

High Speed Rail Eastern Network  
Partnership

**Technical Business Case Work on  
High Speed Rail**

Final Report

121525-50

Final Report | July 2011





## Appendices

### Appendix A

#### Details of Economic Impacts for Different Areas

# Executive Summary

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## Introduction

This report sets out the main findings of the Arup – Volterra research on the economic benefits of high speed rail to the High Speed Rail Eastern Network Partnership area<sup>1</sup>. The Partnership has been formed to make the case for the eastern route of the proposed Y shaped national high speed rail network.

The Eastern Network Partnership area consists of some of the largest urban areas in the UK outside of London containing more than 8.7 million people and 3.6 million jobs.

## Creating Substantial Economic Benefits

**We need to build a national high speed rail network to support economic growth and rebalance the national economy.**

**The total wider economic impacts of the eastern route of the proposed national high speed rail network are estimated to be £4.2bn<sup>2</sup>.** These comprise productivity benefits of bringing businesses closer together of £2.6bn, imperfect competition benefits of £0.8bn, and economic benefits of enabling workers to access more productive jobs by releasing capacity on existing rail routes of £0.8bn. This is additional to the benefits from reduced journey times for passengers (conventional transport benefits) which have been estimated by HS2 to be £20.8bn<sup>3</sup>, for the Y-shaped network north of the West Midlands.

## Delivering Better Value for Money

**We need to build the eastern route as soon as possible, in advance of, or at least at the same time as the western route.**

**The economic benefits compared to the costs of the eastern route are significantly higher than the western route.** In terms of benefits to rail users (conventional transport benefits), the Benefit to Cost Ratio of the eastern route of the high speed network north of the West Midlands is 5.6, compared with 2.6 of the western route. The productivity benefits of bringing businesses closer together of the eastern part of the network (£2.6bn) are around 20% higher than those for the western part (£2.1bn). The Eastern Network Partnership area includes major cities – including four of the eight Core Cities (Leeds, Newcastle, Nottingham and Sheffield), as well as other major urban areas such as Bradford, Derby, Tees Valley and York. In contrast the western route of HS2 will serve only two Core Cities north of Birmingham, and no other major urban areas.

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<sup>1</sup> The Eastern Network Partnership area comprises: the Derby, Derbyshire, Nottingham and Nottinghamshire Local Enterprise Partnership (LEP) area; the Leeds City Region LEP area; the North Eastern LEP area; the Sheffield City Region LEP area; and the Tees Valley LEP area

<sup>2</sup> All benefits are at 2009 prices, and over a 60-year appraisal period.

<sup>3</sup> HS2 Ltd do not explicitly split out the benefits of HS2 north of the West Midlands from the benefits of the whole of the Y-shaped network. This figure has been arrived at by comparing the benefits of the whole Y-shaped network with the benefits for HS2 from London to the West Midlands. See section 3.1.1 for more detail.

## Creating Economic Benefits by Faster Links to London

**Once the national high speed rail network is completed it will be important to ensure that there will be at least six high speed trains per hour to / from London on the eastern route of the network. Most (70%) of the productivity benefits of the eastern route are created by the faster journeys to London and the number of paths will be critical to maximising the benefits of high speed**

## Transforming Links between Cities Outside London

**We need to ensure the eastern route of the high speed network is planned in the right way to maximise the potential for bringing city regions outside London closer together.**

**A significant proportion (30%) of productivity benefits from the eastern route will also result from high speed rail bringing city regions outside London closer together.** In addition to the high speed rail services to / from London, there will also be high speed services between Birmingham, the East Midlands, Yorkshire and the North East. The national high speed rail network has the potential, if it is planned in the right way, to transform the connectivity between the main cities outside London. Some of the existing rail links between these cities are poor. For example it now takes almost two hours to travel by rail between Leeds and Nottingham, two of the largest cities in England which are only 70 miles apart.

## Developing a Strategy for the Rail Network as a Whole

**The economic benefits of high speed rail will be maximised if it is planned and delivered in the right way and integrated with a strategy for improving rail services on existing lines.**

Improvements are needed to existing rail routes in the short to medium term to deliver benefits in advance of the completion of the full national high speed rail network (which could take over 20 years).

Capacity released on existing rail routes by high speed rail should be used to retain and enhance existing long distance inter-urban rail services to the Eastern Network Partnership area, not for additional London commuter services. There should be more regular services to London from places in the Eastern Network Partnership area that do not have them currently. The estimated economic benefits to the Eastern Network Partnership area of enabling workers to access more productive jobs by releasing capacity on existing rail routes would be £0.8bn.

There must also be improvements to local and regional transport networks including rail and light rail services that connect with the high speed rail stations. This will spread the benefits of high speed rail as well as delivering substantial economic benefits in its own right.

To maximise its economic benefits and integration with the wider rail network, high speed rail should serve city centre and other key hub stations or should be as accessible as possible to main centres of population and economic activity. The economic benefits will be increased if high speed rail is planned in conjunction with regeneration and development projects in the areas next to the high speed rail stations.

