment of inflation by HS2 Ltd and Network Rail in previously modelled costs. Reporting of cost estimates has since been changed to the financial year in which they are produced, while acknowledging that the calculation of inflation is itself prone to uncertainty given long term time frames of the IRP.
- 5.9 The IPA recommended that Network Rail and HS2 Ltd collaborate further on cost estimation, and that both organisations should assess their organisational maturity for cost estimating and benchmarking.
- 5.10 The Government has responded by:
- uprating costs to 2019 rates;
 - ensuring decisions are framed within the wider (RNEP) approach to rail enhancements, by committing only to the next stage of development work of individual projects;
 - providing an indicative fiscal envelope for the core pipeline, while acknowledging the range within which that sits and avoiding setting detailed budgets for individual projects at this stage of development;
 - ensuring the strong co-working and knowledge sharing relationship between Network Rail, HS2 Ltd and the Department continued through the development of the plan.



- in addition, in line with the findings of the Oakervee report, the Government is continually considering how best to present the costs. This includes presenting the costs in the IRP as a range to reflect uncertainty and working with HS2 to deploy benchmarking more consistently and uniformly and monitor prices on the market to check cost estimates align with current market prices.

5.11 In line with Oakervee, the Government will continue to consider how it presents the costs of major infrastructure projects with a view to helping Parliament and the public better comprehend the costs of these projects.

Avoiding Over-Specification

5.12 The Oakervee Review highlighted the need to avoid over-specification when planning further sections of the UK's high speed rail network, as it can become costly to make changes as the design becomes more mature.

5.13 HS2 Ltd and Network Rail have iterative processes to sifting route options, to better understand the benefits, costs, engineering feasibility, environmental impacts and other impacts arising to determine the suitability of possible concepts and the resulting route alignments. This process has enabled outputs to be reviewed to understand the journey times, frequency, capacity and performance metrics that would be delivered by each concept to assess its contribution to the strategic case and the value for money outcome.

5.14 This iterative approach to specification development has enabled some concepts to be revised, so that rail outputs better represent the forecast travel market or demonstrate a stronger value for money case.

5.15 Many possible interventions outlined within the IRP are subject to further work being completed to determine they represent the right choice on their respective corridors. While further work is performed on these corridors, the same iterative approach will be taken to ensure the Government's strategic objectives are met, while still delivering strong value for money and benefits for the communities in the Midlands and North.

Responsibility for delivery

- 5.16 The Government will ask Network Rail to lead work, with input from HS2 Ltd, on schemes to upgrade the conventional existing rail network; option assessment how HS2 services could reach Leeds. Network Rail has already taken action to decentralise responsibility by introducing more devolved accountability to make sure that investment in railways meets the needs of its passenger and freight customers. This devolution to Regions and Routes also includes capital delivery. Network Rail has also taken action to strengthen its capability for major project delivery through the implementation of the Investment Decision Framework, including the Rail Network Enhancement Pipeline (RNEP) which has introduced staged approval of schemes to help manage costs.
- 5.17 The recently published Williams-Shapps Plan for Rail sets out the Government's plans to radically overhaul the way the rail sector works today. Great British Railways will take over future responsibility from Network Rail for upgrading the existing network and taking a leading role in ensuring integration with HS2 into that network. It will be made up of powerful regional divisions, with budgets and delivery held at the local level, not just nationally. This will enable much closer collaboration and joint working with local leaders. There will be one, single point of accountability for rail services in a town, city or region.



