Volterra

Nottingham City Council and Partners

Maximising the Economic Benefits of the East Midlands HS2 Station at Toton

FINAL REPORT

Prepared by Volterra Partners

November 2013

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1 Executive Summary

Background to this study

1.1 This report assesses the economic benefits of the proposed East Midlands HS2 station at Toton, and considers how to maximise those benefits. It has been commissioned by Nottingham City Council and its partners Nottinghamshire County Council, Broxtowe Borough Council and Derbyshire County Council.

1.2 A high speed rail (HSR) station at Toton would serve a large population of over 1.7 million people from the Derby, Derbyshire, Nottingham and Nottinghamshire (D2N2) Local Enterprise Partnership (LEP), and some 4.5 million that live in the wider East Midlands region. The prospective East Midlands hub station would also provide direct connections to Nottingham and Derby.

1.3 Nottingham and Derby are the main centres of employment in the D2N2 region. This means that good transport links to both cities are crucial for the prosperity of the wider region. The Government's decision to designate Toton as its preferred option for a High Speed 2 (HS2) Hub station in the East Midlands provides the best opportunity to realise the envisaged benefits.

Scale of HS2 benefits at the national level

Case in line with guidance

1.4 HS2 Ltd's latest (October 2013) strategic and economic case for HS2 concludes that there is a high likelihood (78.7%) that HS2 would be a high value for money investment. The central estimate is for a benefit cost ratio (BCR) of 2.3 which means that for every £1 spent there would be benefits of £2.30. The latest case undertakes considerable sensitivity analysis and concludes that even if a raft of downside risks materialise, the full Y network will still deliver medium value for money.

1.5 It is important to note that this case is based upon traditional guidance principles which were designed to evaluate smaller schemes where the majority of factors remain fixed and it is now widely accepted that these methods are not appropriate for capturing the full benefits of a project of this nature, which is intended to have transformational impacts all across the country.

1.6 In line with the standard modelling approach, the government's central case assumes that demand growth stops in 2036, only 3 years after Phase Two opens. The strategic case presents findings from sensitivities where demand is allowed to continue to grow to 2040 and 2049 and finds that this dramatically increases the BCR, seeing it rise to between 2.8 and 4.5.

Wider case

1.7 In addition to undertaking the standard analysis, HS2 Ltd also commissioned work to look at alternative approaches to capturing the benefits of HS2. Recent work published by KPMG finds that the productivity benefits could be as large as £15bn per annum. These are not additional to the standard approach and should be viewed as indicative at this stage. Work is currently underway to revise these estimates.

1.8 Even this new work and the sensitivities undertaken by HS2 still assume that there is no net additional economic activity attracted to the UK as a result of HS2. They therefore still do not capture the transformational impacts that the investment could have. Work undertaken by Volterra for HS1 found that even if only 5% of the regeneration benefits around stations were due to new investment into the UK, then this would more than double the benefits estimated by traditional methods. It is clearly possible that HS2 could have significant step change impacts on the economic geography of the UK that are not yet captured by the existing evaluation approaches.

Jobs

1.9 The initial analysis carried out by the Government estimated that HS2 will support over 100,000 jobs across Britain. A more recent study, commissioned by Greengauge21 (June 2013), estimated that it would support the equivalent of 89,000 full-time equivalent jobs through the direct employment in the planning, design, construction and long-term renewals of the infrastructure and train; the indirect jobs through the supply chain; permanent jobs for the operation and maintenance; and expected employment within the station footprints.

1.10 The same study showed that the direct employment opportunities generated by manufacture of the rolling stock is expected to be some 7,350 full-time equivalent jobs. This would be spread over the period 2021 to 2031, peaking in 2029 and 2030. The report also argues that there are significant supply-chain opportunities around rolling stock production. It suggests that a total of around 18,000 full-time equivalent jobs would be associated with building trains to run on HS2.

Capacity Release

1.11 As a result of HS2, additional capacity on existing rail lines will be released. This released capacity will have benefits, the magnitude of which will depend upon how it is used (for example for commuting, freight, business trips, and which stations/areas are served). The HS2 case includes some high level assumptions about service patterns on the released capacity in order to arrive at their benefits estimates, and therefore implicitly captures these benefits. The economic case highlights however that this is just one set of possible combinations for the released capacity and that there are many other options that will need to be considered in the future.

1.12 In our opinion, the potential benefits of released capacity on existing classic lines have therefore not yet been comprehensively considered. This will affect both passenger networks and rail freight. Whilst the analysis to date assumes a high level service pattern and so implicitly does capture these benefits, it has not assessed in a detailed fashion how the released capacity should best be used (for commuting, freight or business) and what routes should be served in order to maximise the associated benefits.

Scale of HS2 benefits in the East Midlands

Case in line with guidance

1.13 Based on the origin of trips, HS2 report that 8% of the transport user benefits accrue to the East Midlands in 2036. No breakdown is given of the WEIs and no breakdown for the full 60 year appraisal horizon. However work by Volterra for a variety of local bodies along the eastern leg of

the Y network to analyse the WEIs, also found that the East Midlands would get a similar proportion of the wider economic impacts, and that the distributions of benefits did not vary significantly across the appraisal horizon. We therefore estimate that, of the £70.9bn net benefits estimated by HS2, around £5.4bn are likely to accrue to the East Midlands region. This should be viewed as a high level indicative estimate.

Wider case

1.14 The new work that has been carried out by the Government also includes a strategic case for HS2. The strategic case pulls on a range of evidence, including the standard economic case, but also new evidence on the wider impacts of transport investment, which does not follow the standard Department for Transport guidance on transport appraisals. It is the culmination of the business case for HS2, along with the Government's own reasons for supporting the project.

1.15 In the strategic case reference is made to the KPMG report, which analysed the potential impacts of HS2 at a city and regional level. They found that areas outside London, especially the D2N2 LEP, would benefit significantly from investment in HS2. Specifically they estimated that, of the £15bn annual productivity benefits nationally, £1.1bn-£2.2bn per year would accrue to the Derby/Nottingham area, amounting to an increase in local economic output of 2.2%-4.3% in 2037.

1.16 They also found that improvements in connectivity would be significant, with increases in labour connectivity by rail of 14.3% and increases in business connectivity by rail of 23.2%, which could have a significant impact on the local economy.

Jobs

1.17 The Greengauge study by Albion Economics estimated that HS2 would support around 89,000 FTE jobs nationally, through planning and design, construction, rolling stock, operation and maintenance, and renewals.

1.18 Based on the current distribution of relevant employment sectors across the UK, we estimate that around 15% of the 89,000 jobs could be workers within the East Midlands. This implies the East Midlands as a whole could benefit from 13,350 additional jobs as a result of HS2.

1.19 These employment activities could be worth an estimated £575 million in annual economic benefits, which, even using conservative assumptions about phasing, would result in a 60 year NPV of over £7 billion.

1.20 The most notable type of employment that the region, and specifically Derby, could benefit from, is the manufacturing of rolling stock. Over half of national employment in this sector is located in the East Midlands, and two thirds of this is within Derby. This means that around 2,500 workers in Derby could be involved in the manufacturing of rolling stock related to HS2. This of course has no bearing on the location of the HS2 station. But the point is that Derby will be boosted by the overall HSR programme due to the relative strength of its transport engineering industry.

1.21 This could have a huge bearing on the East Midlands economy, as the direct effects from manufacturing the rolling stock reverberate to the wider region through supply-chains and additional household spend.

1.22 Another specific job creation site linked to HS2 that the area could benefit from is the Staveley Infrastructure Maintenance Depot. Although no detail is available at this stage, initial estimates suggest that this could create around 80 FTE construction jobs and around 500 FTE operational jobs. It should be noted that the site is currently earmarked for residential development so it will be important to ensure that the specific location of the depot is compatible with wider regeneration aims for the area.

Capacity Release

1.23 The high level service pattern assumptions underpinning the HS2 economic case have services falling from 2 per hour to 1 per hour for Nottingham and remaining at 2 per hour for Derby. The intention is that with a HS2 station at Toton, Nottingham and Derby will be well served via a hub and feeder approach. However in order for this to work, it is crucial that a connection to the Midland Mainline allows classic compatible services to run onto Nottingham and Derby's Stations. This will be vital for ensuring that the benefits of HS2 are spread and maximised throughout the region. The authorities in the area believe it is of vital importance that existing levels of service are at least maintained. The sooner HS2 can make some firm commitments on the service patterns and retaining existing levels, the more certainty the area will have about its future connectivity.

1.24 Network Rail has been commissioned to analyse the options related to capacity release and has published an initial assessment that explains three possible approaches:

- 'Do minimum' approach, where the current services are maintained when the second phase of HS2 is operational in 2032/33. This effectively means that minimal changes will be made to services on the existing network with the introduction of HS2;
- 'Incremental' approach, where services are identified on the existing network, which are replicated to a greater or lesser extent by the new HS2 lines. An assessment of the transfer of passengers from the existing network to the high speed rail lines then allows for capacity released to be replaced, aligned as far as practical with the market study conditional outputs. In most circumstances this would substitute long distance, fast services with inter-urban connectivity improvements or additional commuting capacity; and,
- 'Integrated Connectivity' approach, where the introduction of the second phase of HS2 would seek to coordinate services on the existing network so as to work in conjunction with HS2. The aspiration is that where appropriate, long distance services would be provided by HS2, with services on the existing network set up in a feeder pattern to provide frequent and reliable connectivity between surrounding areas and the HS2 station as a hub.

1.25 In relation to the East Midlands, the second two approaches could result in a change to the current service patterns on the classic rail network, specifically in relation to the Midland

Mainline. It is crucial that this is decided upon in discussion with local stakeholders so that appropriate service levels are maintained.

Impact of Station Investment

1.26 The current Government framework for transport appraisals does not take into account the economic development and regeneration benefits that could come from station investments. Work on HS1 showed that incorporating this into the evaluation could more than double the BCR, as a result of inward investment supporting employment and housing development, and increases in land values. It is therefore clear that this needs to be taken into account as part of the HS2 scheme's assessment. These benefits could come through the following channels:

- Net additional jobs as agglomeration indirectly produces more employment;
- Regeneration benefits precipitating from improvement in the type of employment attracted within defined local areas, which could include reductions in deprivation and improvements in economic opportunities and skills;
- Land value uplift, which would offset local capital costs;
- Value of place through improvement in the user benefits of amenities, upgraded facilities and places; and,
- Inward investment and tourism impacts.

1.27 For example, in the vicinity of the Toton site, there are currently plans for a mixed-use housing and commercial development that could result in around 650 to 875 residential dwellings, and 2,800 sq m to 19,800 sq m of commercial office space – other uses are planned too. This could result in the creation of 200 to 1,500 office-based jobs once the development enters its operational phase. Meanwhile, since the total capital investment is expected to be in the region of £120 million, this could lead to some 200 full-time jobs generated during its 5 year construction phase.

1.28 Bringing forward development of the residential components of the proposed scheme around Toton is crucial to realising the economic benefits at an early stage. Importantly, the Nottingham Express Transit (NET) tram line will be linking the site at Toton to the main employment locations at Broxtowe and Nottingham City. Furthermore the area is well connected to the road network. Thus Toton has the attributes for being a thriving commuter location. In addition, since the HS2 station is not due to be operational until 2033, the demand for commercial office space is likely to be limited in the immediate term and so economic benefits will almost definitely not come from this source until much later on.

1.29 Indeed experience from other countries, where high speed rail has been in operation for some time, shows that bringing forward residential development does not prevent commercial offers from emerging in the future. For example many of the intermediate Spanish cities, which lie on the high speed network, started with residential developments around the stations. The success of these developments eventually acted as a catalyst for the current commercial and hospitality offers that exist around high speed stations – Cordoba is a good example of this. The key for

Broxtowe is to find a balance between the immediate needs of the Toton site and potential developments in the future.

Other proposed developments in the vicinity

1.30 There are also several other proposals in the area, including schemes along the tram route in Broxtowe and Nottingham, a major redevelopment planned at the former Stanton Iron Works in Ilkeston and a proposed Strategic Rail Freight Interchange near East Midlands airport. Combining these schemes we estimate that they could deliver over 4,000 new homes and support over 10,000 new jobs. This would be a significant boost for the local area.

1.31 The proximity to the HS2 station at Toton could very well lead to a significant boost to its economy, provided there is direct connectivity to the proposed station. This could come through an extension of the NET2 tram network or other forms of rapid transit. A heavy rail station is also under construction in Ilkeston, which will lie on the Northern Rail network, offering direct connections to Nottingham and Sheffield.

Maximising the benefits of HS2 in the East Midlands

1.32 Assuming the planned cut back on the Midland Mainline for services to Nottingham, along with Derby's expertise in rolling stock production, it cannot be unreasonably inferred that Derby would still benefit from a HS2 station at Toton, whilst Nottingham would be worse off as a result of a Derby station. Thus the choice of station location i.e. at Toton, is optimal.

1.33 While the benefits of station investments in terms of economic development and regeneration of areas are well-documented, there are some challenges and risks that need to be considered. Some of these challenges include:

- poor planning policies and preparation for a new station investment – examples include some of the stations along the high-speed TGV network in France, including Picardie, Avignon and Aux de Provence where very little development activity materialised following the station investment;
- unrealistic expectations in relation to the scale of development following a station investment – a good example is Ebbsfleet on the HS1 network where the initial expectations for the scale of commercial development in particular were considerably inflated; and,
- haphazardly designed stations and a poor urban environment in general – examples include Sheffield Midland and Manchester Piccadilly before refurbishment.

1.34 Overall, the potential for revision of the estimates of economic benefits are firmly skewed towards optimism, provided that the right policies are implemented. For example, estimates of the conventional economic benefits are all primarily based on future projections of passenger trips. This data is derived from historic performance. But the reality is that the 'transformative' nature of the HS2 investment suggests that the future trajectory of passenger trips could look very different to their historic performance.

1.35 Once HS2 is fully operational, the time savings made in journeys to Nottingham are substantial. The reduction in journey times to London, Birmingham and Leeds are 35%, 51% and 58% respectively, bringing Birmingham and Leeds specifically to commutable distance. In fact, the reduction in travel time between Nottingham and Leeds is among the highest between any two city pairings that are affected by the HS2 network. This will have a significant impact on both the potential for firms to relocate to Nottingham (and its wider region) and the ability of the city's (and the wider region's) residents to access jobs in other parts of the country.

1.36 The key point here is that the 'transformational' impacts of HS2 (due largely to the reduction in travel times) could change the trajectory of passenger travel and business investment decisions. In this regard, Nottingham and its wider region are well placed to reap the reward.

1.37 The success of a HS2 station in the East Midlands will largely depend on the region's ability to attract businesses and jobs, and the capacity that will be released for local transport infrastructure and commuter networks. The maintaining of the current service on the Midland Mainline to Nottingham is also crucial.

1.38 The development of local skills in particular will form one of the main challenges. As things stand, the region falls behind England and the other core cities. This will be a key component of its ability to attract the right kind of highly-skilled employment opportunities that will boost its productivity and future economic fortunes.

1.39 However, creating jobs in the well-connected parts of the region alone is not enough. As jobs are created in the main urban centres, residents from the wider area need to be able to access these opportunities, both from the perspective of good transport connections and having adequate skills.

1.40 Accessibility to these jobs, from both a transport and skills perspectives, will help to enable the economic development and regeneration of large swathes of Nottinghamshire and Derbyshire. Many parts of these regions are currently deprived and the regeneration of these areas is already at the heart of local authorities' plans. The HS2 scheme, along with changes in the central government funding arrangements, creates an ideal environment for major initiatives to be brought to fruition.

1.41 Within the context of transport connectivity, these could take the form of heavy and light rail, and other rapid transit options, such as bus routes. Whether these schemes are actually realised will depend largely on investment viability and projected demand in the affected areas.

2 Introduction

2.1 Nottingham City Council and its partners Nottinghamshire County Council, Broxtowe Borough Council and Derbyshire County Council (collectively referred to as the 'Client' thereafter) have commissioned Volterra to provide an assessment of the economic impacts of the planned East Midlands High Speed Rail ('HSR') Hub at Toton. A key part of the work is to assess the measures that could maximise the benefits of the planned HSR Hub station at Toton.

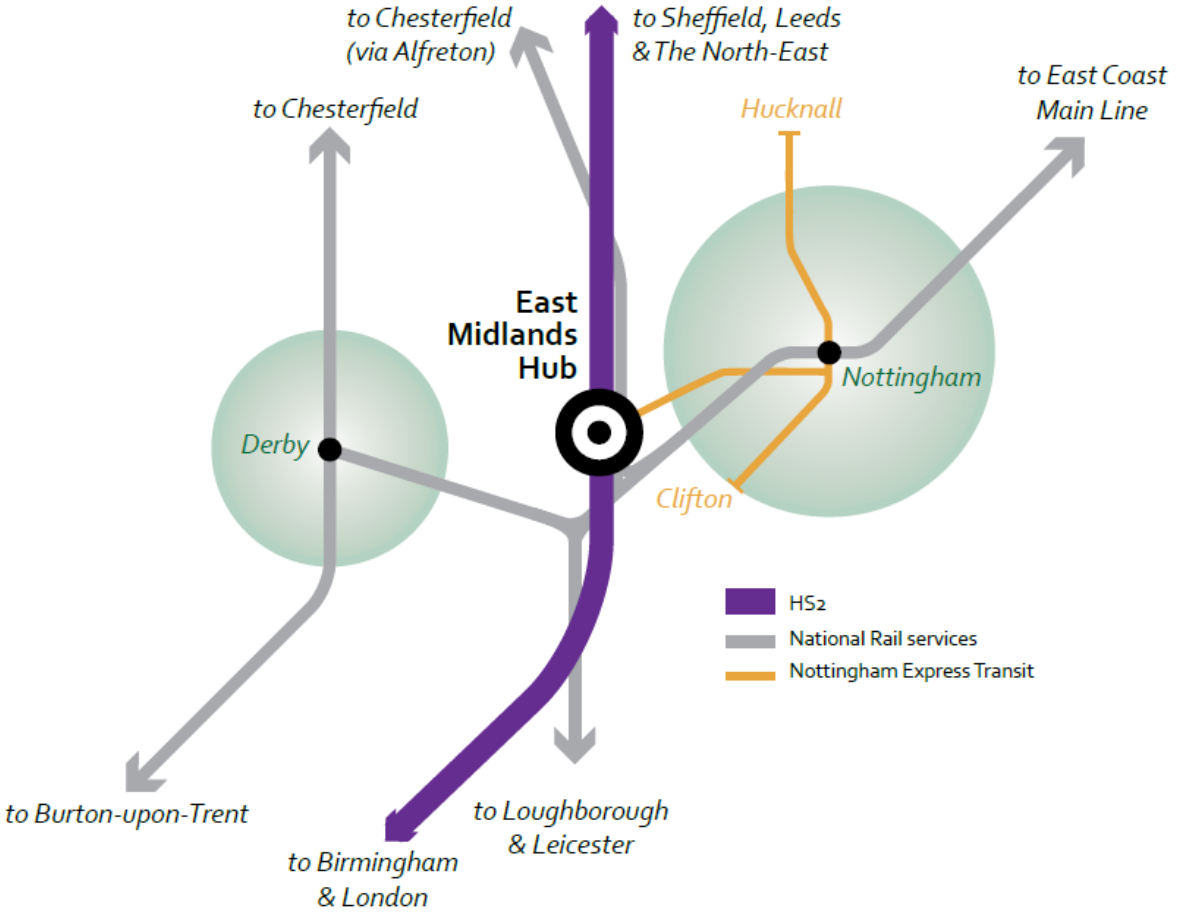
2.2 The map below highlights the various local authority boundaries for the area around Toton.