# 1 Introduction

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## 1.1 Role of this Report

This report sets out the economic benefits of high speed rail to the High Speed Rail Eastern Network Partnership area (see figure 1.1), which comprises:

- The Derby, Derbyshire, Nottingham and Nottinghamshire Local Enterprise Partnership (LEP) area;
- The Leeds City Region;
- The North Eastern LEP area;
- The Sheffield City Region; and
- The Tees Valley LEP area.

This Partnership has been formed to make the case for the eastern part of the proposed national high speed rail network. This work has been commissioned to:

- Estimate the Wider Economic Impacts (WEIs) of the eastern part of the national high speed rail network;
- Compare the economic benefits of the eastern and western routes of the national high speed rail network;
- Consider the economic benefits of the enhanced connectivity between regional centres that will be provided by the eastern route of the national high speed rail network; and
- Identify the scope of capacity relief on the existing rail network, considering in broad terms how this released capacity might be best used and how this could enhance the economic benefits of high speed rail.

This work builds on the analysis undertaken by HS2 Ltd (the Government's high speed rail development company) on the economic impact of the proposed high speed rail network. It is based on similar assumptions, and is in conformity with Government guidance on assessing the economic benefits of transport projects. This report updates previous work on the economic case for high speed rail to the Leeds and Sheffield City Regions, and the "Three Cities" of the East Midlands<sup>4</sup>.

## 1.2 The Proposals for a High Speed Rail Network

The proposals of the Government are for a Y-shaped national high speed rail network (see figure 1.2)<sup>5</sup>. The first stage of this will connect London with the West Midlands. Detailed route proposals have been published for this first stage.

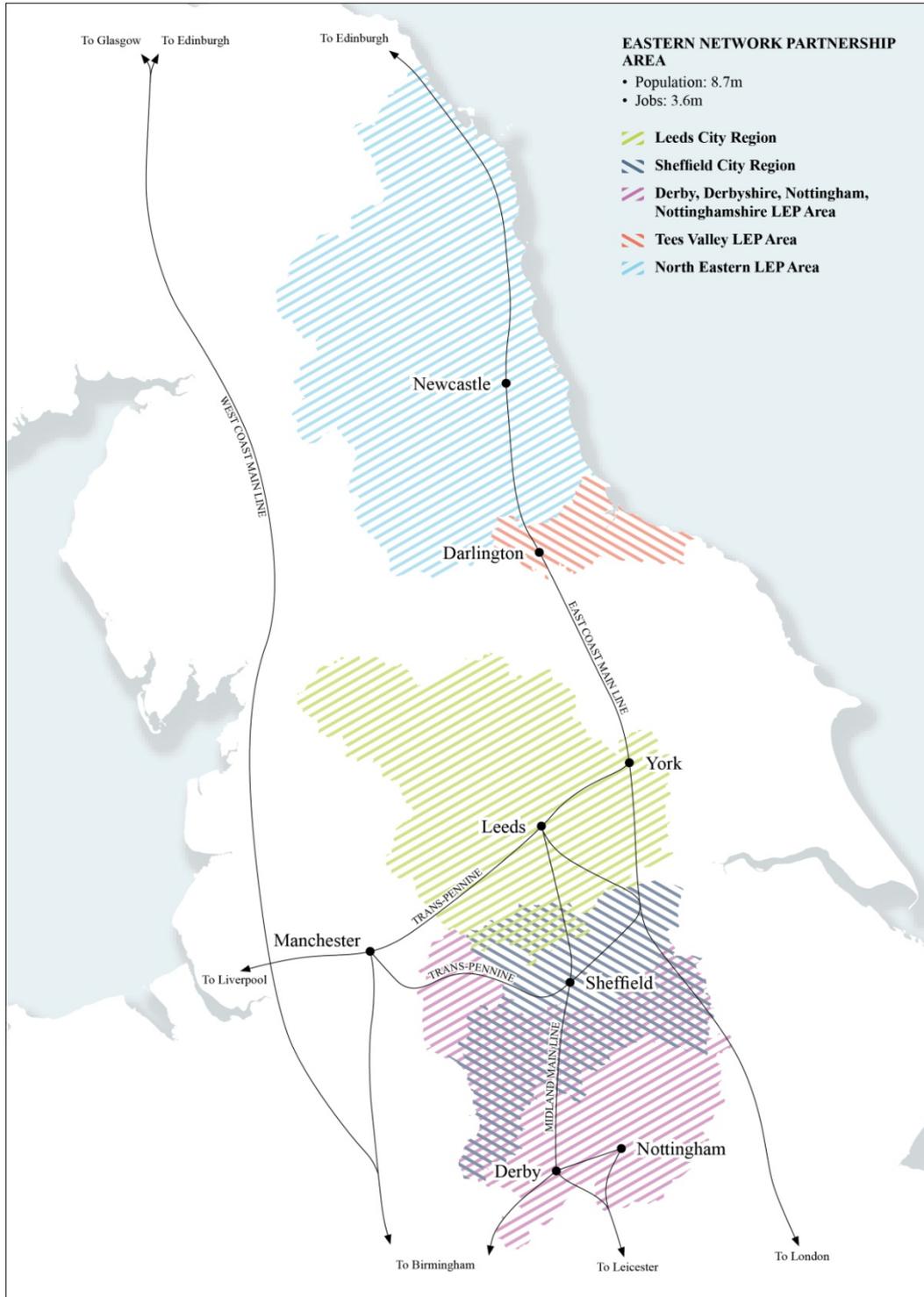
The later stages will extend the network northwards from Birmingham. HS2 Ltd is currently undertaking work to specify the details of the routes, station locations and interfaces with the existing rail network. The eastern route will continue from the West Midlands to the East Midlands, South Yorkshire, the Leeds City Region, with a connection near York on to the existing East Coast Main Line to enable train services to run on to the North East and Edinburgh. The western route will extend the network to Manchester and Liverpool with a connection on to the existing West Coast Main Line to enable high speed rail services to run on to Scotland.