- 5.18 The Oakervee Review, published in February 2020, concluded that HS2 Ltd's governance arrangements needed to evolve and strengthen to reflect the complexity and scale of its work, and that additional Non-Executive Directors should be appointed to its Board. It was concerned about the scale of the potential full portfolio of future new lines (HS2 Phases One, 2a, 2b, Northern Powerhouse Rail (NPR)).
- 5.19 The Government has since taken steps to increase the capacity of the Board of HS2 Ltd by appointing four additional Non-Executive Directors, and to strengthen oversight of delivery of the Western Leg by nominating a specific Non-Executive Director to lead on Phase 2b matters. The Government has also taken supportive steps to develop new delivery arrangements for the Euston terminus. The Euston Partnership has been established as a first step, with a dedicated Euston Partnership Board, chaired by Sir Peter Hendy, the Chairman of Network Rail, and new executive leadership to support collaboration and integration across all the projects at Euston. The Board includes senior representatives from the Department, HS2 Ltd, Network Rail and Lendlease (the appointed Master Development Partner), the London Borough of Camden, Transport for London and the Greater London Authority.
- 5.20 The Government has carefully considered future delivery responsibilities in the light of the proposals in this report. It considers that on balance, the advantages of creating a new delivery body would likely be outweighed by the disbenefits of fragmentation and dis-economy of scale. However, there is a need to ensure that HS2 Ltd's work is manageable and reflects both the expertise of HS2 Ltd and the sensible potential boundaries of the future High Speed Network signalling system and infrastructure manager. HS2 Ltd is therefore progressing the Western Leg hybrid Bill; and will prepare legislation for the proposed highspeed route from the West Midlands to the East Midlands (High Speed 2 East). It is also expected to lead the next stages of work on the new line sections of NPR connecting to Warrington and the Transpennine route. As noted above, work on Leeds station capacity and the study of route options to take HS2 to Leeds will be led by Network Rail. Indicatively, the bounds of the high speed network envisaged in the IRP core programme would be Euston; Birmingham Curzon Street; Warrington; the end of the connection to the Transpennine route to Huddersfield; the end of the connection to the West Coast Main Line for Scotland services; and the East Midlands.



The **bounds** of the **high speed network** in the **IRP core programme** would be...

- ⇒ Euston
- ⇒ Birmingham Curzon Street
- ⇒ Warrington
- ⇒ End of the connection to the Transpennine route to Huddersfield
- ⇒ End of the connection to the West Coast Main Line for Scotland services
- ⇒ East Midlands Parkway

5.21 Also indicatively, the programme for introducing future hybrid Bills in Parliament could be:

- Western Leg to Manchester;
- High speed line to East Midlands (HS2 East);
- NPR connections to Warrington and the Transpennine route to Huddersfield.

5.22 To ensure it has the appropriate capacity for this portfolio, HS2 Ltd has also strengthened the capacity of its Executive team, and its collaboration with Network Rail.

Sponsorship

5.23 The Government does not intend to make changes to the existing sponsorship models for HS2 Ltd or the collaborative partnership used for Midlands Rail Hub.

5.24 NPR has, to date, been formally co-cliented between the Department for Transport and Transport for the North (TfN), even though the vast majority of the money for the project is being provided by the Government. TfN is England's first statutory sub-national transport body, formed to provide statutory advice to the Secretary of State on Northern transport matters. TfN brings together 20 local transport authorities and business leaders to act as "one voice" to communicate the North's transport priorities, informed by local knowledge and requirements.

5.25 One key lesson from other projects of this scale is the vital importance of leadership, clear accountabilities and simple client relationships. Splitting these roles in delivery risks failure. TfN is also a relatively small and young organisation with no experience of clienting a project of this scale through detailed development or delivery, and little or no ability to bear financial risk.

5.26 In finalising the Strategic Outline Case and moving forward into delivery, the NPR Programme will move to a different phase of development. As such, the current sponsorship model will need to evolve. In line with TfN's own recommendations, the Department and Transport for the North will continue to co-sponsor NPR, but the clienting of Network Rail, HS2 Ltd and other delivery partners will be managed in a single team. That team will need to be answerable to the Secretary of State for Transport to



streamline relationships, create efficiencies and provide clarity on the roles and responsibilities for the two sponsors while ensuring the North can still provide strategic advice on the direction and outcomes for NPR.

- 5.27 Northern leaders will continue to have direct and regular access to the Secretary of State for Transport to communicate their transport priorities as part of the Northern Transport Acceleration Council (NTAC).

Lessons learnt to date

- 5.28 The IPA also conducted a review into Phase One of HS2 in the form of a commercial ‘Lessons Learned’ review from HS2 Phase One to inform decisions on Phase Two and other schemes. A number of key issues were raised, and recommendations made to ensure the Government’s decision-making process was robust. These have been considered in the preparation of the IRP, and HS2 will look at implementing the recommendations going forward. Key themes include:

- **Changing Behaviour** – overall culture, management and contractual procedures should complement the chosen procurement and commercial strategies before contracts are placed.
- **Managing Cost** – for cost estimates there should be a move away from point estimation and reliance upon a single cost estimate, such as a Quantified Risk Assessment (QRA). The IPA found that Reference Class Forecasting (RCF) should be used to estimate a funding envelope (not a target price) when there is limited data to work off e.g. ground investigation and planning consent. Range estimates are more appropriate in cases where designs are immature and there is uncertainty. It is important to avoid placing too much weight too early on risk methodologies requiring robust statistical or comparable data.
- **Setting the scope** – on project scope, QRA techniques are appropriate when sufficient design exists to enable a mature understanding of the project risks. However, no estimate, whether generated by a design, a Bill of Quantities (BoQ) a QRA or from an RCF, will be robust if the scope continues to change.