Figure 1: Local authority boundaries around Toton (source: Nottingham City Council)



2.3 The background to this work is that in January 2013, the Government announced its initial preferred route for the second stage of High Speed 2 ('HS2'), including stations in Manchester city centre, Manchester Airport, Leeds city centre, Meadowhall in Sheffield and a parkway station in Toton – between Nottingham and Derby (see figure 2). The Client's view is that a new HS2 station at Toton, located between Nottingham and Derby, would offer excellent links to the East Midlands cities and stimulate growth across the region.

Figure 2: Proposed HS2 East Midlands Hub Station at Toton (source: HS2)



2.4 The formal consultation period started in July of this year and is due to end in January 2014. This provides an opportunity to enhance the economic benefits and the case for a HSR station in Toton. To achieve this, the Client has proposed the following broad tasks:

- Understanding the Government's case for Toton and the key reasons for choosing Toton as the preferred option;
- Disaggregating the potential economic impacts of a Hub at Toton according to different timescales (near, medium and long-term) and at different spatial boundaries (local, sub-regional and wider region), including:
    - The direct impacts at the various phases of the life of the station development;
    - The indirect/multiplier effects such as new business start-ups and income multipliers associated with new/ retained jobs and investment;
    - Wider economic benefits such as agglomeration effects associated with business clustering; labour market impacts; and,
    - Intangible benefits including enhanced image, business culture and local business confidence.
- Evaluating the conditions under which the benefits of a HSR Hub station at Toton could be maximised; and,

- Recommendations for further work that could be carried out by the Client to enhance the case for Toton, as well as a strategy for the delivery of this work.

2.5 We believe that the above broad specification will provide the best possible outcome for the Client at this stage – particularly given the timescales for the Government's consultation. This document provides our final report and it is structured as follows:

- First, it describes the context of this review;
- Second, it provides the economic baseline for the East Midlands region and other geographic areas which are relevant to the study;
- Third, it describes the HS2 scheme, its proposed route and service patterns;
- Fourth, it provides an explanation of the Government's case for the station location choice and the long term economic benefits of a HSR station at Toton;
- Fifth, it assesses the impact of a HSR station at Toton;
- Sixth, it examines the conditions that could maximise the benefits to the region; and
- Eighth, it concludes and provides recommendations for further work.

3 The Context of this Study and Overall Guiding Principles

3.1 It is not the objective, or even within the scope, of this project to assess the Government's case for HSR. Indeed, the Client is fully supportive of the overall HSR programme - particularly the fact that the East Midlands Region has been included in the route.

3.2 Instead, the work in this project focuses on the likely economic impacts of the preferred station location at Toton on the East Midlands region.

3.3 This falls within the Government's objectives for the overall HSR project - namely the key objective of the expected economic and regeneration benefits that the improved transport infrastructure and connectivity is set to generate in many parts of the country.

3.4 In this regard, although we have procured data from the Government's business case in order to complete our analysis, the approach taken is not one that could be described as a standard transport appraisal in the sense that the DfT guidelines describe.

3.5 Instead, since economic regeneration is a key objective, we focus on whether the decision regarding station location will boost the economies of the D2N2.

3.6 In particular, our assessment focuses on the specific conditions that could put Nottingham, Nottinghamshire and Derbyshire in the best position to maximise the economic benefits from a HS2 station at Toton.

3.7 Against this backdrop, we look at the near and medium term policy objectives that need to be considered to help maximise these benefits when the planned HS2 station in Toton is operational in 2033, as currently envisaged.

3.8 This economic assessment considers the following:

- The Government's business case for its preferred route and the long term implications for Nottingham, Nottinghamshire and Derbyshire;
- The impact of investment in a HS2 station on Toton;
- The impact of the construction phase on Nottingham, Nottinghamshire and Derbyshire; and,
- The conditions that are needed to maximise the economic benefits to Nottingham, Nottinghamshire and Derbyshire.

3.9 Finally, it is important to note that some parts of the region – specifically in Derbyshire – will be impacted upon more by the HS2 station in South Yorkshire than the one at Toton. In particular, this applies to Chesterfield and North East Derbyshire, which are closer in proximity to Sheffield than to Toton. Furthermore, both are part of the Sheffield City Region. It is not within the scope of this report to analyse the impact of the station in Sheffield and therefore, these impacts are not covered within this report.

4 The Economic Baseline

- Within the East Midlands, the greatest population levels and densities are found in the cities of Nottingham, Derby and Leicester, which together account for a fifth of the region's population and a quarter of its workers.
- The economic structure of the East Midlands is markedly different to the UK as a whole. Just less than 25% of GVA comes from the financial services and business sector, compared to nearly 35% nationally. Conversely, there is a 17% contribution to GVA from manufacturing in the East Midlands compared to 10% for the UK.
- The East Midlands economy is worth around £82 billion in terms of GVA, with the D2N2 LEP accounting for £37 billion, or 45.1% of the region's output.
- In Nottingham, GVA per worker is about 20% lower than the English average.
- Nottingham and Nottinghamshire are expected to see employment growth exceeding the UK average, but Derby and Derbyshire are forecast to experience the reverse. This will lead to their share of national employment falling over the coming decades, with the formers rising.
- However, these predictions do not consider the effect of local policies nor HS2. Furthermore, the D2N2 is placed well, with Derby in particular, to reap the benefits of a restructuring of the economy towards manufacturing. Specifically in the context of HS2, Derby has expertise in the manufacturing of rolling stock which could mean that it benefits disproportionately from the jobs created in association with HS2.

4.1 To start with, it is useful to set out the economic baseline of the regions that are considered within the study, including the central projections for their respective economies without the HS2 intervention.

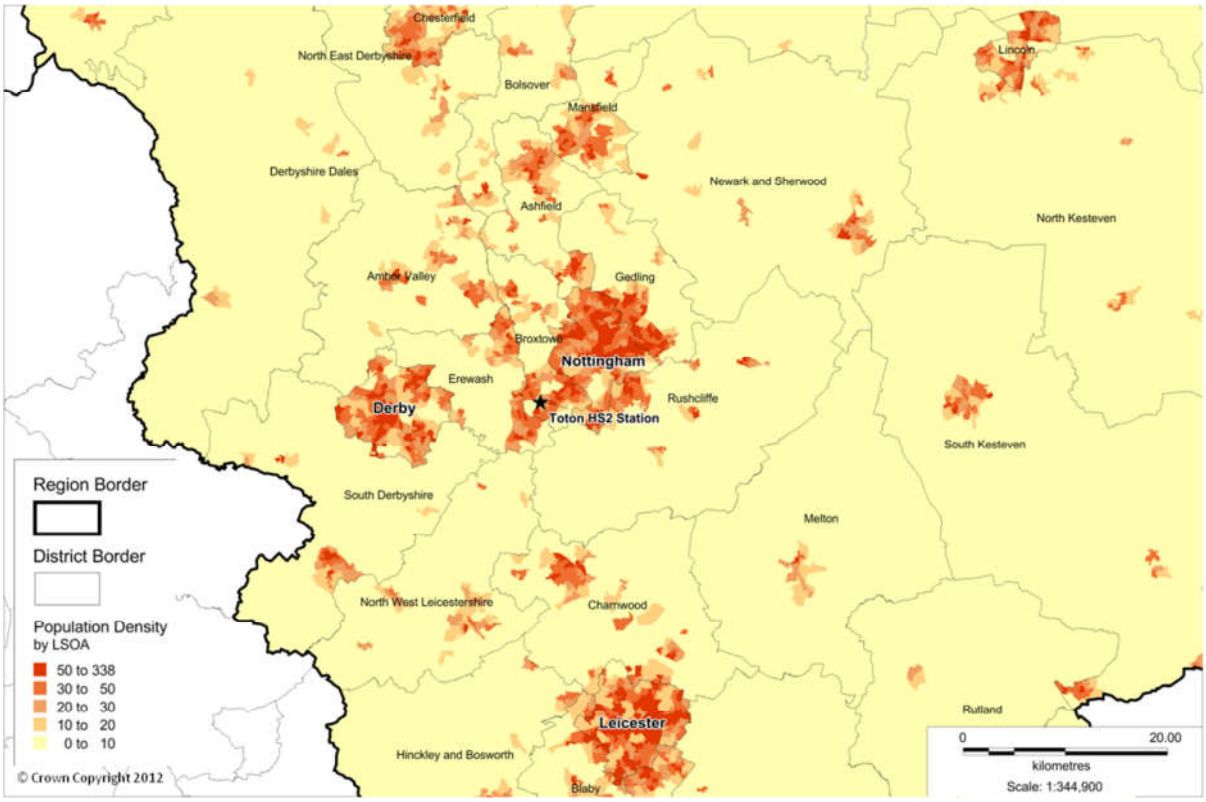
4.2 For the purpose of this section and preceding chapters, the analysis will consider a number of geographic levels:

- the East Midlands region;
- the Derby, Derbyshire, Nottingham, Nottinghamshire (D2N2) Local Enterprise Partnership (LEP);
- the relevant districts and counties – namely Nottingham, Nottinghamshire and Derbyshire; and,
- other regions, LEPs and the country as a whole as comparators.

4.3 The East Midlands is home to over 4.5 million people and 2 million workers, distributed across the counties of Derbyshire, Nottinghamshire, Leicestershire, Rutland, Northamptonshire and Lincolnshire. As shown in figure 3, the population of the East Midlands is concentrated in and

around its main urban centres – namely Nottingham, Leicester and Derby – with the Nottingham urban conurbation housing the largest share.[1]

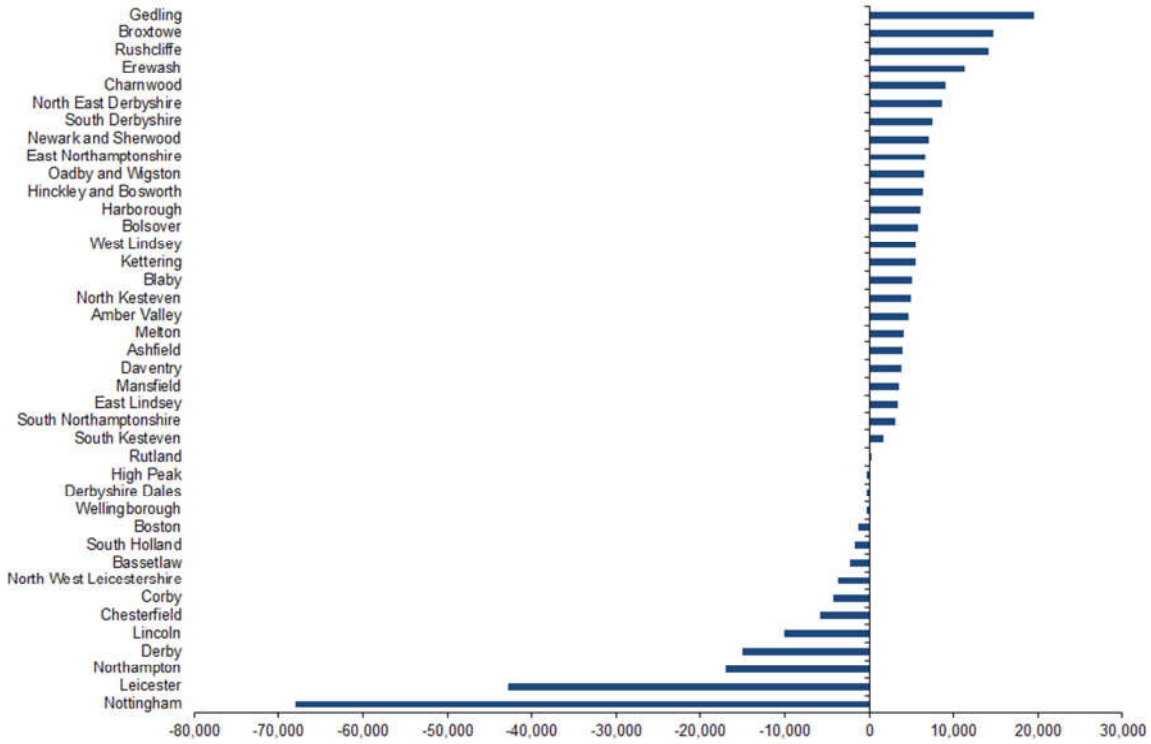
Figure 3: Map of population density, person per hectare



4.4 The main urban centres within the East Midlands are Nottingham, Leicester and Derby, which together account for a fifth of the region's population and a quarter of its workers. As shown by figure 4, the three cities also provide jobs for the wider region, with Nottingham the key centre of employment for residents of other districts in the East Midlands. Indeed Nottingham has a net influx of nearly 70,000 commuters.

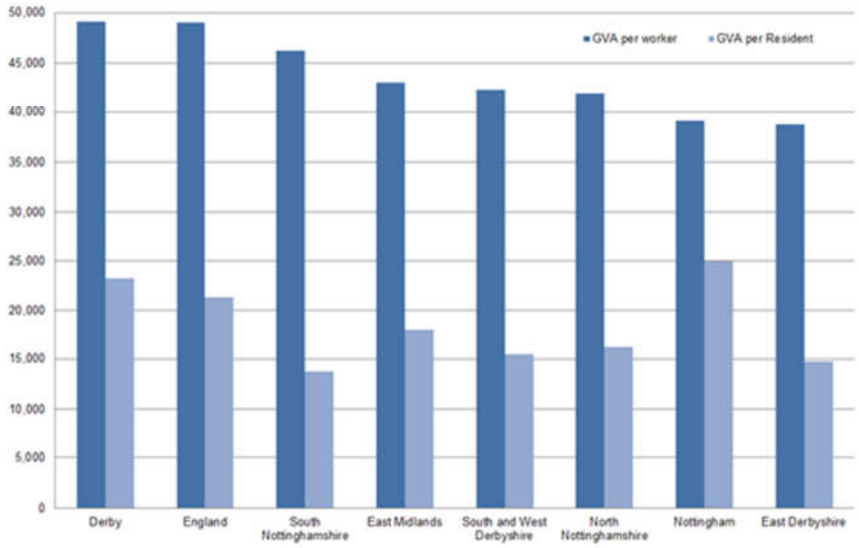
[1] It should be noted that, while there are references to the East Midlands as a whole, this report focuses on the D2N2 LEP area; which encompasses Derby, Derbyshire, Nottingham and Nottinghamshire.

Figure 4: Net commuter outflows (negative means more people from outside coming into district), persons, 2001



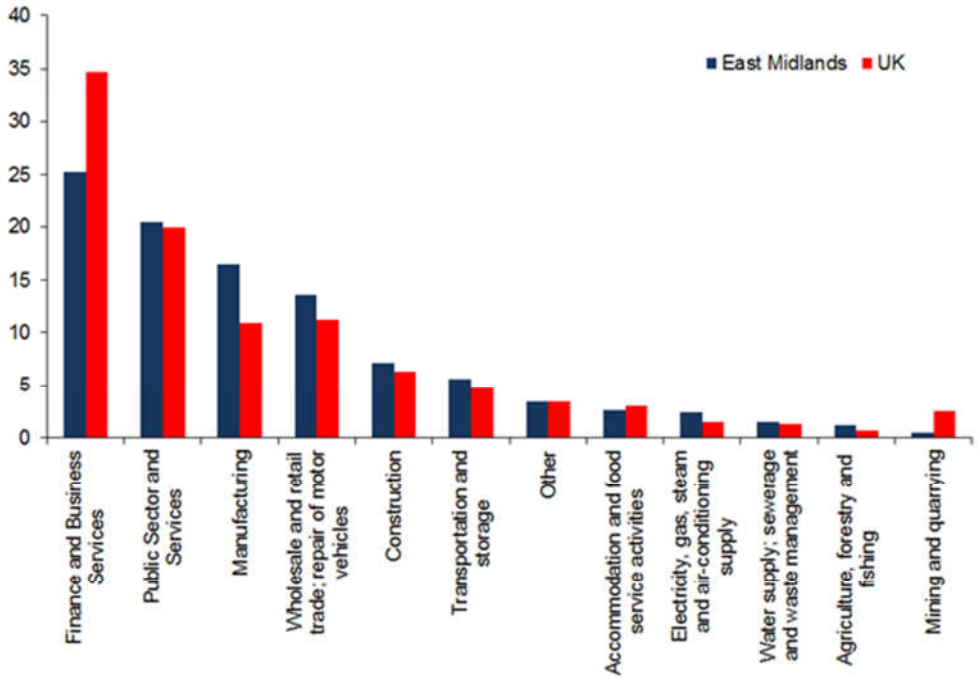
4.5 In Gross Value Added (GVA) terms, the economy of the East Midlands is worth an estimated £82 billion, but there is vast disparity in economic prosperity across the region (see figure 5). Given its successful engineering sector, Derby is the most productive, while Nottingham and East Derbyshire rank lowest in terms of GVA per worker – the relevant measure of productivity.

Figure 5: GVA per worker and resident at NUTS3 level, £s, 2011



4.6 Compared to the country as a whole, the finance and business services sector in the East Midlands makes a smaller contribution to total GVA, while the manufacturing sector makes a larger contribution. The shares of each sector relative to overall GVA in the East Midlands and the UK are shown in figure 6.