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<sup>4</sup> See "High speed rail to Yorkshire" and "The case for high speed rail to the Three Cities"

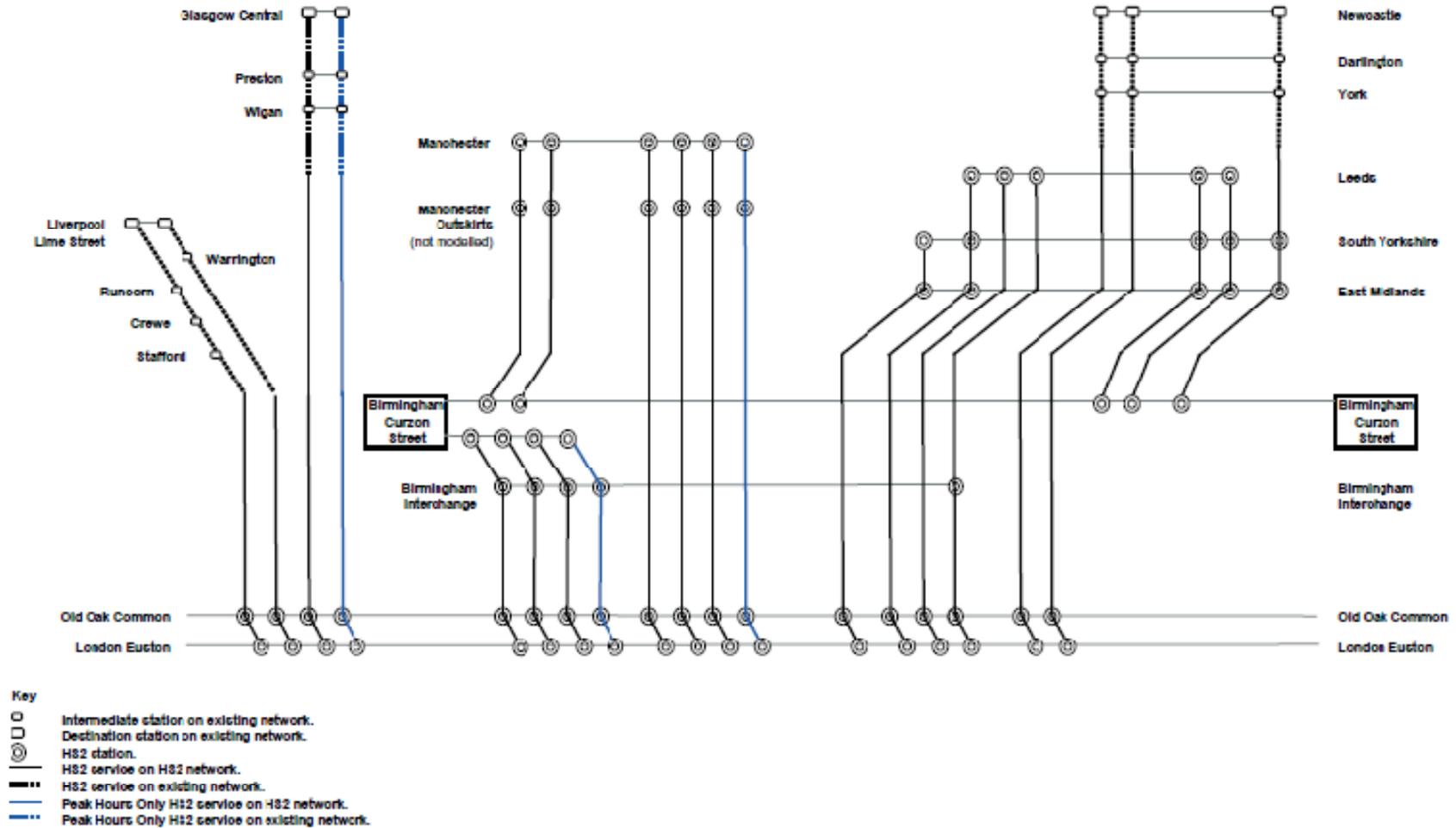
<sup>5</sup> As set out in the Department for Transport (2011) High speed rail: investing in Britain's future

**Figure 1.1: The High Speed Eastern Network Partnership Area**





**Figure 1.3: Service Specification Assumptions for the Y Network (Extract from HS2 Ltd report)**











commuter rail network, although it will relieve capacity on some existing commuter rail routes to London and on some routes between regional cities, which could enable greater commuting to take place.