5.29 In response to this:

- **HS2 Ltd and Network Rail have used cost range estimates instead of single estimates.** This process has been similar to DfT's work on Strategic Roads, which agreed to accept range estimates from the Highways Agency in 2008, recognising the uncertainty surrounding early stage projects;
- **A range of techniques for assessing contingency have been used,** including RCF and QRA. Cost estimates have been assessed against a range of benchmarks and have gone through several stages of assurance;
- **The Government has ensured that projects within the IRP are considered on a portfolio basis;**
- **Sponsorship responsibilities are being clarified** where needed to ensure clear control of scope and change, with regional authorities still given a voice with regards design development and delivery.





Future reform

- 5.30 The recommendations set out in this report are important decisions for the future of the railway and transport. It is critical to build them into an integrated strategic approach, recognising their wider implications and identifying the new opportunities they create.
- 5.31 The Williams-Shapps Plan for Rail will significantly change the way the railways are run, with integrated national leadership and the creation of powerful regional divisions within Great British Railways. Great British Railways will be responsible for upgrades to its infrastructure and will take on a lead role ensuring integration with HS2, providing a single point of accountability for ensuring plans are joined up and work together. This provides a significant opportunity to maximise the efficient and effective delivery of IRP schemes.
- 5.32 IRP delivery will take place as these changes occur and in the new structure. The Government's Rail Transformation Programme will ensure changes are delivered alongside the delivery of IRP, with both rail reform and the delivery of the IRP complementing one another and. It will also ensure that they are fit for the future needs of the network and support the sector moving forward.
- 5.33 To deliver the Williams-Shapps Plan for Rail the Secretary of State for Transport has already asked the Great British Rail Transition Team to lead development of a Whole Industry Strategic Plan (WISP) for the railway. This will identify key Governmental priorities to support future planning and decision-making on rail, supporting objectives for communities, the environment, transport and wider policy.
- 5.34 Work will be carried out during 2021 and 2022 to develop the WISP, considering how best to align with IRP recommendations and with broad engagement with industry. The process will consider how to take maximum advantage of the opportunities and clarity provided by IRP, both in the development of regional rail services and networks and in strategies, to achieve network-wide objectives such as decarbonisation and the growth of rail freight.
- 5.35 The Government will continue to accelerate and improve infrastructure delivery through Project Speed. Further reforms to deliver rail projects better, greener and faster may be identified through this process, including through the Department's collaboration with Network Rail on Rail SPEED (Swift, Pragmatic and Efficient Enhancement Delivery).



6. Conclusion

- 6.1 This Integrated Rail Plan (IRP) for the Midlands and North is an integral part of the Government's commitment to levelling up the country and Building Back Better following the impact of COVID-19. It presents an ambitious programme of Government investment through to the 2040s – at a scale unparalleled – which will drive economic growth and prosperity in the Midlands and North. The package presented by the Government will deliver significant benefits to passenger and freight users and strengthen intercity connections in an efficient way, to ensure good value for taxpayers. This investment will transform communities through improved connectivity, bringing the economies of the Midlands and North together, which will boost productivity and enable the Midlands and North to compete on the global stage. A modal shift towards rail travel will put rail infrastructure at the heart of the UK's ambitions to meet its net zero targets by 2050.
- 6.2 Construction is already underway on HS2 Phase One with shovels in the ground, and there is no better time to set out the IRP, as we Build Back Better. The Government has sought to bring work forward on projects where possible, to maximise benefits and deliver them as soon as possible to help businesses and communities focus on future growth after the uncertainties of COVID-19.
- 6.3 There are choices that must still be made, such as assessment of alternatives to Golborne as part of the upcoming Union Connectivity Review, which will be published shortly, and way to run HS2 services to Leeds. This will be considered as part of an adaptive approach, in line with the NIC's recommendation.
- 6.4 Publication of this IRP follows the earlier publication of the Williams-Shapps Plan for Rail, which set out the creation of a new organisation, Great British Railways, with overall responsibility for the rail industry. Great British Railways, when established, will take forward the delivery of many recommendations made within the IRP, and will take a lead role in the integration of these proposals with HS2, Northern Powerhouse Rail and the existing network. With oversight of timetabling, infrastructure and operational contracts, Great British Railways will be best placed to ensure efficient delivery of the IRP outputs.
- 6.5 The Government will continue to work with delivery and subnational transport bodies, such as HS2 Ltd, Network Rail, Transport for the North, Midlands Connect, and other wider stakeholders to continue to improve rail services across the North and Midlands faster. The Government will support Great British Railways in developing a Whole Industry Strategic Plan (WISP) for the railway, identifying key Governmental priorities to support future planning and decision-making on rail, supporting objectives for communities, the environment, transport, and wider policy. The Government will continue to examine how to best deliver infrastructure better, greener and faster, including through Project Speed, reduce costs and speed up the delivery of infrastructure schemes.