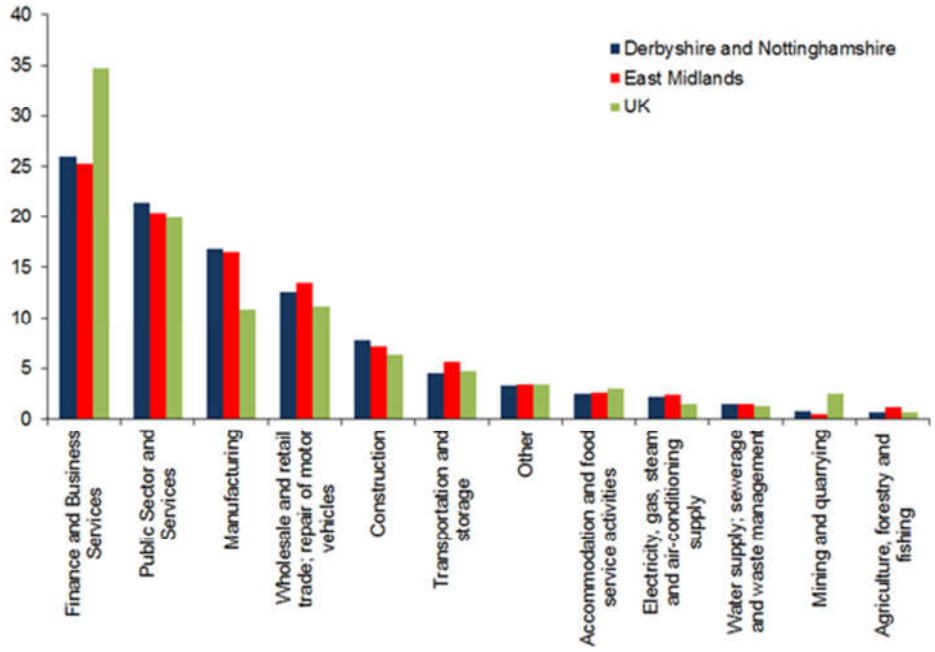
Figure 6: Sectoral contribution to GVA; % of total, 2010 (most recent data)



4.7 The counties of Derbyshire and Nottinghamshire, and the cities of Derby and Nottingham, make up the D2N2 LEP, where over 1.7 million people live and over 700,000 work. Within D2N2, Nottingham is the main urban centre and the wider Greater Nottingham conurbation is home to over 750,000 people and nearly 350,000 workers. Meanwhile, the population of Derby – the second largest urban centre in the D2N2 area – is 250,000 and some 120,000 people work in the city.

4.8 The economy of the D2N2 LEP is worth around £37 billion in GVA terms and its industrial structure is shown in figure 7. The economic structure of the D2N2 region is broadly similar to the East Midlands as a whole – with the finance and business services, public sector and manufacturing sectors contributing marginally more to the economy than in the region as a whole.

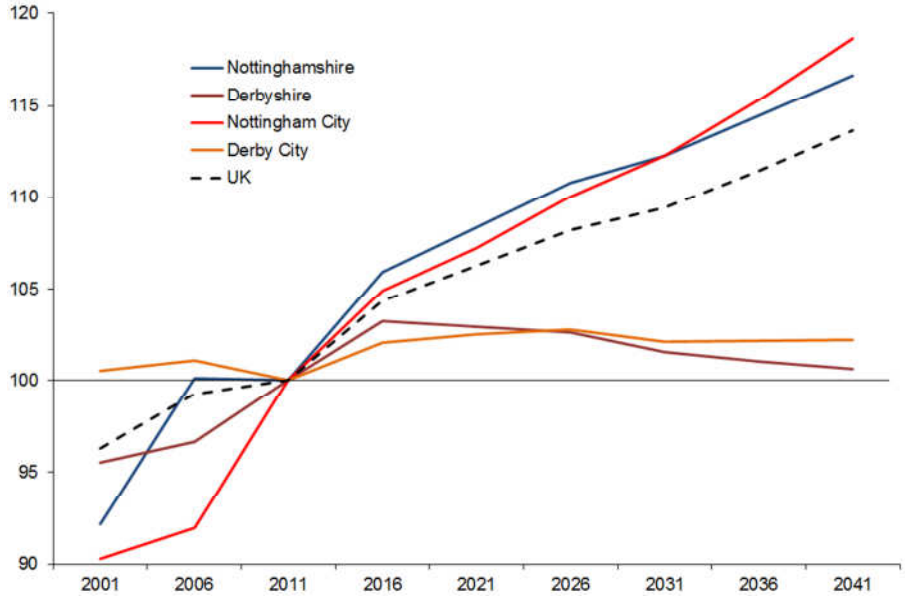
Figure 7: Sectoral contribution to GVA; % of total, 2010 (most recent data)



4.9 Looking ahead, current projections for the performance of the districts that make up the D2N2 region paint a mixed picture. As the economic assessment in this report is related to phase 2 of the HS2 scheme (which is expected to become operational in 2032/33), it is useful to consider forecasts to that date – whilst bearing in mind that forecasting to such a long horizon is fraught with uncertainty.

4.10 The DfT provides an economic dataset for the estimation of benefits from transport projects. This dataset contains projections for employment at the district level, and broken down by the four sector groupings: Construction, Consumer Services, Manufacturing and Production. These are based on the TEMPRO and NTEM models, and they ensure that the projections are consistent at the national level. They essentially assume a continuation of past trends. Figure 8 shows the DfT's forecasts for the D2N2 regions up to 2041 and they are indexed to 100 in 2011 to allow for comparisons.

Figure 8: DfT Employment Forecasts, index number (2011 = 100)



4.11 Evidently, employment has grown fastest in Nottingham and Nottinghamshire over the past 10 years and the DfT's model has these trends persisting in the future, even outpacing employment growth in the country as a whole. This means that both Nottingham and Nottinghamshire will see their proportion of employment out of the UK total rise in the next 30 years, while Derby and Derbyshire will experience a contraction.

4.12 Central to these projections is the expectation that employment in the manufacturing sector, which is prominent in large parts of the D2N2 region, will decline rapidly. This is particularly the case for Derby and Derbyshire, where the producer services sector is not expected to offset the fall in manufacturing.

4.13 At this stage, however, it is important to note that these are just baseline forecasts, which would not take into account local policies or major infrastructure investments – including HS2 or local schemes. With the right policies and local infrastructure provision, the employment trajectory could look very different. Furthermore, there is likely to be a move towards restructuring the economy so as to promote manufacturing – especially high-end manufacturing. This could very well reverse the trend that is currently being seen in Derby and Derbyshire, as these places have a comparative advantage in this sector, compared to the rest of the UK.

4.14 The relevance of these forecasts is that they form the DfT baseline against which the impacts of a transport intervention, such as HS2, are assessed. As will be discussed later in this report, the current framework for transport appraisals assumes that a transport intervention does not lead to an increase in the size of the economy. Instead, the productivity of jobs changes and some sensitivities in the analysis allow for the distribution of jobs and households to change, but fundamentally no additional jobs can be created as the result of transport investment uner the current methods of evaluation.

4.15 In the context of figure 7, this would imply that the growth trajectory might change at a district level, while the forecast for the UK as a whole (shown in the dashed line) would remain the

same. The economic benefits are therefore the result of an increase in employment density in highly productive places and/or an improvement in the ability of people to work in places where they could be more productive.

4.16 With this in mind, the next section gives an overview of phase 2 of the HS2 programme before the likely economic impacts are assessed in later sections.

5 The HS2 Programme

- HS2 is a new proposed high speed railway running from London to Birmingham in Phase 1, after which Phase 2 splits into two branches to serve the North West and the East Midlands and Yorkshire.
- Current plans see Phase 1 being operational in 2026 and Phase 2 being operational in 2032/33.
- The main Government objectives for HS2 are: providing much needed extra rail capacity, promoting economic growth, transforming the distribution of growth across the country and aiding regeneration.
- In order to run at high speed, the trains must accelerate rapidly up to their maximum speed, and then run at that maximum speed for as long as possible. Consequently, there are only a small number of stations proposed on the route. There are 9 proposed stations, of which Toton, in between Nottingham and Derby in the East Midlands, is one.
- Current plans have Toton served by 2 trains per hour to London, 3 to Birmingham and 4 to Leeds; train times from Toton will be 51 minutes, 19 minutes and 29 minutes to London, Birmingham and Leeds respectively.
- The largest journey time saving will be from Nottingham to Leeds where the journey time will fall from 106 minutes currently to 46 minutes with HS2. Journeys to London and Birmingham would also fall by 36 and 37 minutes respectively. The most significant time savings from Derby will be to London where the journey will fall from 91 to 71 minutes.
- It was recently announced that a study will be undertaken to look at how to increase the economic benefits that Scotland could experience. If the High Speed Rail network is extended to Scotland, this could bring further benefits to cities all across the UK, most notably in the North and Midlands.

Project Overview

5.1 High Speed 2, a new high-speed railway, is proposed for construction between London, Birmingham, Manchester, the East Midlands, Sheffield and Leeds. The following map illustrates the current proposed route:

Figure 9: High Speed 2 second phase route map



5.2 The proposed High Speed 2 route is to be built in two phases. Phase one encompasses the section from London to Birmingham. The London terminus will be located at a substantially rebuilt Euston station, from where the route will run in a tunnel towards the west. It will resurface within the vicinity of the current Old Oak Common rolling stock depot, where a new station will be built to allow for interchange with Crossrail. From there, High Speed 2 will run towards Birmingham Interchange station, located near to the current Birmingham International station.

5.3 Phase two will extend High Speed 2 with two branches – a western one to Manchester and an eastern one to Leeds. The western branch will run alongside the existing West Coast Main Line and the M6 motorway towards Crewe, where a link to the WCML is to be provided for high-speed trains running between London and Liverpool. A junction will be located north of Crewe, with one branch running to Wigan for high-speed trains running between London, the North West and Scotland. The other branch will run into the centre of Manchester, terminating next to Piccadilly station, with an intermediate station near Manchester Airport.

5.4 The eastern branch of phase two will start just to the north of the Junction of the M6 and M42 Motorways. It will run in a north-easterly direction, following the M42 and A42 to Kegworth. It will then turn towards the north-west and follow the Erewash Valley Railway Line. A station will be built at Toton, and will serve Nottingham as the core city, but also will boost connectivity to Derby, Leicester and the wider East Midlands region.

5.5 North of Toton, the line will follow the M1 as far as Junction 29A. From there, it will shift westwards, running parallel to the existing freight-only railway from Chesterfield to Rotherham. The route then turns towards the north-west, and runs between the Meadowhall shopping centre and the M1 Tinsley viaduct. Sheffield Meadowhall High Speed 2 station will be built on the site of the existing coach park at the Meadowhall Centre.

5.6 From Sheffield, the route will turn north in order to pass to the east of Barnsley and Wakefield, and continue to Woodlesford. Here, the line divides, with one of the spurs to follow the Aire and then run through the Stourton and Hunslet areas of Leeds to New Lane, in the city centre, where a terminus station will be located. The other spur will continue north towards the M1, where it will turn east and join the existing Leeds – York railway line close to Church Fenton. This spur will be used by high speed trains which continue to York and Newcastle along the East Coast Main Line.

HS2 Objectives

5.7 The stated overriding purpose of High Speed 2 is to provide significant extra rail capacity between the core cities, reduce journey times, and thus to make a significant contribution to economic regeneration.

5.8 The DfT, Network Rail and HS2 Ltd have concluded that the most efficient way to provide a significant increase in capacity is through the construction of a new rail line. Other options have been dismissed including upgrading of the existing north-south main lines.

5.9 The Government argues that the construction of a new line will maximise economic benefits and draws on the fact that HS2 would enable trains to operate at very high speeds (300 km per hour or more). This would help to improve the UK's competitiveness. Furthermore, analysis has suggested that the cost of a standard speed line would be 9% less, but the benefits would be 33% less. Accordingly, the Government and the industry have concluded that a new high-speed line is currently the optimal solution to meet overarching economic aims.

Station locations and service patterns

5.10 The principle of a high-speed line is that trains should accelerate rapidly up to their maximum speed, and then run at that maximum speed for as long as possible. Consequently, there are only a small number of stations proposed on the route, which are to be provided at the following locations:

- London Euston
- Old Oak Common
- Birmingham Interchange (airport)
- Birmingham (Curzon Street)
- Manchester Interchange (airport)
- Manchester Piccadilly
- Toton (between Nottingham and Derby)

- Meadowhall (Sheffield)
- Leeds (New Lane)

5.11 In addition to the core route, links will be provided to the classic network at Lichfield, to permit high speed trains to operate to Manchester in advance of the opening of phase 2; Crewe, to permit trains to operate to Liverpool and Scotland; and, at Colton Junction, south of York, to permit trains to operate to York, Newcastle and Scotland.

5.12 The assumed service pattern that has been presented by HS2 Ltd in its reports, and included in its business case analysis is the following, in relation to the eastern leg of the route:

- HS2 Captive Service:
  - 1 train per hour London Euston – Old Oak Common – Birmingham Interchange – Toton – Meadowhall – Leeds
  - 1 train per hour London Euston – Old Oak Common – Toton – Leeds
  - 2 trains per hour Birmingham Curzon Street – Toton – Meadowhall – Leeds
- HS2 Classic Compatible:
  - 1 train per hour London Euston – Old Oak Common – York - Darlington – Newcastle
  - 1 train per hour London Euston – Old Oak Common – York – Newcastle
  - 1 train per hour London Euston – Old Oak Common – Toton – Meadowhall – Leeds/York[2]
  - 1 train per hour Birmingham Curzon Street – Toton – Meadowhall – York – Darlington – Durham – Newcastle

5.13 Of note are the following projected service patterns specific to the East Midlands Hub at Toton (through the HS2 Captive Service):

- 2 trains per hour to London
- 3 trains per hour to Birmingham; and,
- 4 trains per hour to Leeds.

5.14 In terms of time savings, the Government's current route assumptions suggest the following:

- From Toton (note that there are no comparable services as no station exists in Toton):
  - London in 51 mins;
  - Heathrow in 70 mins;
  - Birmingham in 19 mins;
  - Sheffield Midland in 27 mins;
  - Leeds in 29 mins;
  - York in 36 mins; and,

[2] Note, train divides at Meadowhall.

- Newcastle in 106 mins.

- From Nottingham Midland:
  - London in 68 mins, compared to 104 mins currently;
  - Birmingham in 36 mins, compared to 73 mins currently; and,
  - Leeds in 46 mins, compared 106 mins currently.

- From Derby, the most significant journey time savings are found on services to London, where the journey time will fall from 91 mins currently to 71 mins through the East Midlands hub at Toton.

Possible extensions

5.15 HS2 is intended to provide benefits all across the UK, and potentially be the beginning of a bigger High Speed Rail network for the UK. With this in mind, it was announced on 1st November that a study will be undertaken, which looks at how to increase the economic benefits that Scotland could experience as a result of HS2. If the High Speed Rail network is extended to Scotland, this could bring further benefits to cities all across the UK, most notably in the North and Midlands.

5.16 The next section discusses the long-term economic benefits, namely the conventional benefits of transport investments as presented by Government, of Phase 2 of the HS2 scheme, with a focus on the East Midlands.

6 Review of the Government's Case in Relation to Station Location and the Long-term Benefits of HS2

- The standard techniques used for estimating the benefits of transport projects fail to capture the transformational impacts that HS2 is intended to facilitate.
- Even set against these limited criteria, the central scenario estimates benefits of £70.9bn, giving a Benefit Cost Ratio of 2.3. The business case tests a variety of sensitivities and concludes that there is a high likelihood (78.7%) that HS2 would be a high value for money investment. The BCR could rise to 4.5 if certain assumptions are relaxed. We estimate that £5.4bn of the estimated benefits will accrue to the East Midlands.
- Alternative work commissioned by HS2 estimated that the productivity benefits could be as large as £15bn per annum. Of this, £1.1bn-£2.2bn per year would accrue to the Derby / Nottingham area, amounting to an increase in local economic output of 2.2%-4.3%. Improvements in connectivity would be significant, with increases in labour connectivity of 14.3% and business connectivity of 23.2%.
- Even this new work and the sensitivities undertaken by HS2 still assume that there is no net additional economic activity attracted to the UK as a result of HS2. Work undertaken by Volterra for HS1 found that even if only 5% of the regeneration benefits around stations were due to new investment, then this would more than double the BCR.
- Work by Greengauge estimates that HS2 will create around 89,000 FTE jobs across the UK in construction, rolling stock manufacturing, operation and maintenance. We estimate that around 13,350 of these jobs could be in the East Midlands. These employment activities could be worth an estimated £575 million in annual economic benefits, which, even using conservative assumptions about phasing, would result in a 60 year NPV of over £7 billion.
- The most notable type of employment that the region, and specifically Derby, could benefit from, is the manufacturing of rolling stock. Over half of national employment in this sector is located in the East Midlands, and two thirds of this is within Derby. This means that around 2,500 workers in Derby could be involved in the manufacturing of rolling stock related to HS2. It will be important to foster the right training and skills to enable the local workforce to take advantage of these opportunities.
- Analysis carried out by the Government found that a station at Toton would generate an additional £500 million and revenues of £190 million over the Derby option, largely due to the fact that a station at Toton would serve a wider area. The Government's initial analysis estimated that there would be 1,500 direct jobs and 150 new homes supported by a station in Toton.
- The benefits of capacity release are not currently well understood, partially due to poor methods for evaluating them and partly due to uncertainty over service patterns.
- Local authority policies, skills development and wider connectivity of the D2N2 area are other crucial determinants of how beneficial HS2 will be to the local area.

The Government's approach to transport appraisals and HSR

6.1 Before considering details of the Government's case for its preferred HS2 Phase 2 route, it is worth explaining the conventional approach to transport appraisals and how this relates to HSR. Although this work is not concerned with the overall business case for HS2, an assessment of the guidance will help to inform understanding of the likely long term benefits.

6.2 In the UK, decisions regarding transport investment follow a cost-benefit analysis ('CBA') approach that is informed by evidence set out within a business case. The guidelines on how this evidence must be produced can be found in the HM Treasury' Green Book. In relation to transport projects, this is contained within WebTAG ('Web-based Transport Analysis Guidance') – the DfT's transport appraisal guidance.

6.3 The DfT's conventional approach to appraisals requires that a wide range of impacts – beyond the direct impacts on the transport users and providers – are assessed, including environmental and taxation impacts. Figure 10 shows an overview of the DfT approach specifically relating to the economic and business case.

Figure 10: Overview of DfT appraisal framework in relation to transport business cases



6.4 In the first instance, the impacts of a transport project are captured by the direct transport user benefits, namely through:

- journey time savings;
- reduced congestion;
- increased frequency; and,
- improved safety/reliability.