Second, rail can help spread the economic reach of productive places by supporting decentralisation of secondary economic functions, which in themselves can become drivers for economic growth and more skilled labour markets in their local areas. The role of rail in supporting this pattern of economic growth in the London and South East “mega-city” region is already well documented. This could be a positive economic effect of HS2, particularly for places that will be brought within around 80 minutes of London.

Third, rail is particularly good at supporting inter-urban connections between main cities. This can enable different locations (which will have different economic specialisms) to improve their access to markets, suppliers, and knowledge. High speed rail could be particularly effective at supporting these links. Finally, rail can support cities’ international connectivity, which is important for economic competitiveness. It can provide fast access to major airports. HS2 will transform the accessibility by rail of Heathrow from the Midlands and north of England. It will also provide direct access to Birmingham International Airport, and potentially to East Midlands and Manchester Airports.

### 2.4.3 Wider Economic Impacts

The WEIs methodology was developed with the specific focus of considering the economic benefits of Crossrail, the east-west cross-London commuter rail scheme. It is primarily designed to capture the productivity benefits of (a) people being ‘effectively’ closer together and (b) enabling existing workers to work somewhere else, where they would be more productive. These are the largest two elements of WEIs, but there are also two further elements which consider the ability of transport to increase competition in markets and also its ability to deliver benefits to consumers as a result of increased production in imperfectly competitive markets.

#### Pure agglomeration

The first of these impacts (people working closer together) is called ‘pure agglomeration’ in the guidance and is the term given to the growth in productivity of existing workers as the effective density of employment around them increases. Effective density is a measure of employment density, transformed by the distance between places. For example if place A has 100 people and place B has 50 people, and they are 30 minutes apart, if they become only 20 minutes apart but still have the same numbers of people, then they both become ‘effectively’ denser.

This denser employment leads to higher productivity, which is achieved through larger labour pools and additional suppliers and clients, which lead to greater competition between firms and more opportunity for specialisation. A clear example of the effects of agglomeration can be seen in the levels of innovation of businesses in city centres and the higher prices that companies are willing to pay to locate in these prime, accessible locations.

The productivity benefits through pure agglomeration are captured by applying an elasticity of productivity with respect to employment density to the change in







**Table 2.1: WEIs of the Eastern Route of HS2 – Pure Agglomeration**

Area to where the benefits accrue	annual benefits (£m)	60yr NPV (£bn)
Leeds City Region	30.3	0.9
Sheffield City Region	13.0	0.4
East Midlands	11.5	0.4
North East	5.7	0.2
Birmingham City Region	3.4	0.1
London	20.8	0.6
<b>Total</b>	<b>£84.7m</b>	<b>£2.6bn</b>

Of these benefits just over 70% accrue to the Eastern Network Partnership area. 36% of the benefits accrue to the Leeds City Region, a further 15% to the Sheffield City Region, 14% to the East Midlands and 7% to the North East. Finally, 4% of the benefits accrue to Birmingham City Region as a result of the improved connectivity between the West Midlands and the Eastern regions, and 25% accrue to the London through these better connections.

This does not include any benefits to the West Midlands and London of the HS2 line itself (i.e. improved connectivity between the West Midlands and London). These would be additional to the benefits estimated here and have been estimated by HS2 to be of the order of £4bn, which is made up of £3m of 'pure agglomeration' benefits and £1m of benefits resulting from imperfect competition.

The next section considers how the pure agglomeration benefits are made up across different sectors. Section 3.1 goes on to compare the pure agglomeration benefits from the eastern route with the western route.

### 2.5.3 Pure agglomeration benefits by sectors

The table below shows the distribution of the pure agglomeration benefits across the four sectors. This shows that the majority of the benefits are through productivity benefits in Producer Services. This reflects the fact that Producer Services have a higher propensity to cluster geographically than other sectors. Producer Services generally benefit most from rail investments because of the large size and rapid growth in recent decades of these sectors and because these firms are usually concentrated in city centre locations near to main railway stations.

The results by sector show that there would be a significantly higher percentage of productivity benefits in manufacturing in the North East and Birmingham City Region compared to the other areas. This reflects the economic structure of the different areas.







**Table 3.2: WEIs of the eastern and western routes (all figures are 2009 prices)**

<b>EASTERN ROUTE</b>			
<b>Area to where the benefits accrue</b>	<b>annual benefits (£m)</b>	<b>60yr NPV (£bn)</b>	<b>%</b>
Leeds City Region	30.3	0.9	36%
Sheffield City Region	13.0	0.4	15%
East Midlands	11.5	0.4	14%
North East	5.7	0.2	7%
Birmingham City Region	3.4	0.1	4%
London	20.8	0.6	25%
<b>Total</b>	<b>£84.7m</b>	<b>£2.6bn</b>	<b>100%</b>
<b>WESTERN ROUTE</b>			
<b>Area to where the benefits accrue</b>	<b>annual benefits (£m)</b>	<b>60yr NPV (£bn)</b>	<b>%</b>
Greater Manchester	21.7	0.7	31%
Merseyside	3.3	0.1	5%
Lancashire	9.4	0.3	14%
Staffordshire	2.4	0.1	3%
Cheshire	3.2	0.1	5%
Cumbria	2.1	0.1	3%
Birmingham City Region	4.2	0.1	6%
London	22.5	0.7	33%
<b>Total</b>	<b>£68.9m</b>	<b>£2.1bn</b>	<b>100%</b>

## 3.2 The wider case for delivering the eastern part of the high speed network prior to the western part

### 3.2.1 Introduction

The previous section has shown that there is a stronger economic case for the eastern part of the proposed high speed network to the East Midlands, Yorkshire and North East than there is for the western route of the network to the North West. There are also some wider issues to be considered: the relative journey time savings; future capacity on existing routes; and the benefits to Scotland.