Endnotes

- 1 Prime Minister Speech at Manchester Science and Industry Museum (July, 2019), PM speech at Manchester Science and Industry Museum – GOV.UK (www.gov.uk)
- 2 Based on indicative train service.
- 3 All figures in the report are given in 2019 prices unless otherwise stated.
- 4 Transport for the North is a sub-national transport body, with the aiming of making strategic transport improvements in the North of England.
- 5 Subject to confirmation of local funding contribution.
- 6 The report draws on a wide range of evidence from projects at different levels of development to assess outputs. Journey times are variously based on (i) assured development activity by HS2 Ltd and Network Rail; (ii) work undertaken by Mott MacDonald for the Department; and (iii) professional judgement to combine elements of i) and ii). As is common, outputs (including on frequency and capacity to stations) are subject to possible change as scheme development proceeds and more detailed work is undertaken on infrastructure, timetabling, and stopping patterns.
- 7 Depending on whether services call at Crewe, or not.
- 8 Based on indicative train service for NPR and depending on whether services call at Crewe, or not.
- 9 Subject to confirmation following 2020 Design Refinement Consultation on Phase 2b.
- 10 Subject to confirmation following future consultation on detailed design.
- 11 The report draws on a wide range of evidence from projects at different levels of development to assess outputs. Journey times are variously based on (i) assured development activity by HS2 Ltd and Network Rail; (ii) work undertaken by Mott MacDonald for the Department; and (iii) professional judgement to combine elements of i) and ii). As is common, outputs (including on frequency and capacity to stations) are subject to possible change as scheme development proceeds and more detailed work is undertaken on infrastructure, timetabling, and stopping patterns.
- 12 Even taking account of emerging analysis from recent model updates.
- 13 Centre for Cities, Measuring Up – Comparing Public Transport in the UK and Europe’s Biggest Cities (2021)
- 14 It should be noted that the most recent update to Parliament on HS2 was provided by the Minister of State at the Department for Transport in October 2021. This confirms that Phase One and Phase 2a remain within budget. The Provision of £42.5bn shown above for HS2 Phases One and 2a excludes spend of £8.3bn up to March 2020 and comprises costs to go as follows: (i) £36.6bn on Phase One (total HS2 Ltd delegated funding together with Government retained contingency of £4.3bn); and (ii) £5.9bn costs to go on Phase 2a (where approximately 50% contingency funding has been assumed given the earlier stage of design and development).
- 15 Excluding NPR and 3rd party scope.
- 16 National Infrastructure Committee, Rail Needs Assessment (2020), <https://nic.org.uk/app/uploads/RNA-Final-Report-15122020.pdf> pp30-31
- 17 Office of Rail and Road (2019), Passenger rail performance. Measured using the proportion of trains on time (within one minute) in 2018-19 and 2019-20 (2019)
- 18 NSS, Rail passenger numbers and crowding on weekdays in major cities in England and Wales (2019) <https://www.gov.uk/government/statistics/rail-passenger-numbers-and-crowding-on-weekdays-in-major-cities-in-england-and-wales-2019>
- 19 DfT, Passengers in excess of capacity (PiXC) on a typical autumn weekday by city: annual from 2011, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1027185/rai0209 ods
- 20 National Travel Survey, Average number of trips made and distance travelled, <https://www.gov.uk/government/statistical-data-sets/nts01-average-number-of-trips-made-and-distance-travelled>
- 21 National Travel Survey, When people travel, <https://www.gov.uk/government/statistical-data-sets/nts05-trips>
- 22 Noting that the use of estimated time savings as the basis for quantifying economic impact remains robust.
- 23 Douglas Oakervee, Oakervee Review of HS2 (2020), <https://www.gov.uk/government/publications/oakervee-review-of-hs2>
- 24 Department for Transport, IRP Terms of Reference (2020), <https://www.gov.uk/government/publications/high-speed-north-an-integrated-rail-plan-for-the-north-and-midlands-terms-of-reference/terms-of-reference-for-an-integrated-rail-plan-for-the-north-and-midlands>
- 25 NIC, Rail Needs Assessment (2020) <https://nic.org.uk/studies-reports/rail-needs-assessment-for-the-midlands-and-the-north/>
- 26 NIC, Rail Needs Assessment Interim Report (2020), <https://nic.org.uk/app/uploads/RNA-Interim-Report-Final.pdf> (updated 21 September 2020)
- 27 National Infrastructure Commission, Rail Needs Assessment for the Midlands and the North (December, 2020), <https://nic.org.uk/app/uploads/RNA-Final-Report-15122020.pdf>
- 28 DfT, Outcome Delivery Plan: 2021 to 2022, <https://www.gov.uk/government/publications/department-for-transport-outcome-delivery-plan/dft-outcome-delivery-plan-2021-to-2022>
- 29 Transport Focus, “Williams Rail Review: what do passengers want?”, (January 2019), <https://d3cez36w5wymxj.cloudfront.net/wp-content/uploads/2019/02/01160753/Williams-Rail-Review-what-do-passengers-want.pdf>
- 30 BEIS/NSS, 2019 UK greenhouse gas emissions, provisional figures (2020), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/875485/2019_UK_greenhouse_gas_emissions_provisional_figures_statistical_release.pdf