6.5 Of those, journey time savings typically account for the majority of monetised benefits in the benefit-cost ratio ('BCR'). Indeed, in the context of HS2, the Government's most recent economic update shows that over three quarters of the transport benefits will be due to journey time savings for commuters, business and leisure users.

6.6 In addition to transport user benefits, the DfT guidance also allows for the estimation of wider economic impacts ('WEIs'). This is described in the DfT guidance – WebTAG units 2.8: Wider Impacts and Regeneration and unit 3.5.14: The Wider Impacts Sub-Objective. The DfT guidance follows the HM Treasury's Green Book: Appraisal and Evaluation in Central Government.

6.7 The DfT guidance explains that, in the presence of imperfect markets, WEIs are not captured by transport user benefits and must therefore be estimated separately. In a perfect market, the value of the benefits of transport schemes can be captured through the impact on transport users; through time savings, frequency improvements, and reductions in delays and accidents. However, since real world scenarios do not involve perfectly competitive conditions, we must explore other methods of appraising the impact of a project.

6.8 In its report "Transport and the Economy" (DETR, 1999), the Standard Advisory Committee on Trunk Road Assessment (SACTRA) noted that markets are often imperfect, which means that Wider Impacts (WIs), positive and negative, may result via direct user impacts being amplified through the economy. Accordingly, appraising only the direct user impacts means that some economic impacts would be missing from the appraisal and the cost-benefit analysis might not give an accurate estimate of the full costs and benefits of a scheme.

6.9 The Eddington Transport Study (DfT, 2006) estimated these impacts and noted that in some cases they can be significant, and are therefore an important part of the overall cost-benefit assessment. Such impacts would include productivity and welfare changes associated with the impact of transport on agglomeration and labour supply. The appraisal of WEIs aims to capture these effects, positive or negative, that are a result of market failure.

6.10 Guidance from the DfT on WEIs is intended to quantify the additional economic impacts of transport improvements upon business and workers' productivity and the resulting increase in output. WEIs are completely additional to standard transport user benefits. Therefore, including WEIs in the evaluation of a transport scheme can completely alter the benefit-cost ratio (BCR) of a project.

6.11 WebTAG provides guidance on how to estimate the following WEIs:

- agglomeration;
- move to more/less productive jobs
- output change in imperfectly competitive markets; and
- labour supply impacts.

6.12 In our experience, the first two of these are typically the largest. Agglomeration captures the benefits that firm derive from being effectively closer together. Transport investment can make places effectively closer together by reducing the travel time between them. This means that firms can benefit from knowledge transfer, spillover effects and wider labour catchments. Move

to More Productive Jobs refers to the impact that transport can have upon workers' commuting decisions – transport investment can enable workers to choose to commute into a city centre where they can take up a more productive form of employment.

6.13 Table 1 shows a breakdown of the benefits of the entire Y-Network as presented by the Government in October 2013. Evidently the majority (81.2%) of the estimated benefits are due to transport user impacts. WEIs make up the remainder, under 20% of the total benefits. This is an important finding, and table 2 compares the relative magnitudes of standard transport benefits to WEIs between HS2 and other major schemes.

Table 1: Government estimated benefits of HS2

Benefit Type	£ billions	% of Total
Transport User Benefits (Business)	40.5	57.1
Transport User Benefits (Other)	19.3	27.2
Other quantifiable benefits (excl. Carbon)	0.7	1.0
Loss to Government of Indirect Taxes	-2.9	-4.1
Net Transport Benefits	**57.6**	**81.2**
Wider Economic Impacts	13.3	18.8
Net Benefits including WEIs	**70.9**	**100.0**

Source: HS2 Ltd

6.14 Table 2 compares the increase in BCR that results from inclusion of WEIs into the business for HS2 in comparison to other large infrastructure schemes – namely the Northern Line Extension, Crossrail and High Speed One. This shows that the inclusion of WEIs increases the HS2 by just 0.5, whereas it was at least double this for NLE and Crossrail and almost double for HS1. As detailed earlier, our work on HS1 showed that even if just 5% of the transformational impacts of HS1 were included, this would double the BCR again. The table highlights that the approach may well be capable of capturing the wider economic impacts of commuter based transport investments, but struggles to capture those associated with intercity long distance schemes.

Table 2: Comparison of relative size of benefit types with other large schemes

Scheme / Benefit type	NLE	Crossrail	HS1	HS2
Conventional BCR	1.5	2.0	0.9	1.8
BCR including WEIs	3.0 (central) up to 9.0 (sensitivity)	3.1 (central) 3.5 (sensitivity)	1.8	2.3
WEIs additionality to BCR	1.5-7.5	1.1-1.5	0.9	0.5

Sources: NLE: The Wider Economic Benefits of the NLE in the VNEB OA, January 2012; Crossrail 1: Crossrail Business Case Update Summary Report, July 2011; HS1: Economic Impact of High Speed 1: Colin Buchanan &Volterra, January 2009

6.15 The approach for the estimation of WEIs was originally developed by Volterra and Colin Buchanan in 2007 for the appraisal of Crossrail, a domestic rail network. It was also applied to parts of HS1 since it delivered additional commuter capacity. The parameters that underpin the WEIs approach are derived from 45 minutes catchments and accessibility measures. Accordingly, this approach is much more applicable to commuter routes and is not wholly suitable for the assessment of a large-scale inter-regional rail network, such as HS2 – at least not at the national level.

6.16 This is acknowledged in the government's latest business case which also seeks to summarise some wider work that they have undertaken to attempt to capture the potential scale of some of these transformational benefits.

6.17 Nonetheless, in its most recent economic case, the Government provided an estimate for the WEIs of HS2. These were largely due to agglomeration benefits, caused by the reduction in journey costs stemming from time savings – since this is a key component of agglomeration impacts. The WEIs totalled £13.3 billion, 65.5% of which were due to the effects of agglomeration.

6.18 It is important to note that the overarching guideline from the DfT in relation to transport appraisals is that such projects do not result in an increase in the overall size of the economy. This is to say that there will be no net additional jobs as a result of the investment. Instead, any additional jobs in one place must be assumed to be displaced from other locations that are outside of the study area.

6.19 Furthermore, land use impacts of transport interventions are not taken into account in these appraisals – or at least not in the core business case. Instead, WebTAG allows for land use impacts to be measured as sensitivities, until land use transport interaction ('LUTI') models are available. These are used to forecast potential land use changes stemming from transport intervention, which is essential for estimating the move to more/less productive components of the WEIs.

6.20 A number of LUTI models have been developed in the UK, including Transport for London's (TfL) LonLUTI, Scotland's TELMoS and the Urban Dynamic Model used by the West Yorkshire PTE. HS2 Ltd have commissioned work through Atkins to model potential changes in land use as a result of HS2. Once this is available, it may be possible to use the outputs from this work in the calculation of wider economic impacts. However it should be noted that our experience of the application of these models to transport schemes is that they typically dramatically underestimate the impact of transport investment upon land use decisions.

6.21 The DfT guidance also allows for the estimation of regeneration impacts. This is usually estimated as the number of unemployed and economically inactive people that can access employment due to the transport intervention. The DfT approach allows for an estimate of the number of unemployed workers that will have access to jobs as a result of the transport project. This is presented as the total regeneration impacts of the transport investment.

6.22 Overall, then, the current DfT guidance for transport appraisals only allows for the estimation of direct transport benefits, wider economic impacts and regeneration impacts, with parts of the latter two mostly applied as a sensitivity. This means that other economic and regeneration benefits that could arise from the HS2 network cannot be included within the framework of the current guidance – or at least not the business case that underpins the scheme's 'value for money' assessment.

6.23 Of course, within the context of station location, this does not mean that these benefits cannot be considered within the overall assessment of the scheme. After all, the regeneration of the affected parts of the country and the distribution of economic activity to these regions are a key objective of HS2. Accordingly, the framework for assessing route options should take this as one of its key criteria as pointed out in the recent National Audit Office ('NAO') report into the

DfT's appraisal of HS2. It is therefore possible to include the economic development and regeneration benefits at the local level and the guidance prescribed in the HM Treasury's Green Book allows these aspects to be included in the appraisal.

6.24 The economic development and regeneration benefits of transport schemes are typically realised through the following channels:

- Net additional jobs as agglomeration indirectly produces more employment;
- Regeneration benefits via improvement in the types of employment attracted within defined local areas;
- Land value uplift, which will offset local capital costs;
- Value of place through improvement in the user benefits of the amenities, upgraded facilities and places; and,
- Inward investment and tourism impacts

The Government's case for HS2 and its relation to the East Midlands

6.25 Notwithstanding these additional impacts that are not yet captured within the Government's case, the appraisal is considered here as it stands in the most recent government reports. Specifically, this relates to the updated economic case for HS2 (published in October 2013) and the Government's preferred route (published in July 2013).

6.26 From the outset, it is important to realise that since the estimation of transport and economic benefits are highly dependent on route assumptions, it is not possible to calculate the costs and benefits of alternative routes – such as the one that would go through Derby instead of Toton.

6.27 At this stage, it is important to bear in mind that the current Government assumptions, based on the scenario of the preferred route as it stands, are not yet set in stone. Indeed, recent statements from Government already show that there may be alterations, such as its decision to invest in tunnelling under the M6 motorway, which was not accounted for in previous assessments. It is possible that there will be further changes to the route (even if station locations are unchanged) as thorough environment impact assessments are carried out in the future.

6.28 In addition, the Government is currently undertaking a more comprehensive economic assessment of the route options for phase 2. The results of this work are not scheduled to be published until the end of 2014, and it is not clear whether it will consider alternative routes or just focus on the current preferred options. Once this is complete, it is likely that the outcomes of the cost-benefit analysis of the HS2 Y-Network will look different to the current estimates. Thus, in this most recent business case the analysis assumes the proposed route that was released for public consultation on 17 July 2013. Since the previous economic case in August 2012 there have been two major changes to the route, with the Heathrow Spur temporarily excluded, whilst the Airports Commission conducts its review. Conversely, Manchester Airport has been added to the route.

6.29 The latest Economic case has come up with an overall BCR, for the entire HS2 network, of 2.3 (with WEIs) and 1.8 (without WEIs). Furthermore, the net transport benefits for the entire Y network sum to nearly £71 billion (excluding the benefits of a reduction in carbon). Note this is

using the standard approach and is therefore subject to a stringent set of assumptions. Therefore HS2 ltd has carried out further research and has come up with a distribution of BCRs with associated probabilities. These have been calculated by varying the parameters that are imputed into the model. The independent variables include construction costs, projected demand for rail services, forecast economic growth and the value of time.

6.30 For the entire HS2 network, under standard appraisal, there is a 78.7% chance of the project being classed as high value for money i.e. for the project to have a BCR of 2.0 or greater. In line with the standard modelling approach, the government's central case assumes that demand growth stops in 2036, only 3 years after Phase Two opens. The strategic case therefore also presents findings from sensitivities where demand is allowed to continue to grow to 2040 and 2049 and finds that this dramatically increases the BCR, seeing it rise to between 2.8 and 4.5.

6.31 The Government has also recently changed its contingency planning for HS2 to include an additional £10 billion and this takes the overall budget to a total of £42.6 billion. However, HS2 ltd has stated that maintaining a rigorous and disciplined approach to cost control is a key priority.

6.32 The updated economic case is accompanied by an overall strategic case for HS2. HS2 Ltd have developed a programme of work to consider the potential impact of HS2 on the economy and in particular improve the evidence on the potential sub-national economic impacts of investment in HS2. The recent report by KPMG is part of this wider work programme.

6.33 The Government has changed one of the key assumptions underpinning its transport business case – namely the productivity of business users when they travel. Previously, it was assumed that business users did not work, but the revised assumption is that they are relatively productive whilst travelling. Subsequently the benefits precipitating from reduced journey times are diminished. However HS2 ltd believes that the new assumptions are unreasonable and points out that many studies have found people are willing to pay far more for time savings when making long distance journeys. Furthermore they refer to a report carried out by the Institute for Transport Studies at Leeds University. It found that across 6 UK studies, the value of time was 40% larger on average than the gross wage rate. Following on from this, HS2 ltd ran a model - this time changing the value of time from the recently updated £32 per hour to £45 per hour (a 40% increase). This is still below the figure of £47 per hour used in the August 2012 economic update. Under these revised conditions, HS2 would deliver a BCR of 2.0 or more in virtually all scenarios tested – even the most pessimistic ones.

6.34 In the Strategic Case for HS2, released alongside the latest business case, the Government has announced that it is still working towards better understanding the impacts of HS2 at a city and regional level. As part of this, HS2 Ltd commissioned KPMG to consider alternative methods of quantifying the benefits of HS2. Their report provides very positive evidence in favour of HS2 and found that by 2037 the British economy would generate an additional £15 billion per annum (2013 prices) as a result of the project. The analysis adopted a different approach to conventional transport appraisal, which traditionally tries to monetise the value of travel time savings and other variables that make up generalised cost of travel. Furthermore, in traditional models that seek out regeneration impacts and employment impacts, only the immediate sites around the stations are considered.

6.35 Conversely KPMG evaluated the impact of investing in HS2 on productivity and output, for larger geographical areas. The study estimated a production function and calibrated it using UK output and input data from 2010. The function estimated the impact of changes to transport connectivity on production efficiencies and total output, with values assigned to inputs.

6.36 Put simply, by 'connectivity' here they mean the ability of people and businesses in one area to connect to people and businesses in other areas. There is a strong correlation between connectivity and economic growth: the better connected places perform better. This relationship is both intuitive and supported by economic theory. Increasing connectivity increases effective market size – businesses are more easily able to access a wider range of suppliers and customer; and individuals have access to a wider range of job opportunities. This means that there are greater opportunities for trade and potential reorganisation of economic activity as businesses and people move to places that are more efficient as a result of improvements in connectivity.

6.37 In order to measure connectivity improvements, the KPMG work estimates changes to business-to-business markets and labour markets by capturing an area's connection to business and to labour by rail, as follows:

i. Labour market connectivity – the total number of workers who can reasonably access employment in a specific area; and

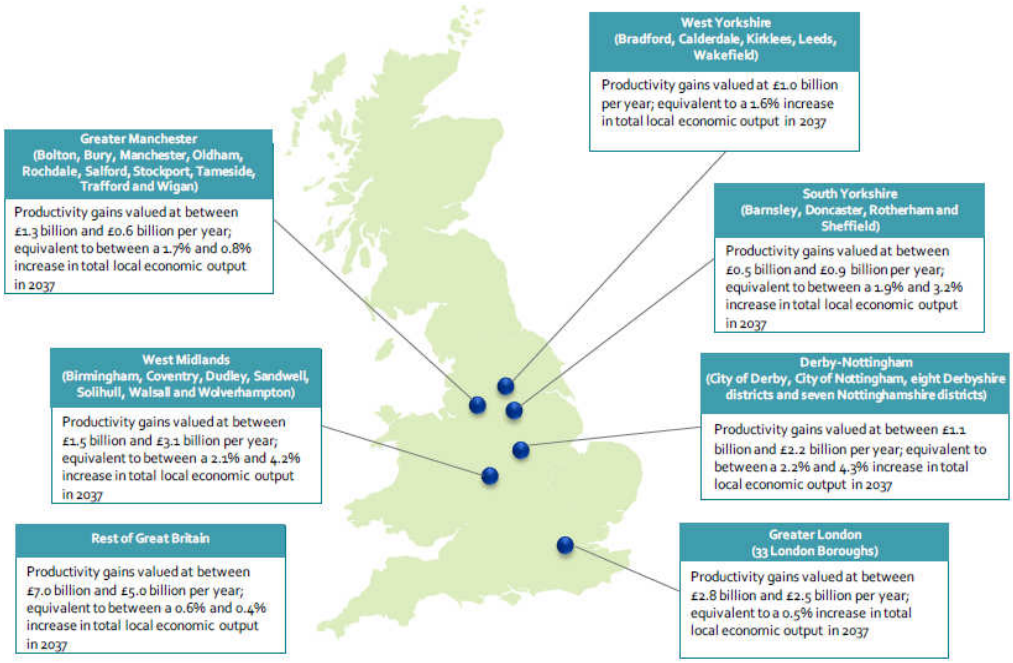
ii. Business connectivity – the total number of businesses accessible from a specific area;

6.38 The key drivers underpinning changes in labour connectivity are the assumptions on the use of released capacity for local and regional services, and the key drivers underpinning business connectivity are the assumptions on high speed and inter-city operations. The study presents these improvements in connectivity as well as estimating associated increases in productivity.

6.39 As figure 11 shows, the study concluded that regions outside London and the South East stand to benefit handsomely from investment in HS2. Indeed, their analysis concluded that the D2N2 area would benefit strongly from HS2 in terms of improved productivity; the LEP was forecast the largest percentage increase (between 2.2% and 4.3%) in local economic output per year among the regions analysed.

6.40 Specifically for Derby/Nottingham, the study found that the area would benefit from annual productivity improvements of £1.1bn-£2.2bn and it also found that improvements in connectivity would be significant, with increases in labour connectivity by rail of 14.3% and increases in business connectivity by rail of 23.2%, which could have a significant impact on the local economy.

Figure 11: Productivity Gains for UK Regions



Source: KPMG, "HS2: The Regional Economic Impact"

Understanding the impact of HS2 in the East Midlands

6.41 In this section we expand the Government's estimates to provide high level estimates of the benefits at the East Midlands region wherever possible. Because detailed regional breakdowns are not published, we utilise the most appropriate assumptions possible but the figures presented should be viewed as illustrative only.

Transport user benefits and WEIs

6.42 The Government business case does not provide detailed estimates of the transport user and wider economic impacts at the regional or district level. The only available breakdown is for the transport user benefits which were provided at the regional level but only for 2036. The split of benefits at that level is shown in table 3 below.

6.43 It must be noted that it is difficult to analyse exactly where, geographically, the benefits of HS2 would accrue. The Government models assess benefits according to where trips start and finish, but do not analyse exactly where the benefits will fall.

Table 3: Estimated transport user benefits of HS2 split by region, in 2036 only (%)

Regional User Benefits	Total
London	35.5
South East	2.8
West Midlands	14.8
North West	16.7
East Midlands	7.7
Yorkshire and Humber	11.0
North East	3.4
Scotland	4.4
Other[3]	3.7
Total	**100.0**

Source: HS2 Ltd

6.44 The results shown in table 3 are based on where trips originate from, but the Government has stated that the output is similar to those for where the trips finish. The analysis shows that while trips from London deliver the biggest proportion of benefits, there are also large benefits for trips starting in the East Midlands, West Midlands, North West and Yorkshire and the Humber.