### 3.2.2 What happens after HS2 Phase 1 opens?

A significant feature of the first phase of HS2 that has been proposed is that it will include a link to the existing West Coast Main Line (WCML). This will enable “classic compatible” high speed trains to travel on HS2 at high speed between London and the West Midlands, and then to continue at lower speeds north on the existing West Coast Main Line. The link between HS2 Phase 1 and the WCML will be via the proposed Lichfield High Speed Junction on WCML to Water Orton South Junction on the Birmingham - London HS2 spine.





and Scotland. It is important that at least six trains per hour are retained for services between London and the Eastern Network Partnership area. If the overall service pattern on HS2 needs to be rationalised, the three trains per hour in the peak to Birmingham and the North West should be removed first.

If city centre through-stations are not feasible or affordable then a dedicated high speed route with some edge of city stations and some access to city centres by spur lines would be preferable along the eastern route. However, this option could require additional paths to those previously identified. Therefore it will be important to continue to make the case for the 6tph on HS2 via the eastern route, even if the overall frequency on the core network is reduced. Ensuring the proposed frequencies in the current HS2 reports are delivered is crucial. This case is based on the substantial economic benefits that the eastern route provides, which are greater than those for the western route.

Some of the proposed high speed rail services are assumed to only operate during the peak and it is suggested stakeholders served by the Eastern route should persuade HS2 and the Government that these trains should be rationalised if there are capacity constraints.

## 4 Benefits of improved connectivity between non-London city regions

### Main Conclusions

**We need to ensure the eastern route of the high speed network is planned in the right way to maximise the potential for bringing city regions outside London close together.**

### Summary of Evidence:

**A significant proportion (30%) of productivity benefits from the eastern route will also result from high speed rail bringing city regions outside London closer together.**

In addition to the high speed rail services to / from London, there will also be high speed services between Birmingham, the East Midlands, Yorkshire and the North East. The national high speed rail network has the potential, if it is planned in the right way, to transform the connectivity between main cities outside London. This could bring city region economies closer together, improving firms' access to skilled staff, markets, workers' access to jobs, and supporting greater sharing of knowledge and expertise between cities. This opportunity is particularly strong in the Eastern Network Partnership area which has a far larger concentration of population and economic activity than the North West.

Some of the existing rail links between the cities are poor. For example it now takes almost two hours to travel by rail between Leeds and Nottingham, two of the largest cities in England which are only 70 miles apart.

### 4.1 Introduction

This section considers the benefits of high speed rail of improved links between non-London city regions.

As well as resulting in faster journey times to London, the proposed Y-shaped high speed network has the potential to transform links between some of the largest cities and city regions outside London.

Figure 4.1 sets out some of the proposed journey time savings.

### 4.2 The economic opportunity for bringing regional cities closer together in the Eastern Network Partnership area

The Eastern Network Partnership area offers significant opportunities for using high speed rail to transform the economic geography in terms of how major cities and city regions function. The area includes major cities – including four of the eight Core Cities (the largest cities in England outside London – which include Leeds, Newcastle, Nottingham and Sheffield), as well as other major urban areas such as Derby, Bradford, York and the Tees Valley.

In contrast the western route will serve only two Core Cities north of Birmingham, and no other major urban areas. It will serve an area with a far lower density of population and economic activity. The route will provide limited economic benefits in England north of Manchester and Liverpool due to the sparsity of population and economic activity of the area it will serve, in contrast to the Eastern Network Partnership area north of Leeds.