- 31 HM Government, Transport Statistics Great Britain 2020 (December 2020) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945829/tsgb-2020.pdf
- 32 Decarbonising Transport: A Better, Greener Britain, p. 19. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf
- 33 HM Government, A Green Future: Our 25 Year Plan to Improve the Environment (2018), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
- 34 DfT, Rail Environment Policy Statement: On Track for a Cleaner, Greener Railway (2021), Rail environment policy statement: on track for a cleaner, greener railway, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002166/rail-environment-policy-statement.pdf
- 35 Government commits to 'nature positive' future in response to Dasgupta review (2021), <https://www.gov.uk/government/news/government-commits-to-nature-positive-future-in-response-to-dasgupta-review>
- 36 Transport use during the coronavirus (COVID-19) pandemic, <https://www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic>
- 37 The Green Book is guidance provided by HMT on economic appraisal of policies and projects. <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020>
- 38 Train punctuality at recorded station stops by operator, ORR. This is based on the combined punctuality statistics of Avanti, Northern, TPE and LNER TOCs.
- 39 HS2 Ltd, Options for phase two of the high speed rail network (2012), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/68965/options-for-phase-two-of-the-high-speed-rail-network.pdf
- 40 Department for Transport, HS2 Phase 2b Western Leg Design Refinement Consultation (2020), <https://www.gov.uk/government/consultations/hs2-phase-2b-western-leg-design-refinement-consultation>
- 41 Department for Transport, Union Connectivity Review Terms of Reference (2020), <https://www.gov.uk/government/publications/union-connectivity-review-terms-of-reference>
- 42 NSS, Rail passenger numbers and crowding on weekdays in major cities in England and Wales (2019) <https://www.gov.uk/government/statistics/rail-passenger-numbers-and-crowding-on-weekdays-in-major-cities-in-england-and-wales-2019>
- 43 NIC, Rail Needs Assessment (2020) <https://nic.org.uk/studies-reports/rail-needs-assessment-for-the-midlands-and-the-north/>
- 44 Strategic Alternatives to HS2 Phase 2b (2016) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/568309/strategic-alternatives-to-hs2-phase-2b-atkins-report.pdf
- 45 DfT analysis of Civil Aviation Authority Airport data, <https://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-Airport-data/Airport-data-2019/>
- 46 Including two semi-fast conventional services serving Dewsbury and Stalybridge
- 47 HS2 Ltd, Options for phase 2 of the high speed rail network (2012) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/68965/options-for-phase-two-of-the-high-speed-rail-network.pdf
- 48 Department for Transport, Investing in Britain's Future – Phase Two: The Route to Leeds, Manchester and beyond (2013) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69738/hs2-phase-two-command-paper.pdf
- 49 Like other parts of the HS2 network, the spur line capacity would in theory be 18 trains per hour (unconstrained). However, 14 trains per hour is judged the practical limit given the constraints from coordinating timetables from a range of different destinations; optimising the use of the HS2 line into London; and timetabling through the delta-junction at Birmingham.
- 50 Greater Manchester Combined Authority, The Greater Manchester Strategy: Our People, Our Place, https://www.greatermanchester-ca.gov.uk/media/1084/greater-manchester-summary_full_version.pdf
- 51 Greengauge 21, Beyond HS2, (May 2018), p103, http://www.greengauge21.net/wp-content/uploads/Beyond_HS2WEB.pdf
- 52 HS2 Ltd, Rebalancing Britain: From HS2 towards a national transport strategy (2014), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/374709/Rebalancing_Britain_-_From_HS2_towards_a_national_transport_strategy.pdf
- 53 Ennio Cascetta and Pierluigi Coppola, Milan-Rome: New High-Speed Rail Lines and Market Competition (2015); Francesca Pagliara, Jose Vassallo and Concepcion Roman, Madrid-Barcelona: High Speed Rail Versus Air Transportation: Case Study of Madrid-Barcelona (2012).
- 54 Department for Transport, High Speed Two: From Crewe to Manchester, West Midlands to Leeds and beyond (2017), <https://www.gov.uk/government/publications/hs2-phase-2b-route-decision>
- 55 Subject to confirmation following future consultation on detailed design
- 56 Mott Macdonald analysis for DfT
- 57 HS2 Strategic Alternatives Final Report (2013) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/253456/hs2-strategic-alternatives.pdf and Strategic Alternatives to HS2 Phase 2b (2016) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/568309/strategic-alternatives-to-hs2-phase-2b-atkins-report.pdf
- 58 Subject to an anticipated future consultation on detailed design.