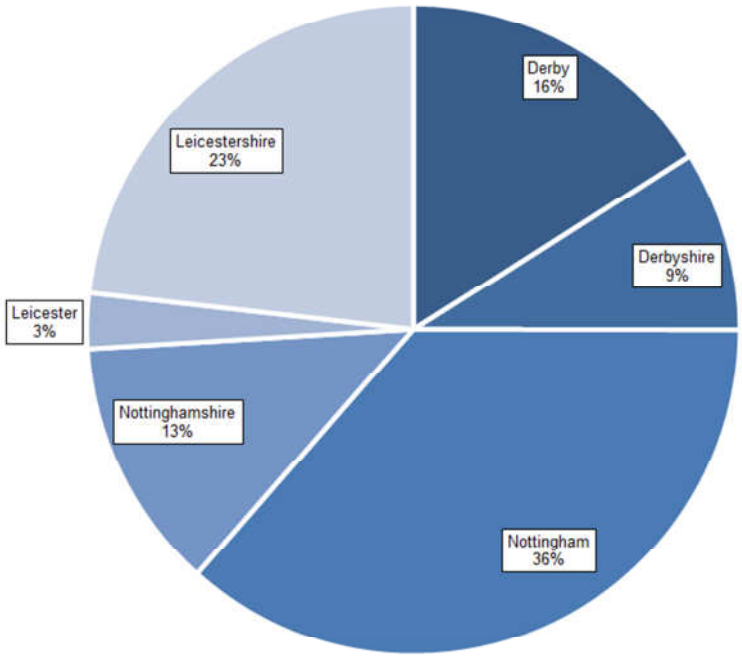
6.45 As shown in table 3, HS2 Ltd report that 7.7% of the transport user benefits accrue to the East Midlands in 2036. No breakdown is given of the WEIs and no breakdown over the appraisal horizon. However work by Volterra for a variety of local bodies along the eastern leg of the Y network to analyse the WEIs, also found that the East Midlands would get a similar proportion of the wider economic impacts and that this proportion did not vary significantly across the appraisal horizon. We therefore estimate that, of the total £70.9bn net benefits (transport user benefits and WEIs) estimated by HS2, around £5.4bn are likely to accrue to the East Midlands region.

6.46 Previous work by Volterra found that the majority of the WEIs would be due to agglomeration benefits for Producer Services employment.

6.47 Within the East Midlands, the distribution of WEIs estimated by Volterra's previous work is shown in figure 12. It shows that the largest share of these benefits is expected in Nottingham, making up 36% of the total. In terms of urban centres in the East Midlands, Derby comes second with 16% of the benefits. It may be surprising that the benefits expected in Leicestershire are larger than those in Nottinghamshire and Derbyshire, but it is worth bearing in mind that this work was done before the current preferred route was proposed. Accordingly, the results should be treated as only indicative.

[3] Other includes East of England, South West and Wales

Figure 12: Distribution of wider economic impacts in the East Midlands, %



6.48 In addition the estimates above, as well as those provided in the Government's analysis, are all primarily based on future projections of passenger trips in each of these regions and are derived from their respective historic performance. However, the reality is that the 'transformative' nature of the HS2 investment suggests that the future trajectory of passenger trips could look very different to their historic performance.

Jobs

6.49 In terms of job creation, there are also no estimates that are disaggregated by region. So far, the Government has estimated the likely number of jobs supported in the area up to 1km away from the proposed station locations, taking into account the ways in which HS2 can act as a catalyst for major employment-generating developments.

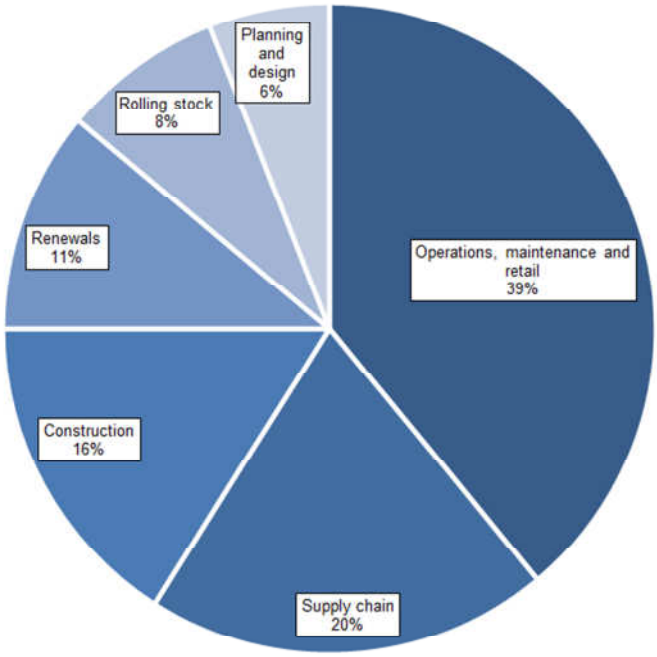
6.50 This analysis estimated that Phase 2 of HS2 would help to support the creation of some 100,000 jobs nationally, of which around 60,000 jobs would be in the cities of the Midlands and the North. Up to 10,000 jobs are anticipated in construction; 1,400 in operation and maintenance; and, almost 50,000 around the proposed stations.

6.51 A more recent study (June 2013), commissioned by Greengauge21, analysed the potential for job creation in the construction of HS2; the production of trains; planning and design; long-term renewal projects; the operation and maintenance of the network once it is operational; and the indirect and supply-chain effects of all of the direct jobs.

6.52 The report showed that there is potential for 890,000 person years of employment over a 60 year period of operation, starting from the planning and design phases in 2012. This is equivalent to 89,000 full-time equivalent jobs. Figure 13 shows a breakdown of these job years by employment

area. The largest area of employment is in the operation, maintenance and retail at stations, given that this will occur over the lifetime of the project, assumed to be 60 years in this analysis. Of importance to the East Midlands; more specifically Derby and Derbyshire, is the amount of jobs that are expected from the production of rolling stock. This will be discussed in more detail later in the report.

Figure 13: Distribution of jobs by area of employment, %



6.53 The analysis found that the majority of opportunities for construction jobs lay in civil engineering, with 80% of construction jobs falling within this broad field. However, specialist railway engineering jobs will nevertheless place additional pressure on scarce skilled resources in signalling and electrification engineering in particular. This represents an opportunity to improve human capital within the affected regions and the UK as a whole.

6.54 In order to gauge the potential job creation in the East Midlands, we assessed the relative sizes of employment activity in the relevant sectors in the UK in comparison to the East Midlands and used this to estimate the potential scale of job creation in the study area. Based on the current distribution of relevant employment sectors across the UK, we estimate that around 15% of the 89,000 jobs could be workers within the East Midlands. This implies the East Midlands as a whole could benefit from 13,350 additional jobs as a result of HS2.

6.55 These employment activities could be worth an estimated £575 million in annual economic benefits, which, even using conservative assumptions about phasing, would result in a 60 year NPV of over £7 billion.

6.56 The most notable type of employment that the region, and specifically Derby, could benefit from, is the manufacturing of rolling stock. Over half of national employment in this sector is

located in the East Midlands, and two thirds of this is within Derby. This means that around 2,500 workers in Derby could be involved in the manufacturing of rolling stock related to HS2. This of course has no bearing on the location of the HS2 station. But the point is that Derby will be boosted by the overall HSR programme due to the relative strength of its transport engineering industry.

6.57 This could have a huge bearing on the East Midlands economy, as the direct effects from manufacturing the rolling stock reverberate to the wider region through supply-chains and additional household spend.

6.58 Also of relevance to Derbyshire is the proposed Infrastructure and Maintenance Depot (IMD) at Staveley, which sits in the Chesterfield district. The Government has identified this site as the most suitable option for an IMD. The depot would be the base from which track, signalling and the overhead electric supply would be maintained.

6.59 Although no information is available on the construction costs of the IMD, there have been some studies that estimated the costs of other IMDs. They suggest that the cost is likely to be in the region of £50 million. Based on the average productivity of a construction worker in Derbyshire, an investment of this size should generate jobs worth 800 person years, or 80 full-time equivalent jobs, over the course of the IMD's construction.

6.60 Furthermore, once the IMD in Staveley is operational, some studies suggest that this could generate up to 500 jobs. It may also be necessary to improve the transport infrastructure, such as the road network, around the site. This will further enhance the benefits of the IMD on its surrounding area.

6.61 It is worth pointing out, however, that the proposed site for the IMD in Staveley is earmarked for housing development and there are some environmental impacts that need to be considered. The affected county and districts are fully supportive of the proposals but are engaged with Government to minimise disruption. In order to maximise the benefits of the potential depot at Staveley, it will be important to ensure that the local economy is well placed to train and upskill the relevant population in time for when the jobs come onstream.

6.62 Overall, the actual number of jobs generated across the phases of HS2 over the coming decades will reflect wider economic and policy factors, but the potential clearly exists for tens of thousands of jobs at each site and many additional jobs in the cities and wider regions. This will require local authorities, delivery partners and businesses to work in partnership to create a planning, infrastructure and investment environment capable of fostering growth.

6.63 Indeed, the affected regions are likely to compete for business and jobs, and the impacts will not be distributed equally. It is one thing to see a significant fall in journey times, but future economic prosperity will be impacted upon by more than just transport. Indeed, the policy environment, skills level and wider connectivity will be at least as important. Some of the factors that will be crucial for the maximisation of benefits to Nottingham, Nottinghamshire and Derbyshire will be explored later in this report.

Station location and journey time savings in the East Midlands

6.64 The Government decided that its preferred location for a HSR station serving the East Midlands was Toton. It designated Derby Midland as its second best alternative. This followed an option sifting process that excluded a host of other potential station locations in the East Midlands.

6.65 The analysis carried out by the Government showed that a station at Toton would generate an additional £500 million (60 year present value – PV) and revenues of £190 million over the Derby option. This is largely due to the fact that a HS2 station situated at Toton would serve a wider area and therefore a greater number of passengers would be attracted to the station.

6.66 Indeed, based on existing models of passenger demand (which are likely to be conservative) it was estimated that a station at Toton would attract some 8,500 passengers daily – with 48% of these assumed to be new passengers; 31% would come from Nottingham, 17% from Derby and 4% from Leicester.

6.67 The Government's initial analysis showed that the potential scale of development was such that 1,500 direct jobs (of which 900 are additional) would be created and 150 new homes could be supported by a station in Toton.

6.68 At this stage, it is worth pointing out that the earlier analysis carried out by Government in relation to the development potential around the HS2 station options relates to the site within a 1 km radius of the station. Accordingly, any developments that could be enabled beyond that distance are excluded; even those sites that are well connected through existing or planned transport infrastructure.

6.69 For example, the station at Toton will be connected to the Nottingham tram (Nottingham Express Transit – NET Phase 2) and road networks, as well as the local bus infrastructure. Along the network within the Broxtowe district, are a number of major schemes that are either underway or planned, including in the direct vicinity of the proposed HS2 station at Toton. Since the station in Toton is likely to have an impact on land values, this suggests that there are even more developments that could be enabled than what is currently envisaged by the Government's case. This area is explored in more detail in a later section of this report.

6.70 There are other parts of the Government's assessment of the station location options that are yet to be reviewed. For a start, the earlier analysis assumes job displacements that are located in the direct vicinity. However, there are likely to be more consequences than a simple displacement at the chosen station site. This should form a key part of any local and regional policies that are targeted at maximising the benefits of HS2.

6.71 As shown in table 4, once HS2 is fully operational, the time savings in journeys originating from and ending in Nottingham are substantial.

Table 4: Journey time savings with HS2, in minutes unless stated otherwise

	From			
	Birmingham	Nottingham	Sheffield	Leeds
To				
Current fastest journey time				
London	84	104*	125	132
Birmingham		73	71	118
Leeds	118	109	40	
Fastest journey time with HS2				
London	49	68	79	82
Birmingham		36	48	57
Leeds	57	46	27	
% Change				
London	-42	-35*	-37	-38
Birmingham		-51	-32	-52
Leeds	-52	-58	-33	

*Note that the fastest journey time from Nottingham to London St Pancras will reduce to 91 minutes on the MML, from December 2013, as a result of line speed improvements. This would reduce the % change due to HS2 from a reduction of 35% to 25%.

6.72 The reduction in journey times to London, Birmingham and Leeds are 35%, 51% and 58% respectively, bringing Birmingham and Leeds specifically to commutable distance. In fact, the reduction in travel time between Nottingham and Leeds is among the highest between any two city pairings that are affected by the HS2 network. This will have a significant impact on both the potential for firms to relocate to Nottingham (and its wider region) and the ability of the city's (and the wider region's) residents to access jobs in other parts of the country. It is also worth noting that the reduction in travel times for those in close proximity to Toton will be even greater.

6.73 The key point here is that the 'transformational' impacts of HS2 (due largely to the reduction in travel times) could change the trajectory of passenger travel and business investment decisions, with Nottingham and its wider region well placed to reap the benefits. This suggests that the risks to the estimates for transport user benefits and wider economic impacts are firmly skewed on the upside, meaning there is potential for the benefits to be greater than what is currently forecast.

Capacity Release benefits for the East Midlands

6.74 In order to arrive at their benefits estimates, the HS2 case includes some high level assumptions about service patterns on the capacity that will be released as a result of HS2. The economic case highlights that this is just one set of possible combinations for the use of the released capacity and that there are many other options that will need to be considered in the future.

6.75 The potential benefits of released capacity on existing classic lines have therefore not yet been comprehensively considered in any assessment of HS2. This will affect both passenger networks and rail freight. It should be noted that both the latest HS2 business case and the recent KPMG work implicitly assume a service pattern and so implicitly do capture these benefits. However the analysis to date has not assessed in a detailed fashion how the released capacity should be used

(for commuting, freight or business) and what routes should be served in order to maximise the associated benefits. The implication of this is on both passenger transport and, crucially for the D2N2 region, freight which could be very significant.

6.76 In terms of the former, the released capacity could be used for commuter services, which would allow people to access jobs that they were previously unable to. The impacts of this could be captured within both the transport user benefits and the WEIs. Meanwhile, the potential impact on freight is also unclear.

6.77 In 2011, Volterra was commissioned by the Core Cities to investigate the transport infrastructure needs required to support the challenging growth objectives for the eight largest cities outside of London. As part of this study we undertook high level analysis of the capacity release benefits that could be associated with Phase 1 of HS2. This analysis was limited to Phase 1 because route options were not yet available for Phase 2. We estimated that these benefits could be of the order of £3.4bn-£8.4bn to the UK economy, due to commuters being able to use the freed up capacity to access more productive job opportunities. These benefits were just due to Phase 1, so clearly the benefits of Phase 2 could also be significant and the exact service patterns and frequencies will be crucial to understanding the potential magnitude of these benefits to the D2N2 area.

6.78 The initial analysis that has been carried out by the Government in relation to released capacity on the classic rail network has suggested that some of the current rail connections in the East Midlands will see a significantly reduced service level. The high level service pattern assumptions underpinning the HS2 economic case have services falling from 2 per hour to 1 per hour for Nottingham and remaining at 2 per hour for Derby.

6.79 The intention is that with a HS2 station at Toton, Nottingham and Derby will be well served via a hub and feeder approach. However in order for this to work, it is crucial that connections to the Midland Mainline allow classic compatible services to serve both Nottingham and Derby's Stations. This will be vital for ensuring that the benefits of HS2 are spread and maximised throughout the region. The sooner HS2 can make some firm commitments on the service patterns and retaining existing levels, the more certainty the area will have about its future connectivity.

6.80 The reduction in direct service to Nottingham could deal a heavy blow to the city's economic development. Importantly, it would make the area less accessible, which would inevitably put off prospective businesses and enterprise, leading to a leakage within the local economy. Given that over half of the workers in Nottingham live outside of the city, the impact of a deterioration in its economy would be felt beyond the borders. This should be factored into the options assessment process.

6.81 It is worth pointing out that the DfT have emphasised these are just assumptions within the transport model at this stage and are not definitive. However, it is crucial to give potential business occupiers and investors the certainty of future service levels. Nottingham's station is undergoing a major refurbishment programme, worth some £70 million; while Derby's has already been renovated just recently. In addition, the Midland Mainline is set to be electrified which will bring economic benefits to both Nottingham and Derby and reduce journey times. For Derby this involves upgrading of its station.

6.82 To this effect, it is important that a more comprehensive study on capacity released for both passenger and freight networks is being carried out by Network Rail, which published an initial report in August 2013. The report proposed three approaches to assessing capacity release options on the classic rail network, namely:

- 'Do minimum' approach, where the current services are maintained when the second phase of HS2 is operational in 2032/33. This effectively means that minimal changes are made to services on the existing network with the introduction of HS2;

- 'Incremental' approach, where services are identified on the existing network, which are replicated to a greater or lesser extent by the new HS2 lines. An assessment of the transfer of passengers from the existing network to the high speed rail lines then allows for capacity released to be replaced, aligned as far as practical with the market study conditional outputs. In most circumstances this would substitute long distance, fast services with inter-urban connectivity improvements or additional commuting capacity; and,

- 'Integrated connectivity' approach, where the introduction of the second phase of HS2 would seek to plan the services on the existing network to work in conjunction with HS2. The aspiration is that where appropriate, long distance services would be provided by HS2, with services on the existing network set up in a feeder pattern to provide frequent and reliable connectivity between surrounding areas and the HS2 station as a hub.

6.83 In relation to the East Midlands, the second two approaches could result in a change to the current service patterns on the classic rail network, specifically in relation to the Midland Mainline.

6.84 In relation to the Incremental approach, while Network Rail expects that there will be a shift from the classic network to HS2 (namely to Derby, Nottingham and Sheffield), the requirement to maintain connectivity on the Midland Mainline and North East to Midlands and the South cross country flows may justify the maintenance of a similar level of service as currently.

6.85 Meanwhile, in relation to the Integrated Connectivity approach, Network Rail expects that this would lead to a step change in how passengers would view using long distance services. It would create additional opportunities to improve cross country services; offer new services; and, open up other markets that cannot be currently served due to capacity constraints.

6.86 The main appeal of this approach is that it would allow direct feeder services, serving HS2 stations, to operate along the HS2 network. These services would otherwise not be connected to the HSR network. While there are no details on these proposals yet, it could be an ideal opportunity for economic development and regeneration in some parts of the affected regions.