**Table 4.1: Where do the wider economic impacts come from?**

	<b>(a) Per annum (£m) productivity benefits</b>						Total
	LCR	SCR	E. Mids	N.East	BCR	London	
Leeds CR	0.0	1.3	6.0	0.0	3.2	19.7	30.3
Sheffield CR	1.2	0.0	2.7	0.3	0.5	8.3	13.0
East Mids	1.3	0.1	0.0	0.4	0.5	9.2	11.5
North East	0.0	0.1	1.8	0.0	1.3	2.5	5.7
B'ham CR	2.2	0.3	0.3	0.6	0.0	0.0	3.4
London	10.8	4.3	4.7	0.9	0.0	0.0	20.8
<b>Total</b>	<b>15.5</b>	<b>6.2</b>	<b>15.5</b>	<b>2.3</b>	<b>5.5</b>	<b>39.7</b>	<b>84.7</b>
	<b>60yr NPV (£bn)</b>						
	LCR	SCR	E. Mids	N.East	BCR	London	Total
Leeds CR	0.00	0.04	0.18	0.00	0.10	0.60	0.93
Sheffield CR	0.04	0.00	0.08	0.01	0.02	0.25	0.40
East Mids	0.04	0.00	0.00	0.01	0.01	0.28	0.35
North East	0.00	0.00	0.06	0.00	0.04	0.08	0.17
B'ham CR	0.07	0.01	0.01	0.02	0.00	0.00	0.11
London	0.33	0.13	0.14	0.03	0.00	0.00	0.64
<b>Total</b>	<b>0.47</b>	<b>0.19</b>	<b>0.47</b>	<b>0.07</b>	<b>0.17</b>	<b>1.22</b>	<b>2.59</b>
	<b>% of Eastern Network benefits by area which benefits</b>						
	LCR	SCR	E. Mids	N.East	BCR	London	Total
Leeds CR	0%	4%	20%	0%	11%	65%	100%
Sheffield CR	9%	0%	21%	2%	4%	64%	100%
East Mids	11%	1%	0%	4%	4%	80%	100%
North East	0%	2%	32%	0%	23%	44%	100%
B'ham CR	64%	10%	8%	18%	0%	0%	100%
London	52%	21%	23%	5%	0%	0%	100%
<b>Total</b>	<b>18%</b>	<b>7%</b>	<b>18%</b>	<b>3%</b>	<b>6%</b>	<b>47%</b>	<b>100%</b>
	<b>% of total Eastern Network benefits</b>						
	LCR	SCR	E. Mids	N.East	BCR	London	Total
Leeds CR	0%	2%	7%	0%	4%	23%	36%
Sheffield CR	1%	0%	3%	0%	1%	10%	15%
East Mids	1%	0%	0%	0%	1%	11%	14%
North East	0%	0%	2%	0%	2%	3%	7%
B'ham CR	3%	0%	0%	1%	0%	0%	4%
London	13%	5%	6%	1%	0%	0%	25%
<b>Total</b>	<b>18%</b>	<b>7%</b>	<b>18%</b>	<b>3%</b>	<b>6%</b>	<b>47%</b>	<b>100%</b>

Note: totals may not sum due to rounding.



## 5 The importance of improving existing lines

### Main Conclusions

**The economic benefits of high speed rail will be maximised if it is planned and delivered in the right way and integrated with a strategy for improving rail services on existing lines.**

Improvements are needed to existing rail routes in the short to medium term to deliver benefits in advance of completion of the full national high speed rail network (which could take over 20 years).

Capacity released on existing rail routes by high speed rail should be used to retain and enhance existing long distance inter-urban rail services to the Eastern Network Partnership area, not for additional London commuter services. There should be more regular services to London from places in the Eastern Network Partnership area that do not have them currently. The estimated economic benefits to the Eastern Network Partnership area of enabling workers to access more productive jobs by releasing capacity on existing rail routes would be £0.8bn.

There must also be improvements to local and regional transport networks including rail and light rail services that connect with the high speed rail stations. This will spread the benefits of high speed rail as well as delivering substantial economic benefits in its own right.

To maximise its economic benefits and integration with the wider rail network, high speed rail should serve city centre stations or should be made as accessible as possible to main centres of population and economic activity, and integrated closely with the wider transport network.

The economic benefits will be increased if high speed rail is planned in conjunction with regeneration and development projects in the areas next to the high speed rail stations.

### 5.1 Introduction

The purpose of this chapter is to identify issues and options for how services could be improved on existing rail routes to exploit the benefits of capacity relief created by high speed rail. To do this it is necessary to consider the potential different approaches to planning HS2 north of Birmingham as these have very different implications for the scope to deliver changes to conventional rail services. A detailed timetable planning exercise is outside the scope of this project. The initial analysis undertaken on the issue of capacity relief has indicated the complexity of the subject.

To maximise the economic benefits from high speed rail and capacity relief the main principles for the Eastern Network Partnership are set out below.

- The detail of the HS2 proposals north of the West Midlands need to be right, including routes, station locations, service patterns and rolling stock strategy.
- It will be important to secure improvements to existing routes, including capacity and line-speed improvements and electrification in order to deliver improvements in the short to medium term. This will create benefits before the high speed network is built and will help maximise the capacity relief benefits of high speed rail over the longer term.
- There is a strong case for ensuring that the capacity released on existing routes as a result of high speed rail is used to maintain and enhance existing long distance conventional rail services. This will benefit locations not served by high speed rail, create economic benefits to main cities and city regions, and



















than Derby), whereas the productivity levels are more similar in Nottingham and Birmingham (although producer services workers are more productive in Birmingham than Nottingham).

**Table 5.3: WEIs through ‘move to more productive jobs’ resulting from capacity release**

Route	per annum (£m)	60yr NPV (£bn)
Derby – Leicester	3.5	0.11
Nottingham - Leicester	3.0	0.09
Derby – Sheffield	5.3	0.16
Sheffield / Wakefield – Leeds	3.3	0.10
York – Leeds	3.8	0.12
Leeds – Doncaster	2.8	0.09
Derby – Birmingham	3.7	0.11
Nottingham - Birmingham	1.0	0.03
<b>Total</b>	<b>26.3</b>	<b>0.80</b>

These represent significant productivity benefits and they would accrue partly to businesses in Yorkshire and the East Midlands, as well as Birmingham, as a result of having access to more productive workers, and partly to residents of these cities as the workers take their higher earnings home and spend more money locally, thus creating knock-on local benefits. The tables below show the distribution of where workers originate their commute from and where they go to work.