- 59 Time saving is compared to 2021 position, so includes timetabling and infrastructure changes. The precise journey time is conditional upon identifying the best value balance between the costs and benefits of making the improvement. This is aligned with the adaptive approach being adopted for schemes within the IRP.
- 60 Around 27 minutes quicker than 2019 timetable
- 62 The Northern Powerhouse: One Agenda, One Economy, One North, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/427339/the-northern-powerhouse-tagged.pdf
- 63 HS2 Ltd Network Rail assured costs
- 64 *Beyond HS2*, Greengauge 21, May 2018, p103. http://www.greengauge21.net/wp-content/uploads/Beyond_HS2WEB.pdf
- 65 Transport for the North: Strategic Transport Plan (2019): <https://transportforthenorth.com/reports/strategic-transport-plan-2019/>
- 66 Office for National Statistics, Major Towns and Cities (December 2015), <https://geoportal.statistics.gov.uk/datasets/major-towns-and-cities-december-2015-names-and-codes-in-england-and-wales>
- 67 Transport for the North, Northern Powerhouse Rail: Connecting the people, communities and businesses of the North (June 2021), <https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Rail-Connect.pdf>, p.12
- 68 Infrastructure and Projects Authority, Analysis of the National Infrastructure and Construction Pipeline (November 2018), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/759222/CCS207_CCS1118987248-001_National_Infrastructure_and_Construction_Pipeline_2018_Accessible.pdf
More recent version – https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/892451/CCS118_CCS0620674232-001_Pipeline_document_2020_WEB.pdf
- 69 Office of Rail and Road, Government Support to the Rail Industry 1985-86 to 2019-20, <https://dataportal.orr.gov.uk/statistics/finance/rail-industry-finance/table-7270-government-support-to-the-rail-industry/>
- 70 HMG, The Construction Playbook (2020), <https://www.gov.uk/government/publications/the-construction-playbook>
- 71 Infrastructure and Projects Authority, Transforming Infrastructure Performance: Roadmap to 2030 (2021), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016726/IPA_TIP_Roadmap_to_2030_v6_1_.pdf
- 72 HMG, Rail Sector Deal (2018), Rail Sector Deal – GOV. UK (www.gov.uk) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016726/IPA_TIP_Roadmap_to_2030_v6_1_.pdf

Credits

Maps 1 & 2

Base Maps Credit: Alasdair Rae, Automatic Knowledge Ltd

ISBN 978-1-5286-2947-8

E-Number: E02680339