6.87 Network Rail have not carried out any detailed analysis as of yet and are seeking feedback on the findings of their latest report. They will conduct a separate, more detailed analysis of the potential options in due course. Their provisional findings, however, are that the 'do minimal' approach is unwise, since it will result in the least benefits out of the three approaches.

6.88 Both of the other approaches; namely, incremental and integrated connectivity, are based on reducing the amount of long distance services on the classic network. The integrated connectivity approach would mean that all long-distance journeys, where possible, would be

taken on the HS2 network. This would lead to released capacity that could be used to improve inter-city connectivity. This would be particularly beneficial for those places where HS2 does not directly serve.

6.89 Given the fact that these two latter approaches provide greater overall benefits than the 'do minimal' strategy, according to Network Rail, it would be reasonable to expect that the proposed reduction in service from Nottingham to London, from 2 trains per hour to 1, would not be detrimental to Nottingham's economic prosperity. Indeed, after all, this is the whole point of HS2 - releasing capacity on the existing network so as to offer a more dynamic service that is able to adapt to changing demand

6.90 The key point that is emerging from this work specific to the East Midlands is that there is an acknowledgement on the part of Government that the service on the Midland Mainline needs to be at least maintained to serve the growing demand. This is crucial for the economic development of the region; as shown in the work that was carried out in relation to electrification of the Midland Mainline.

6.91 Already committed upgrading on the MML will deliver a reduction in journey times between London and Nottingham and London and Sheffield of 5 and 8 minutes respectively. These journey time improvements will start to accrue from 8 December, as a result of a new timetable. According to the East Midlands Councils, the overall wider economic impacts on the East Midlands and South Yorkshire are estimated at £450 million. This highlights the benefits to the region and suggests that the region should strive to maintain service levels. Furthermore electrification, expected to be complete by 2020, will bring benefits in addition to those previously specified. This provides some certainty for individual users and businesses.

7 The Impact of Station Investment

- Empirical evidence from HS1, HSR internationally, Crossrail and Sheffield all suggests that station investments lead to uplift in both commercial and residential property values.
- There are various developments that could be enabled as a result of the HS2 station at Toton, such as that planned on the land off Toton Lane. In the direct vicinity of the Toton site, we estimate that current proposals could result in around 650 to 875 residential dwellings, and 2,800 sq m to 19,800 sq m of commercial office space, accommodating 200 to 1,500 jobs once the development is operational.
- Evidence suggests that demand for office-space is likely to be low in the short to medium term, amidst all the uncertainty regarding HS2. Therefore, residential development is the wise choice to opt for in the near term, as is illustrated convincingly by certain European cities and towns. Planners should retain flexibility however so that commercial uses can be developed later on to complement the earlier residential investments.
- It is important that the relevant local authorities put into place policies that will encourage early investment in Toton. Evidence suggests that station locations outside of city centres that do not experience investment prior to the station being built lose out as a result of HSR.
- There are also several other proposals in the area, including schemes along the tram route in Broxtowe and Nottingham, a major redevelopment planned at the former Stanton Iron Works in Ilkeston and a proposed Strategic Rail Freight Interchange near East Midlands airport. Combining these schemes we estimate that they could deliver over 4,000 new homes and support over 10,000 new jobs. This would be a significant boost for the local area.
- HS2, combined with extension of the NET tram network, could boost prosperity in all of these areas, accelerating the development potential of these sites and potentially increasing the densities and values that they attract.

Empirical Evidence from Elsewhere

7.1 The longer term impacts discussed above relate to the benefits that will come primarily from journey time savings and wider economic impacts. However, since Phase 2 of the Y-Network is due to be operational in 2033, the long-term economic development and regeneration impacts of the station investment and connectivity also need to be considered.

7.2 The economic development and regeneration impacts of stations can be summarised as follows:

- additional jobs as a consequence of agglomeration and productivity increases;
- improvements to the types of employment attracted within an area;
- land value uplifts;

- value of place; and,
- inward investment and tourism impacts.

7.3 These types of benefits are particularly difficult to quantify a-priori as economic models are typically driven by a continuation of past trends in activity and by definition these sorts of benefits fundamentally require a change in activity, either due to the types and values of activity, or the scale and location of investment.

7.4 Often the best way to assess the potential scale or direction of these benefits is therefore to consider the evidence that exists from relevant other investments. In this section we therefore summarise the findings from work on Crossrail, Network Rail improvements to Sheffield Midland, HSR internationally and HS1 in the UK.

7.5 A recent report by GVA for Crossrail found that station developments have a broadly positive impact on commercial and residential values, and on development activities around stations. The study reported the following impacts:

- Crossrail will support the delivery of over 57,000 new homes and 3.25m sqm of commercial space;
- Commercial office values around stations in central London will increase over the next decade with an uplift of 10% in capital value above an already rising baseline projection;
- Residential values are projects to increase immediately around stations in central London bby 25%, and by 20% in the suburbsland values reportedly increased by a range of 23% to 146%;
- Crossrail was already reported as having a positive impact on development activity levels and investment decisions, although limited quantitative data; and
- The study concluded that in many locations Crossrail will have a transformative effect on the property market and development activity over time.

7.6 Meanwhile, SDG carried out a study on behalf of Network Rail, which looked at the impact of station investments. This showed that there was an increase in rateable values and employment around new/refurbished stations. Examples include Sheffield Midland where, using data from the Valuation Office Agency (VOA) within a 400m radius of the station, the study found that total rateable values in the area rose from £8.7 million to £14.7millon between 2003 and 2008.

7.7 HSR examples around the world have found that:

- Passenger demand typically exceeds forecasts – for example the Japanese line covers only 3% of the network but carries 25% of the traffic, in the decade to 2004 passenger traffic on HSR in France increased 62.5% and between Frankfurt and Cologne increased 133%;
- Property values around stations have been reported to be up to 67% higher;
- Population and employment in cities connected to the lines grows by 22% and 26% more respectively;
- In Lyon, there was a 43% increase in office space around the station after the HSR link to Paris opened and reports suggest land values have increased by 35%;

- HSR can create new commuter cities (for example Vendome);
- HSR can transform the attraction to tourists – for example Lleida (city between Madrid and Barcelona) where tourism increased by 15%; and
- Reduces the demand for car and air trips.

7.8 Work on High Speed One by Colin Buchanan and Volterra in 2009 found that:

- Including the WEIs doubled the benefits from £3.8bn to £7.6bn, doubling the BCR;
- If only 5% of the regeneration benefits around stations were 'new' investment into the UK, then this would be wort £10bn to the UK economy, more than doubling the BCR again;
- HS1 could dramatically increase the earnings potential of residents in Kent, ranging from £62m-£360m per annum; and
- The value of the housing stock could increase by £1.3bn.

7.9 Whilst it is difficult at this stage to assess the extent to which development in the East Midlands may be either enabled or encouraged to be more economically valuable as a result of the HS2 investment at Toton, this section seeks to examine the following:

- Developments in the direct vicinity of the station site in the near term due to both the completion of Phase 2 of NET and the HS2 station;
- Developments along the tram route in Broxtowe and Nottingham;
- Developments in Erewash, the closest inhabited district in Derbyshire to Toton; and,
- The potential impact of the proposed Strategic Rail Freight Interchange near East Midlands airport.

Development in the vicinity of the HS2 station at Toton

7.10 The main development in the direct vicinity of Toton is that proposed on the land off Toton Lane, where there are submitted plans for a mixed-use scheme, consisting of:

- 650 residential dwellings;
- 380 sq m convenience store;
- 95 sq m retail outlets;
- 2,800 sq m B1 units (B1(a) and B1 (b));
- education floor space (Maximum 2,300 sq m);
- Day Nursery (Maximum 450 sq m);
- pub/restaurant;
- an 80-bed residential care facility;
- open space;

- plot for medical surgery (0.03 hectares);
- plot for community use (0.05 hectares); and,
- highways, drainage, removal of electricity pylons and overhead cables, erection of terminal pylon, demolition of Bessell Lane Farm and outbuildings and 316 Toton Lane, and associated infrastructure.

7.11 The developer of the scheme is also planning to submit an application for the associated land to the east of Toton Lane, which is likely to include either 225 residential dwellings, or 17,000 sq m of commercial office (B1), or a mix of 5,000 sq m of commercial office (B1) and 175 residential dwellings.

7.12 In the construction phase, the value of the investment for both developments is estimated at £120 million. Taking standard assumptions for GVA per capita would result in around 2,000 'job years' worth of construction employment, equivalent to 200 full-time jobs over the course of the development.

7.13 Turning to the operational phase, the combined commercial office space proposed on the two sites is between 2,800 sq m and 19,800 sq m. Applying standard employment densities would yield a range of 200 to 1,500 office jobs on the two sites. This excludes the other employment-generating uses.

7.14 Although it is difficult to establish the likely demand for employment space in the future (especially 20 years from now), the experience of some of the other parts of the world is relevant. For instance, the economic development and regeneration of some of the high speed station routes in Spain focused on housing to start with. A good example is Cordoba, which is an intermediate station on the Madrid-Seville and Madrid-Malaga routes.

7.15 Early developments in Cordoba focused on housing and once sufficient development took place, other land uses started to take shape – including leisure and hospitality, and commercial development. Overall, residential development has been at the heart of the high speed rail network in Spain, which came at the expense of commercial offices and other uses. Meanwhile, land uses around high speed rail stations in France tended to be more mixed – largely owing to their city centre locations.

7.16 A common theme across a number of different countries is the success of some of the intermediate stations along the high speed network. Indeed, there is some strong evidence that intermediate stations along the network could see some significant economic development and urban regeneration. While most of those stations were in city centres, the position of Toton in relation to the main urban centre in the East Midlands and the Enterprise Zones is relevant – even if the impact on Toton itself is less clear.

7.17 Turning back to Spain, Zaragoza (which lies in the middle of the Madrid-Barcelona HSR route) saw a significant transformation in its economic fortunes. The city's cost competitiveness encouraged business services occupants and investment in high-quality meeting space in the vicinity of the station made it an ideal centre for business meetings. There was also a boost to urban tourism. Therefore, HSR enabled Zaragoza to exploit its comparative advantage effectively.

7.18 In France the development of Lille's HSR station, linked directly by EuraLille to the classic rail station, transformed the city's economy. EuraLille emerged to become the third most prominent business centre in France over the last decade. This new urban district of around 70 hectares now boasts commercial offices, residential apartments, hotels and a shopping mall.

7.19 In Japan, some of the intermediate cities along the HSR routes, notably Nagoya and Yokohama, saw an increase in job densities while this fell in some of the bigger cities at either end of the HSR network.

7.20 On the negative side, there is also evidence of HSR stations where development failed to materialise. Generally, this was the case for those stations that were not developed in city centres and where no investment activity and poorly coordinated planning was present prior to investment in the station. A number of examples exist in France; including Picardie, Valence, Avignon and Aux de Provence – all along the TGV network.

7.21 In the UK, the scale of investment at Stratford meant that the initial plans for Ebbsfleet (both stations on the HS1 route) proved unrealistic so that development has been delayed and the number of passengers has so far fallen short of earlier estimates. It is still envisaged that there will be significant development in Ebbsfleet. However the timescale has been put back and the developer is proposing a change of uses. In order to maximise benefits here it will therefore be important that the local planning authorities are flexible enough to allow the developer to alter their plans to fit with current market conditions.

7.22 The main implication for the proposed development at Toton is that the commencement of residential development in the vicinity of the HS2 station does not mean that other mixed uses will not be built in the future. After all, NET Phase 2 makes residential development viable in the near term, bringing the benefits forward. These economic benefits will be more valuable than those that will accrue in the medium to long term.

7.23 Meanwhile, commercial development is unlikely in the near term within the vicinity of the HS2 station at Toton – as envisaged by HS2 ltd in its regional factsheet. The absence of a market in the area, combined with the uncertainty surrounding a HS2 station that will be developed in 20 years, means that there will be huge doubts over the viability of office type developments around the station in the near or medium terms.

7.24 Accordingly, the immediate concern of Broxtowe council is to accelerate the development of the residential component of the proposed scheme, such as the one proposed in the plans that were already submitted. This will bring forward development and economic benefits for the borough and wider region.

Developments along the tram route

7.25 At the same time, the proposal for the land to the east of Toton Lane is still under consultation and it will become clearer once the HS2 proposals themselves are more certain. It is possible to have some employment land on the site, but this should be balanced against the current proposals in Broxtowe that largely follow the tram line. These are summarised in table 5. We estimate that these planned developments could accommodate around 1,000 homes and potentially also significant job creation, which are likely to become more certain once HS2 plans are finalised. While these are not directly linked to HS2, the station at Toton could help to boost

the viability of the schemes and the densities attracted to them since these are likely to be linked to the HS2 station through the tram link.

Table 5: Planned developments in Broxtowe along the tram route in close proximity to Toton HS2

Name	Plans
Former Chetwynd Buildings	Residential 390 dwellings
Village Hotel	Hotel extension
Long Eaton Textiles	Residential land for 86 dwellings
Ambercote Service Station	Residential 24 units
Crest Nicholson	Residential 56 dwellings
Barton's site	Space for approx. 110 dwellings, estimated value c.£22 million
Broxtowe College	Further Education College redevelopment
Former Rugby Club	146 dwellings redevelopment
Former Siemens site	Suitable for employment/residential development, potential for 50 parking spaces
Lidl	Supermarket redevelopment
Styring Street	97 flats development
Anglo-Scotian Mills	104 flats, £11 million investment
Beeston Square	Retail and parking, estimated value £30 million
Tesco	Supermarket redevelopment
Nether Street	44 residential units

7.26 The tram route is of course not limited to Broxtowe and extends to Nottingham. Table 6 shows a breakdown of the main development sites planned on the Nottingham end of the tram line. This shows that there are currently plans for up to 1,190 homes and 179,500 sq ft of commercial floor space along the line in Nottingham. We estimate that the commercial space could accommodate between 680 and 1,220 jobs. While these developments are not directly linked to HS2, the fact that the sites would be connected to the NET tram line and also, Nottingham's station will be directly linked to Toton; will help to improve the viability of development along the tram route and in Nottingham as a whole.

Table 6: Planned developments in Nottingham along the tram route

Site	Housing		Floorspace	
	Min	Max	Min	Max
Ruddington Lane (Rear 107-127)	16	16	0	0
Boots	600	600	40,000	62,000
Canal Quarter - Arkwright Street East	0	0	1,500	10,000
Canal Quarter - Sheriffs Way / Arkwright Street	150	150	7,000	7,000
Canal Quarter - Sheriffs Way (Sovereign House)	253	253	21,000	21,000
Canal Quarter - Waterway Street	42	42	9,100	9,100
Derby Road (Western Club)	29	29	0	0
Medi Park	0	0	45,000	45,000
NG2 South	0	0	5,600	10,600
NG2 West	0	0	5,600	10,600
Nottingham Science & Technology Park	0	0	4,200	4,200
Riverside Way	0	100	0	0
Total	**1,090**	**1,190**	**139,000**	**179,500**

7.27 The analysis above is still omitting potential developments in the parts of Erewash that are in close proximity to Toton. Whether these projects go ahead or not will depend on connectivity improvements between relevant parts of Erewash and the HS2 station. This is discussed next.

Potential for enabling development at Erewash

7.28 The Erewash Economic Development Strategy 2013-2018 identified the lack of readily available development sites as one of the main weaknesses of the district. However, Saint Gobain PAM UK Ltd, the owners of the former Stanton Iron Works in Ilkeston, submitted a planning application for the redevelopment of the site. These plans, which are expected to be delivered over 20 years, consist of:

- 1,950 residential units;
- A neighbourhood centre including retail, restaurants, café/bar/hotel uses and community facilities;
- Employment uses including up to 20,000 s qm of offices and business premises and up to 50,000 sq m of general industrial use warehousing;
- 150-bed accommodation for the elderly;
- Community plaza;
- Primary school;
- GP/Health Centre;
- Sports pitches and open space;
- Allotments; and,
- Associated infrastructure and roads (including alterations to 4 off-site highway junctions).

7.29 We estimate that the commercial part of this development could therefore accommodate around 2,500 jobs.

7.30 As things stand, redevelopment of the Stanton Iron Works is not linked to the potential HS2 station at Toton as there are no plans to connect the site to the HS2 station. However, a new national rail station is planned in Ilkeston by the end of 2014, which will connect the town to the Northern Rail network that runs between Nottingham and Sheffield. This will undoubtedly improve connectivity to Ilkeston. Furthermore, there may also be an opportunity to extend the Nottingham Express Transit tram network in a future phase to Ilkeston. Such a project would give the area direct access to the HS2 station at Toton and this would entail economic and social benefits for Ilkeston and Erewash more generally.

Strategic Rail Freight Interchange

7.31 There is also a proposed Strategic Rail Freight Interchange, which will consist of a 250 acre distribution centre and rail terminal, capable of providing up to 6 million square feet of large-scale warehousing. We estimate that this could accommodate around 7,100 FTE jobs. It will permit freight trains of 750m in length to operate. The proposed location is adjacent to East Midlands Airport and is also conveniently situated next to J24 of the M1. Nottingham is located 13 miles north, with Leicester 20 miles south. The rail terminal will connect the site to the Castle Donington line and, via the Rugby Loop, will provide direct access to major Eastern and Southern UK ports. The viability of this project will inevitably be improved by the presence of an East Midlands hub station.

8 Maximising the Benefits of the HS2 Station at Toton

- Availability of a skilled workforce, the quality of the other infrastructure (such as the telecommunication network), provision of the right type of real estate – for example, high quality grade A offices for potential key occupiers – are crucial factors in business location decisions. The D2N2 area needs to plan to improve these facors if it is to take advantage of future growth associated with HS2.
- In order to maximise the benefits of a HS2 station at Toton, it is vital that skills are boosted in the D2N2 area, so as to increase mobility of labour. This variable encompasses not just the quality of transport links, but also whether there are workers with adequate training and skills, able to competently work in these more productive and demanding sectors.
- Nearly all of the districts in the D2N2 rank below the core cities listed, in terms of occupation type i.e. these districts generally have a higher proportion of workers employed in lower skilled jobs.
- The economic performance of districts surrounding Derby and Nottingham is tied closely to the performance of the two cities. The impact of HS2 on the two cities will therefore be pivotal to the wider area's future prosperity.
- Whilst it is understandable that the service patterns on the released capacity remain flexible at this stage, it would be beneficial to businesses and investors to get some commitments and certainty around the types of services that they can expect.