This shows that the largest benefits are for commuters travelling out of Sheffield and workers travelling into Derby and Leeds. The benefits to Leeds can be explained by the existing size of the city centre economy, and the current limited capacity on the fastest services from Derby and Sheffield. The size of the benefits to Derby can be explained by the fact that it benefits from capacity relief on services from the north and the south.

**Table 5.4: WEIs resulting from capacity release, by origin and destination of workers**

By Origin	per annum (£m)	60yr NPV (£bn)
Derby	1.8	0.05
Nottingham	2.9	0.09
Sheffield	7.5	0.23
York	2.7	0.08
Leeds	1.1	0.03
Leicester	3.9	0.12
Doncaster	2.8	0.09
Birmingham	3.7	0.11
<b>Total</b>	<b>26.3</b>	<b>0.80</b>

<b>By Destination</b>	<b>per annum (£m)</b>	<b>60yr NPV (£bn)</b>
Derby	10.7	0.33
Nottingham	1.2	0.04
Sheffield	1.0	0.03
York	1.1	0.03
Leeds	8.8	0.27
Leicester	2.6	0.08
Doncaster	0.0	0.00
Birmingham	1.0	0.03
<b>Total</b>	<b>26.3</b>	<b>0.80</b>



## Appendix A

### Details of Economic Impacts for Different Areas



## A1 Details of Economic Impacts for Different Areas

### A1.1 Derby, Derbyshire, Nottingham, Nottinghamshire

The table below gives an overview of the scale of the WEIs estimated for Derbyshire and Nottinghamshire. 17% of the benefits from the eastern route accrue to these areas, or other parts of the East Midlands. We estimate that Nottinghamshire and Derbyshire will benefit by similar amounts of £5.7m-£5.8m of productivity benefits per annum as a result of High Speed Rail.

**Table A.1: WEIs of the eastern route for Derbyshire and Nottinghamshire<sup>15</sup>**

Area to where the benefits accrue	annual benefits (£m)	60yr NPV (£bn)
Nottinghamshire	5.8	0.18
Derbyshire	5.7	0.17
Rest of East Midlands	3.0	0.09
<b>Total</b>	<b>£14.4m</b>	<b>£0.4bn</b>
<b>% of eastern route benefits</b>	<b>17%</b>	

The second table below gives the distribution of these benefits by sector. This shows that the majority of benefits are through improved productivity in Producer Services, although Consumer Services also achieve significant productivity benefits and Manufacturing experiences higher productivity benefits here than in other parts of the study area.

**Table A.2: Sectoral split of the WEIs for Derbyshire and Nottinghamshire**

Distribution of benefits by sector	Manufacturing	Construction	Consumer Services	Producer Services
Nottinghamshire	7%	3%	13%	78%
Derbyshire	11%	5%	17%	67%
rest of East Midlands	12%	5%	17%	66%

The final table in this section shows where these WEIs are coming from – the split between the benefits coming from better links to London and better links with the Birmingham City Region, Yorkshire and the North East.

This shows that the majority (around 80%) of benefits are as a result of better links with London. However there are also significant benefits of the improved linked between Derbyshire and Nottinghamshire with Yorkshire.

<sup>15</sup> It should be noted that the results in this section overlap with the results given for Sheffield City Region in the subsequent section due to the overlapping between Nottinghamshire and Derbyshire with the Sheffield City Region.

**Table A.3: Where do the WEIs come from?**

	per annum (£m) productivity benefits from better links to...								
	Yorks	Nott	Derb	EMid	TV	NE	BCR	Lond	Total
Notts	0.7	0.0	0.0	0.0	0.1	0.1	0.2	4.5	5.8
Derbys	0.3	0.2	0.3	0.2	0.0	0.1	0.3	4.4	5.7
rest EMids	0.5	0.0	0.0	0.0	0.0	0.1	0.0	2.3	3.0
	60yr NPV (£m)								
	Yorks	Nott	Derb	EMid	TV	NE	BCR	Lond	Total
Notts	23	1	1	1	2	4	7	138	177
Derbys	8	7	9	6	1	2	8	133	174
rest EMids	16	0	0	0	1	4	0	71	92
	% of by area which benefits								
	Yorks	Nott	Derb	EMid	TV	NE	BCR	Lond	Total
Notts	13%	1%	0%	0%	1%	2%	4%	78%	100%
Derbys	5%	4%	5%	3%	0%	1%	5%	77%	100%
rest EMids	17%	0%	0%	0%	2%	4%	0%	77%	100%

## A1.2 Sheffield and Leeds City Regions

The table below gives an overview of the scale of the WEIs estimated for Sheffield and Leeds City Regions. 51% of the benefits from the eastern route accrue to these areas. We estimate that Leeds City Region will benefit by productivity benefits of £30m per annum and Sheffield City Region by £13m per annum as a result of High Speed Rail, together resulting in an estimated £1.3bn of productivity benefits when calculated as a 60 year NPV.

**Table A.4: WEIs of the eastern route for Sheffield and Leeds City Regions**

Area to where the benefits accrue	annual benefits (£m)	60yr NPV (£bn)
Leeds City Region	30.3	0.93
Sheffield City Region	13.0	0.40
<b>Total</b>	<b>43.3</b>	<b>£1.3bn</b>
<b>% of Eastern Network</b>	<b>51%</b>	

The second table below gives the distribution of these benefits by sector. This shows that the majority of benefits are through improved productivity in Producer Services, although Consumer Services also achieve significant productivity benefits.

**Table A.5: Sectoral split of the WEIs for Sheffield and Leeds City Regions**

Distribution of benefits by sector	Manufacturing	Construction	Consumer Services	Producer Services
Leeds City Region	9%	5%	12%	73%
Sheffield City Region	9%	6%	16%	69%

The final table in this section shows where these WEIs are coming from – the split between the benefits coming from better links to London and better links with the Birmingham City Region, the East Midlands and the North East and between the two city regions themselves.

This shows that the majority (around 65%) of benefits are as a result of better links with London. This majority is lower than for the East Midlands, and there are significant benefits of the improved linked between Leeds and Sheffield City Regions with one another and with the East Midlands, the North East and Birmingham City Region.

20% of the benefits accruing to Leeds and Sheffield City Regions are through better links with the East Midlands. Both city regions benefit by over £1m of annual productivity benefits by better links between the two city regions. Leeds City Region especially benefits from better links with Birmingham City Region.

**Table A.6: Where do the WEIs come from?**

	per annum (£m) productivity benefits						Total
	LCR	SCR	E. Mids	N.East	BCR	London	
Leeds CR	0.0	1.3	6.0	0.0	3.2	19.7	30.3
Sheffield CR	1.2	0.0	2.7	0.3	0.5	8.3	13.0
	60yr NPV (£bn)						Total
	LCR	SCR	E. Mids	N.East	BCR	London	
Leeds CR	0.00	0.04	0.18	0.00	0.10	0.60	0.93
Sheffield CR	0.04	0.00	0.08	0.01	0.02	0.25	0.40
	% of Eastern Network benefits by area which benefits						Total
	LCR	SCR	E. Mids	N.East	BCR	London	
Leeds CR	0%	4%	20%	0%	11%	65%	100%
Sheffield CR	9%	0%	21%	2%	4%	64%	100%

### A1.3 Tees Valley and North Eastern LEP areas

The table below gives an overview of the scale of the WEIs estimated for the Tees Valley and the North Eastern LEP areas. 7% of the benefits from the eastern route accrue to these areas. We estimate that the Tees Valley will benefit by productivity benefits of £1.8m per annum and the North Eastern LEP area by £3.9m per annum as a result of High Speed Rail, together resulting in an estimated £0.2bn of productivity benefits when calculated as a 60 year NPV.

**Table A.7: WEIs of the eastern route for Tees Valley and the North Eastern LEP areas**

Area to where the benefits accrue	annual benefits (£m)	60yr NPV (£bn)
Tees Valley	1.8	0.06
North Eastern	3.9	0.12
<b>Total</b>	<b>£5.7m</b>	<b>£0.2bn</b>
<b>% of Eastern Network</b>	<b>7%</b>	

The second table below gives the distribution of these benefits by sector. This shows that the majority of benefits are through improved productivity in Producer Services, although Consumer Services and Manufacturing also achieve significant productivity benefits in this area.

**Table A.8: Sectoral split of the WEIs for Tees Valley and the North Eastern LEP area**

Distribution of benefits by sector	Manufacturing	Construction	Consumer Services	Producer Services
Tees Valley	16%	8%	16%	60%
North Eastern LEP area	17%	9%	13%	61%

The final table in this section shows where these WEIs are coming from – the split between the benefits coming from better links to London and better links with the Birmingham City Region, different parts of the East Midlands and Yorkshire.

This shows that the largest share (over 40%) of benefits are as a result of better links with London. However this share is considerably lower than for the rest of the city region, and there are significant benefits from the improved links especially with Birmingham City Region and the East Midlands.

Just under a quarter of the benefits accruing to Tees Valley and the rest of the North East are through better links with the Birmingham City Region, and a further third of benefits to each of these areas come from improved links to Nottinghamshire, Derbyshire and the rest of the East Midlands.

**Table A.9: Where do the WEIs come from?**

	per annum (£m) productivity benefits from better links to...						Total
	Yorks	Nott	Derb	EMids	BCR	Lond	
Tees Valley	0.0	0.2	0.2	0.2	0.4	0.8	1.8
North Eastern	0.1	0.4	0.5	0.4	0.9	1.7	3.9
	60yr NPV (£m)						Total
	Yorks	Nott	Derb	EMids	BCR	Lond	
Tees Valley	1	6	7	6	13	24	56
North Eastern	2	11	14	12	27	53	119
	% of by area which benefits						Total
	Yorks	Nott	Derb	EMids	BCR	Lond	
Tees Valley	2%	10%	13%	11%	23%	42%	100%
North Eastern	1%	9%	12%	10%	23%	44%	100%