Introduction

8.1 The fact that the operational phase of HS2 is expected to start in 2033 means that the affected regions will have to put in place the right policy measures that will maximise the benefits of the scheme once it is developed. After all, the route will impact on a number of different regions in the country, which means that there will be competition between cities to attract, in advance of HS2, the right kind of businesses and employment – especially those that will benefit most from the high speed rail network.

8.2 Transport infrastructure is only one factor that businesses will take into consideration when making location choices. Worker productivity and earnings are further key factors. On the face of it, Nottingham and the wider Nottinghamshire region are therefore in a good place.

8.3 Table 6 below shows that GVA per resident in Nottingham is higher than that of the other core cities (apart from Bristol), the English average and the D2N2 region. However, GVA per worker (the more important and relevant measure) is lower in Nottingham than in most of the D2N2, and in all of the core cities.

Table 7: GVA per worker and resident, £s, 2011

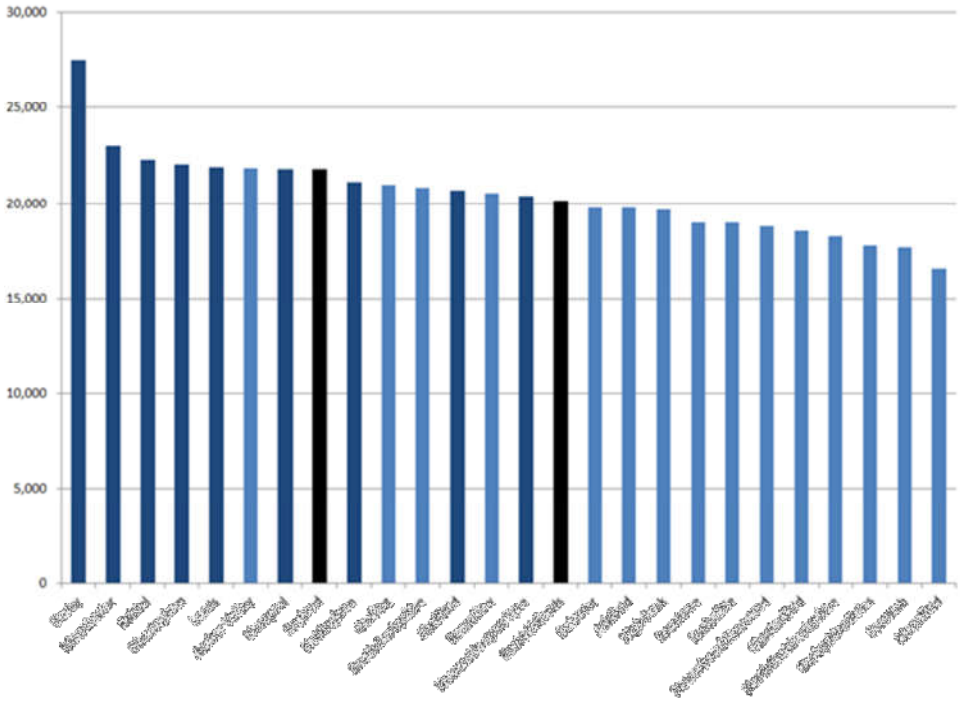
	2011 GVA per worker	2011 GVA per resident
Nottingham	39,076	24,904
Derby	49,122	23,194
South Nottinghamshire	46,220	13,739
North Nottinghamshire	42,021	16,144
South and West Derbyshire	42,324	15,492
East Derbyshire	38,734	14,753
Manchester	*42,119*	*18,113*
Newcastle	*41,091*	*18,313*
Liverpool	*40,902*	*20,387*
Sheffield	*42,134*	*17,752*
Leeds	*45,509*	*22,224*
Birmingham	*44,417*	*19,928*
Bristol	*50,787*	*26,164*
England Average	**49,058**	**21,349**

Source: Regional GVA NUTS 3, ONS

8.4 Median earnings for workers and residents in Nottingham rank 7th and 8th respectively among the nine core cities represented (see figures 14 and 15). Meanwhile, median annual earnings are 11.3% greater in Derby compared to Nottingham.

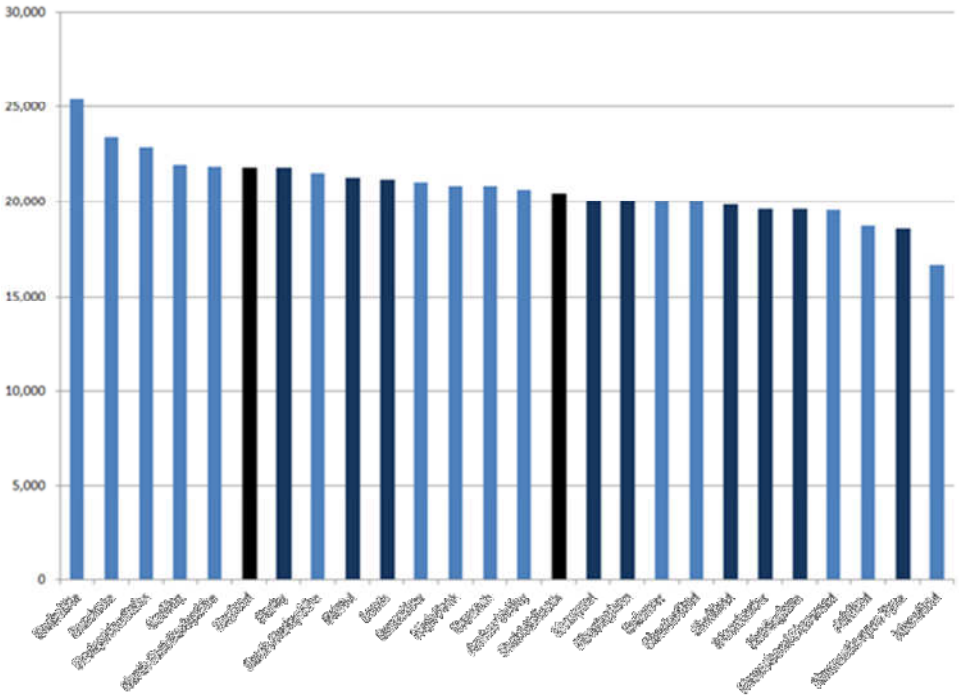
8.5 GVA measures the earnings of labour and capital – the latter through profits of businesses. It is worth noting that lower earnings (i.e. salaries) make Nottingham a more attractive business location, provided that the right skills become available. However, as Nottingham's GVA is relatively low, then this infers that profits have not risen significantly as a result of the relatively cheap source of labour.

Figure 14: Workers' Average annual earnings, £s, 2012



Source: ASHE – workplace analysis

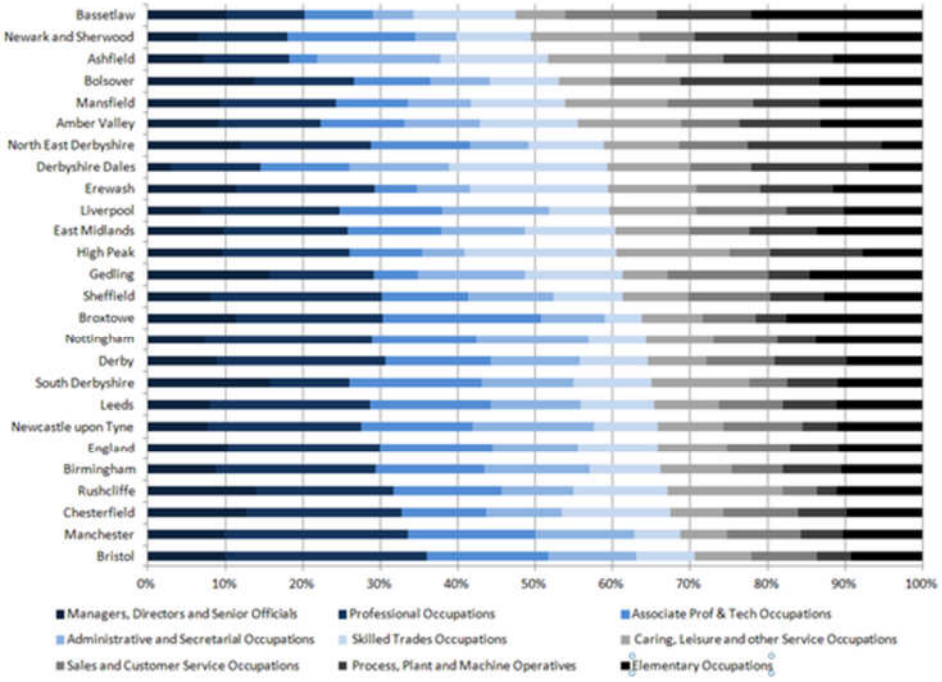
Figure 15: Residents' Average annual earnings, £,s, 2012



Source: ASHE – resident analysis. Note Derbyshire Dales has missing data for 2012 and so 2011 has been used instead.

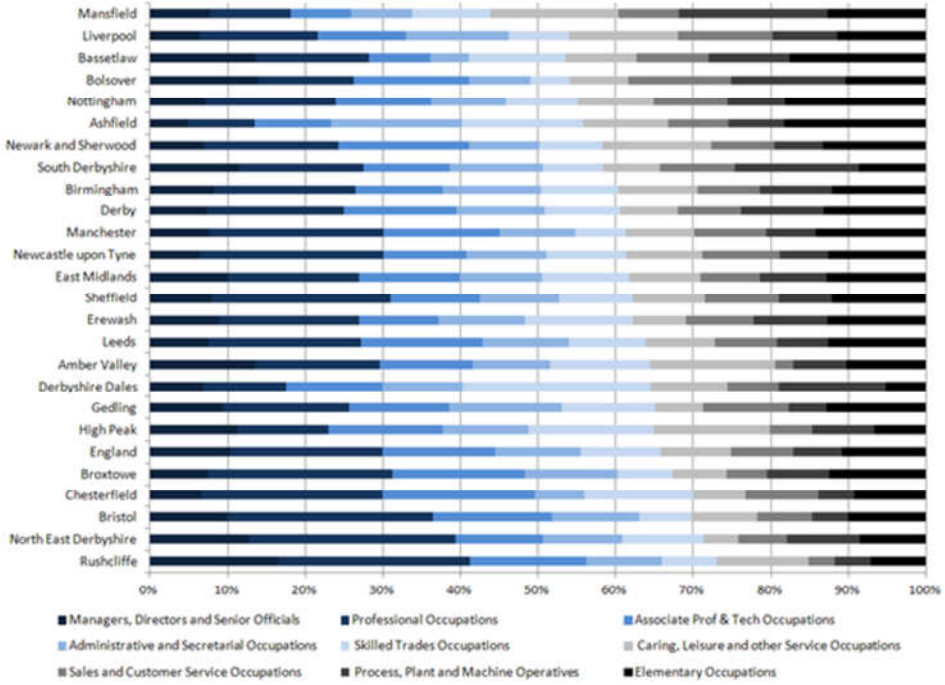
8.6 The lower earnings found in some parts of the D2N2 area could partially be explained by the occupation of workers, which is dominated by lower skilled sectors compared to the other core cities and England as a whole (see figures 16 and 17).

Figure 16: Workers' occupational distribution, %, 2012



Source: Annual Population Survey – Workplace Analysis, ONS (2012). Note, 2011 data used for Bolsover- Admin, Amber Valley - Sales and North East Derbyshire - Process, Plant and Machine Operatives

Figure 17: Residents' occupational distribution, %, 2012



Source: Annual Population Survey, ONS (2012). Note 2011 data used for Rushcliffe for Process, Plant and Machine Operatives due to missing data

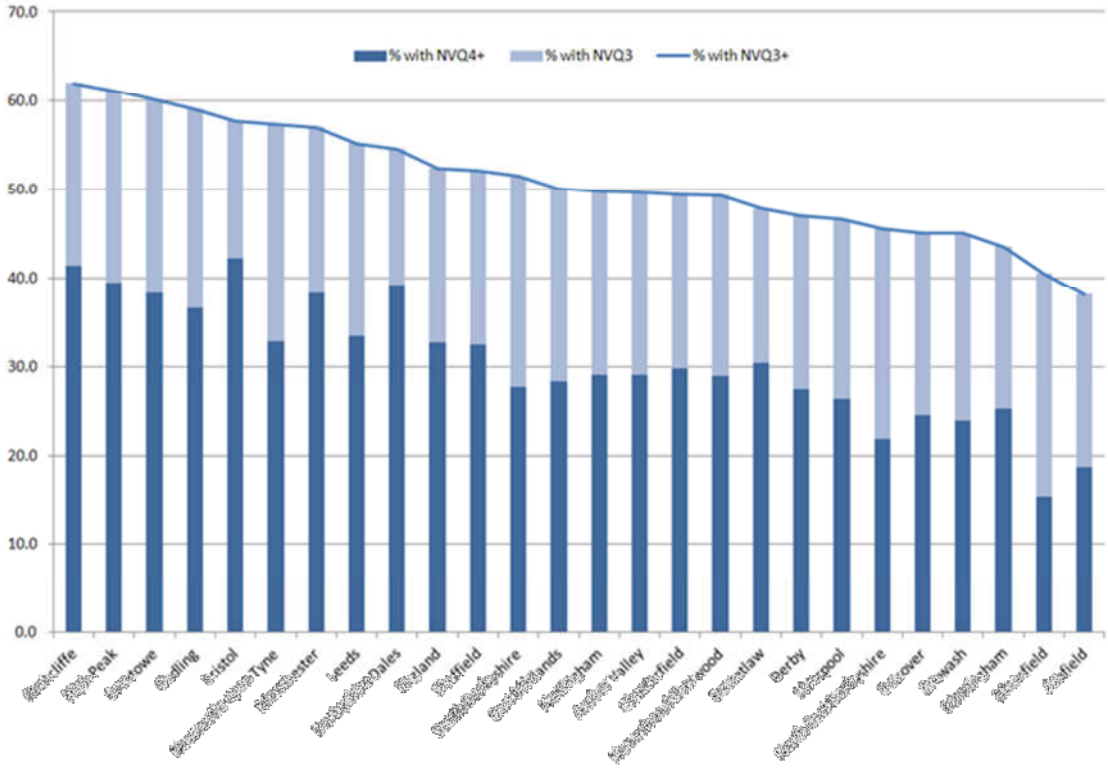
8.7 Apart from the availability of a skilled workforce, the quality of the other infrastructure (such as the telecommunication network) and the right type of real estate – for example, high quality grade A offices for potential key occupiers – are further crucial factors in business location decisions.

Addressing the skills gap

8.8 One of the key determinants of productivity in an advanced economy like the UK is the skill level of its workers. Within the different regions of the country, skill levels are crucial for economic development – many regions are targeting highly-skilled employment to boost their economies.

8.9 Figure 18 exhibits the percentage of working age people (16-64 year olds) that have the specified qualifications. This can be viewed as a proxy for how skilled they are. Nottingham is ranked 6th out of the nine core cities. Furthermore, it falls short of both the England and East Midlands averages for the % with NVQ3+. There are a few districts that surpass the English average, such as Broxtowe and Rushcliffe. However, there are some districts that are lagging severely behind, including Ashfield and Mansfield. Just 15.2%, compared to a national average of 32.7%, of Ashfield's working-age population are qualified to the level of NVQ4+.

Figure 18: Percentage of working-age Population by level of qualification



Source: Annual Population Survey, ONS (2012)

8.10 Through its recently announced City Deal, Nottingham is investing heavily into boosting local skills. This is a key policy for the future of the city and its wider region as it looks to compete with other core cities in England for investment and jobs. Other parts of the D2N2 will need to undertake similar strategies that will boost the skills of the local workforce. This would enhance the D2N2's ability to attract businesses and allow its residents access to the highly-skilled jobs that these opportunities could offer.

The current frequency of service on the Midland Mainline

8.11 One of the key issues that may impact on the competitiveness of Nottingham specifically is that the Government assumes that the frequency of service into the current city centre station will be reduced to one train per hour (see the October 2013 update of the economic case of HS2 where assumptions related to capacity release are shown).

8.12 The impact of this could be two fold. First, it could add further pressure on the development of the city centre. The concern is that the developments in the city centre could be held back. SDG conducted a quantitative analysis in 2011 to determine the extent of any changes in property values and economic activity from station investment.

8.13 For Sheffield station, using the data from the Valuation Office Agency (VOA) within a 400m radius of the station, the study found that total rateable values in the area rose from £8.7 million to £14.7millon between 2003 and 2008. These findings suggest that the anticipated development of Sheffield station was having an effect on property and investment decisions prior to completion of the project. For Nottingham, it is therefore crucial that service levels are

maintained to the city centre so that planned developments in the regeneration areas are not affected.

8.14 Second, the image of Nottingham and its ability to compete for business occupiers will be dealt a blow by plans to reduce direct service levels to the city centre. While Nottingham will benefit from its low-cost characteristics, it still needs to boost skills; and poor connectivity, through reduced direct services to its centre, will place it behind other core cities.

8.15 The costs of poor performance in Nottingham will also impact on the wider region. As shown earlier, the city is a major generator of jobs for residents in its wider region and so the economic success of the latter is interlinked with the city's own performance. As the region's main urban centre, it competes for business occupiers with other similar cities in the country and its performance spills over into smaller urban centres and rural locations in neighbouring districts.

8.16 Importantly, although electrification of the Midland Mainline is not yet underway, there has been a commitment to convert to electric trains and the project is expected to be complete by 2020. This means benefits will be realised earlier than those precipitating from HS2 and so certainty is increased for individual users and businesses. Increased certainty is key for attracting businesses to the East Midlands.

8.17 As discussed earlier in this report, the work that is being carried out by Network Rail will provide a better framework for assessing the released capacity due to HS2. In this regard, the assumptions in the Government's business case may soon become outdated.

8.18 It is important that some certainty is provided so that business occupiers and investors are encouraged to consider Nottingham and any other location that is being adversely affected by planned service reductions on the Midland Mainline. This could be in the form of a Government commitment to maintain the service frequency regardless of HS2, provided that the market demands that level of service. The DfT have indicated that this is possible and that the route and assumptions are not yet fixed. Regardless, further assurances are needed.

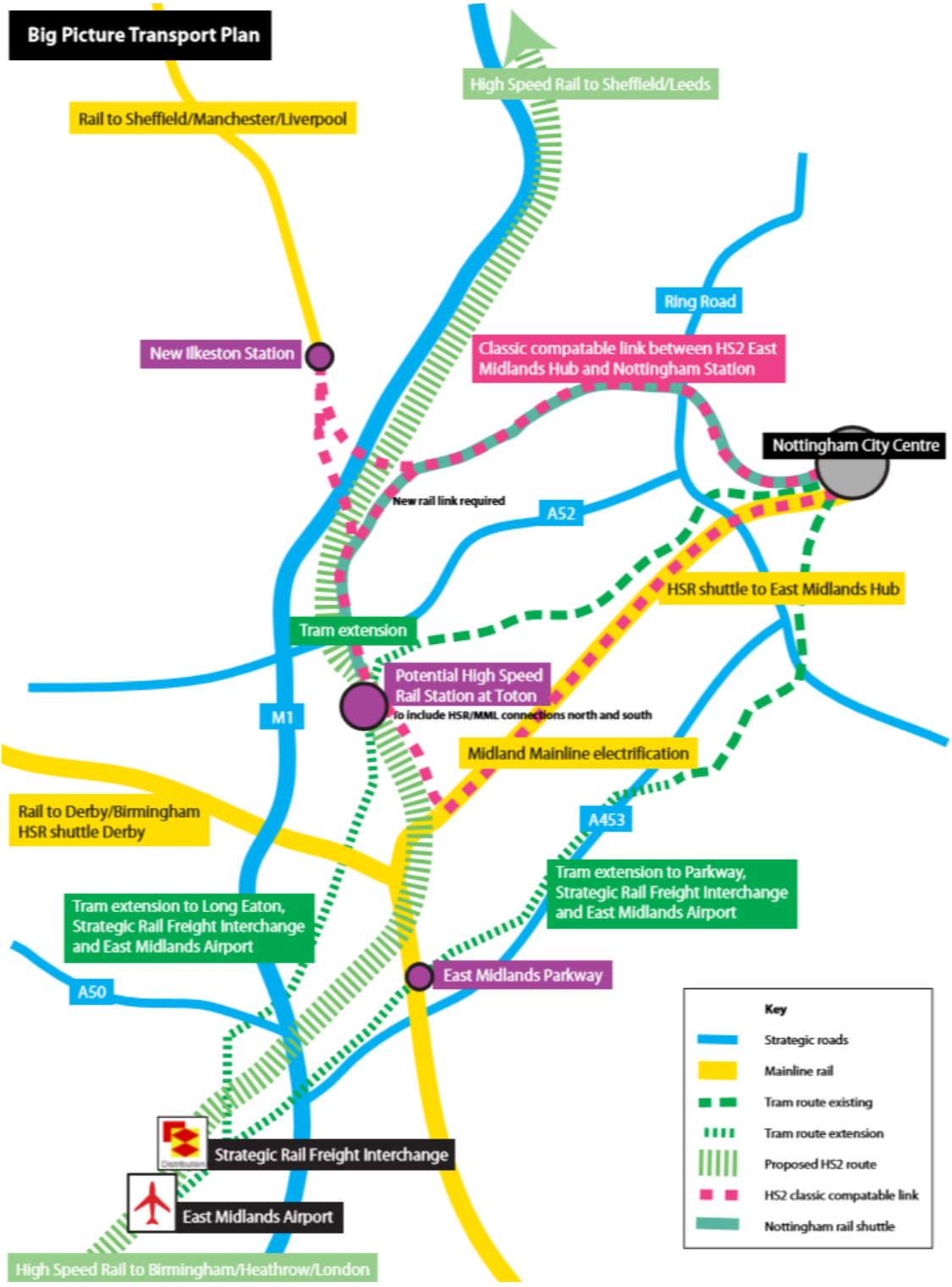
Connectivity to the wider Nottinghamshire and Derbyshire districts

8.19 The work that is being carried out by Network Rail will also be crucial in understanding how the benefits of the HS2 network and a hub station at Toton could be distributed to other parts of the D2N2 LEP. Once the second phase of HS2 is operational, the direct economic benefits are likely to be localised in the site at Toton, and to a lesser extent, to those locations where direct feeder services are planned – namely Nottingham and Derby.

8.20 However, depending on the final approach that Network Rail and the Government decide to use for released capacity – 'Do minimum', 'Incremental' or 'Integrated connectivity' – the benefits will differ. Indeed, the approach taken will determine the shape of transport connectivity within each of the affected regions. Within the D2N2 region, this would relate to the structure of the existing rail network – namely the Midland Mainline, Northern Rail and the NET2 tram network, as well as the road and bus networks.

8.21 The diagram below shows the Big Picture Transport Plan highlighting how the client thinks that HS2 should be connected into the local transport network. This shows complexity of enabling HS2 to be linked throughout the region and the importance of cohesive planning to ensure that this occurs.

Figure 19: Big Picture Transport Plan for linking HS2 into the local transport network (source: Nottingham City Council)



8.22 The relevance of the transport network within the D2N2 region and the East Midlands as a whole is that it will be one of the key determinants of how the indirect benefits are distributed across its districts. Specifically, this relates to connecting the region's population to the jobs that are created in those parts of the region that will directly benefit from the HS2 network.

8.23 Central to this will be the economic impact of HS2 on the cities of Nottingham and Derby, both in terms of job creation and, importantly, through the boost to worker productivity. Indeed, the evidence suggests that the districts around successful cities perform better than those close to less successful urban centres.

8.24 The indirect benefits could come through an increase in residents' income in the surrounding areas of major urban centres, as these residents are able to access higher value jobs in their nearest cities. Higher wages translate into more disposable income and spending in their home districts, thus boosting the local economy. Another indirect channel through which the local economies of these districts can be boosted is the expected rise in property values in the directly affects areas. This would increase the cost differential for businesses making it attractive for them to locate to other parts of the region, thus boosting employment prospects in these districts.

8.25 For example, in relation to the core cities, the most successful performer in terms of growth in Gross Value Added (GVA) per worker over the past ten years was Bristol. This is specifically in relation to growth of GVA per worker relative to the country as a whole. Bristol performed significantly better than the next best performing district of Sheffield. As shown in table 8, GVA per worker in Bristol and Sheffield grew by 51% and 41% respectively over the period 2001 to 2011 (the most recent data). These two cities were the only core cities that performed either as well as or better than the national average. Furthermore, the districts that surround these two cities saw faster employment growth and better performance in terms of earnings, compared to their counterparts in other parts of the country.

Table 8: City and wider region performance

	Best Performers		Worst Performers	
	Bristol	**Sheffield**	**Liverpool**	**Birmingham**
GVA per worker 2001 (£)	33,640	29,885	29,481	31,943
GVA per worker 2011 (£)	50,787	42,134	40,902	44,417
Percentage change in GVA per worker (%)	51	41	39	39
Growth relative to country average (1=average)	1.07	1.00	0.98	0.98
Employment growth in surrounding region from 2001 to 2011 (%)	***16***	***8***	***-4***	***-5***
Earnings growth in surrounding region from 2001 to 2011 (%)	***32***	***35***	***26***	***29***

Source: Office of National Statistics, Volterra calculations

8.26 Although it is difficult to establish a strong linkage between the performance of urban centres and their wider region, there is some evidence to support this assertion. For example, SQW and Cambridge Econometrics were jointly commissioned by DEFRA in 2006 to examine the economic performance of rural areas inside and outside of city regions. The findings were supportive of the role of city economies in their wider regional prosperity. The study found that the levels of earnings and productivity were 18% and 8% higher respectively in rural areas within

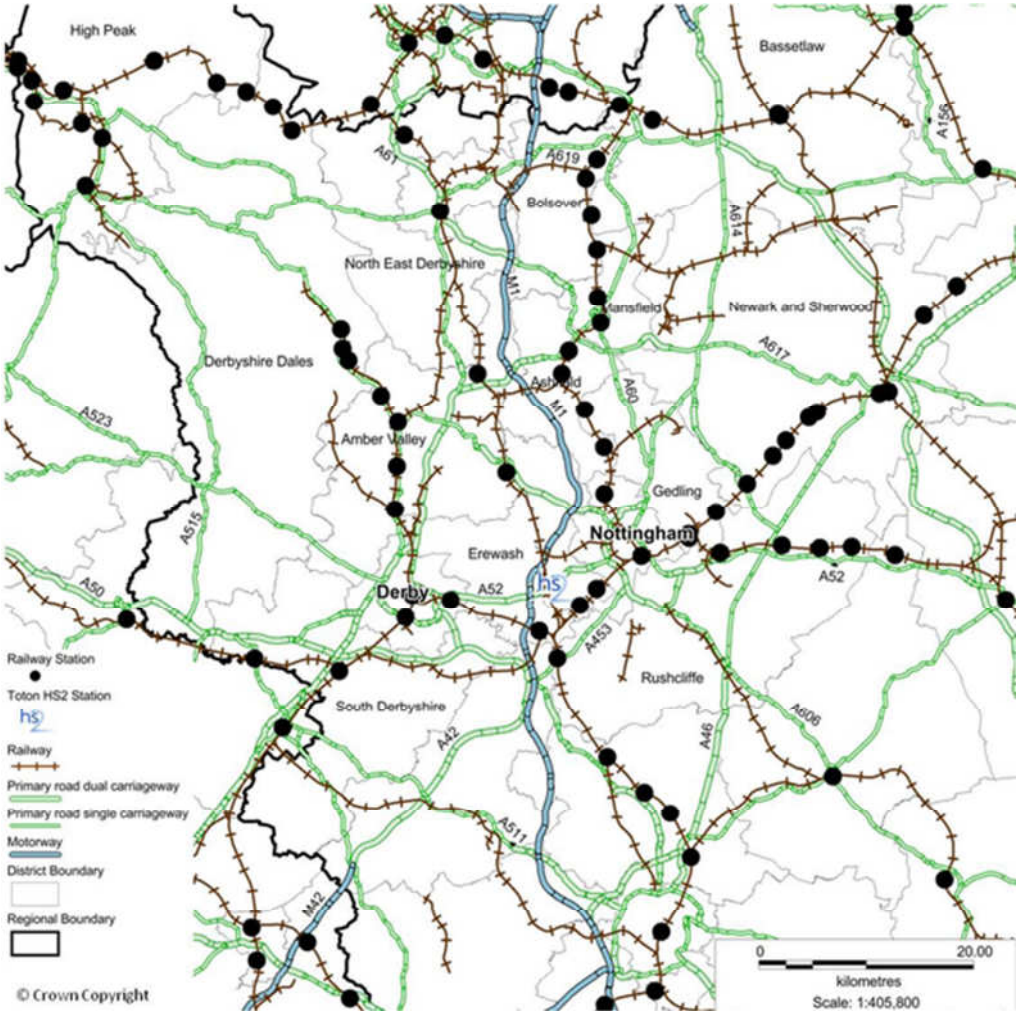
city regions than those outside of city regions. In addition, rural areas within two or more city regions generally performed better than those in only one.

8.27 The decision over the structure of the local transport network beyond HS2 should take into account a number of factors, including: the current transport infrastructure; the viability of serving areas; and, deprivation levels. As the Network Rail work on capacity release progresses, a more comprehensive local transport strategy could emerge. Its overarching objectives could be to provide faster and more frequent transport connections, and aim to address deprivation and low earnings in some parts of the D2N2 region.

8.28 In order to maximise the benefits accruing from the high speed rail station at Toton, it is necessary that there be a connection provided between the HSR network and the Midland Mainline. This would permit high speed trains to serve cities in the East Midlands; namely, Derby, Nottingham, Northampton and Leicester. Similar provision is being made to access Liverpool on the western route. The idea is compatible with Network Rail's integrated connectivity approach, or 'hub and feeder' model. East Midlands Council have commissioned Arup to undertake an assessment of this scenario.

8.29 The D2N2 region generally has an extensive transport network as shown in figure 20, which covers both the rail and road networks.

Figure 20: Road and rail network in the D2N2 (large black dots indicate railway station locations)



8.30 Importantly, the existing rail network is undergoing a number of major initiatives as mentioned earlier in this report, including electrification of the Midland Mainline, the extension of the NET2 tram network and the new railway station at Ilkeston. These projects should be aligned with the HS2 network where possible. In particular, the viability of extending the tram network to other parts of the region, such as Ilkeston and Long Eaton in Erewash, could be explored. It should also be noted that the northern parts of Derbyshire need to consider their options in relation to other parts of the HS2 network, such as the proposed stations in South Yorkshire and the Manchester region.

8.31 As the approach to released capacity emerges, the authorities that make up the D2N2 will need to consider how the transport infrastructure will impact on the economic vitality and development of the regions that are not directly served by the network. Specifically, this relates to the more densely populated parts of the D2N2 region and those that are deprived.

8.32 Of course, it will not be viable to serve every part of the region with heavy rail. However, there are opportunities to improve connections to some of the districts where sufficient passenger numbers make it viable. Table 9 provides some summary statistics on the ten most densely populated districts of the D2N2, including figures on employment and deprivation.

Table 9: Summary statistics for D2N2 districts

District	Population[4] (Persons)	Population Density (Persons/hectare)	Employment[5] (Persons)	Employment Density (Persons/hectare)	Economic Activity Rate (%)[6]	Claimant Count Rate (%)[7]	Indices of Multiple Deprivation (% of Lower Super Output Areas in bottom 25th percentile)[8]
Nottingham	308,700	41.4	200,312	26.8	69.2	6.2	61.9
Derby	250,600	32.1	121,329	15.5	78.3	4.8	33.3
Amber Valley	122,700	4.6	50,436	1.9	82.4	2.9	14.1
Ashfield	120,100	11.0	48,472	4.4	80.1	4.0	32.4
Newark and Sherwood	115,800	1.8	44,675	0.7	81.2	2.7	20.3
Gedling	114,100	9.5	30,455	2.5	83.2	3.4	6.5
Bassetlaw	113,200	1.8	45,960	0.7	82.0	3.2	34.3
Erewash	112,800	10.3	37,561	3.4	83.0	3.8	19.2
Rushcliffe	111,600	2.7	37,021	0.9	77.1	1.9	0.0
Broxtowe	110,700	13.8	37,551	4.7	79.2	3.1	6.8

8.33 The data in table 9 show that apart from Nottingham, Derby and Broxtowe (which will be directly served by HS2), there is an opportunity for regeneration in Amber Valley, Ashfield, Newark, Bassetlaw and Erewash. While some of these districts are currently served by the rail network, there is scope for improvement and direct connections to the HS2 network if the 'Integrated connectivity' approach is adopted by Network Rail. As discussed earlier in this

[4] Source: Mid-year Population Estimates, ONS (2012)
[5] Source: Business Register and Employment Survey, ONS (2012)
[6] Source: Annual Population survey, ONS (2012)
[7] Source: Claimant Count, ONS (2012)
[8] Source: Department for Communities and Local Government, Indices of Deprivation 2010

section, this should also be accompanied by investing in skills development as transport is only one part of the solution.

8.34 In addition, whilst having lower populations, other deprived districts such as Mansfield would also benefit from improved connections and skill development.

8.35 Overall, while the shape of the local and regional transport infrastructure beyond HS2 is not yet clear, it is important that a coordinated and integrated strategy emerges at the local authority and LEP levels over the course of the consultation period. This would help to cement the status of Toton as a regional transport hub that is capable of generating sufficient passenger numbers and thereby capable of boosting the economic prospects of the region as a whole. This will be a fundamental consideration on the part of Government as it fixes the HS2 route throughout its current consultation period.

9 Conclusions and Recommendations for Further Work

Key Findings

9.1 The station at Toton will offer significant benefits to the D2N2 and surrounding area. The table below summarises the benefits that we have quantified. Many of these are high level are should be viewed as illustrative but they provide an indication of the potential scale of benefits.

- Of the £70.9bn economic benefits estimated at the national level in the central case, we estimate that the benefits to the East Midlands region are around £5.4bn
- New work by HS2 looking into alternative methods of quantifying the benefits of HS2 concludes that it could support economic productivity uplifts of £15bn per annum nationally, of which £1.1bn-£2.2bn, would accrue to the Derby/Nottingham area. This amounts to a 2.2%-4.3% increase in local economic output in 2037.
- HS2 will increase labour connectivity by rail by 14.3% and business connectivity by 23.2% in the Derby/Nottingham area.
- Of the 89,000 FTE jobs estimated to be created nationally, we estimate that 13,350 jobs could be created in the East Midlands. These opportunities relate to the planning and design, construction, rolling stock, operation and maintenance, and renewals.
- These employment opportunities are worth an estimated £575m in annual economic benefits, which even using conservative assumptions would resilt in a 60 year NPV of over £7bn.
- Half of national employment in the manufacturing of rolling stock is within the East Midlands, meaning that it has a strategic advantage in this sector. Derby is a specific focus, with two thirds of the region's employment in this sector. We therefore believe that Derby could be particularly well placed to take advantage of job creation in this area, which could account for around 2,500 jobs in Derby. However it will be crucial to ensure training opportunities are available to make sure that the working population have the skills to take advantage of this opportunity.
- There exists limited evidence around the benefits of Staveley depot but initial research suggests that it could create around 80 FTE construction jobs and a further 500 FTE operational positions.
- There are considerable opportunities for development both around the Toton site and on other strategic sites nearby. We estimate that current plans for the Toton site could result in between 650 and 875 residential dwellings, and 2,800sqm to 19,800sqm of commercial floorspace which could accommodate up to 1,500 jobs, as well as 200 jobc during the construction phase.
- We estimate that other potential development, including those along the tram route, Stanton Iron Works in Ilkeston and the proposed Strategic Rail Freight Interchange near East Midlands airport, could deliver over 4,000 new homes and support over 10,000 new jobs, providing a significant boost to the local economy.

9.2 In addition to these benefits, the HS2 project is intended to transform the economic geography of the UK. Existing appraisal methods still do not capture the potential for the investment to catalyse a step change in economic fortunes and investment potential across the UK.

Strategies for maximising the benefits of HS2

9.3 Whilst the HS2 station at Toton offers great potential to deliver significant benefits to the local area, the investment is not a silver bullet nor a guarantee of such benefits, and there are a variety

of measures that we have identified that we believe will help to ensure that the area takes full advantage of the opportunities presented and maximises the benefits that it achieves.

Certainty about service patterns on released capacity

9.4 The initial analysis that has been carried out by the Government in relation to released capacity on the classic rail network has suggested that some of the current rail connections in the East Midlands will see a significantly reduced service level. The assumptions underpinning the HS2 economic case have direct services falling from 2 per hour to 1 per hour for Nottingham.

9.5 The reduction in direct service to Nottingham could deal a heavy blow to the city's economic development. Importantly, it would make the area less accessible, which would inevitably put off prospective businesses and enterprise, leading to a leakage within the local economy. Given that over half of the workers in Nottingham live outside of the city, the impact of a deterioration in its economy would be felt beyond the borders. This should be factored into the options assessment process.

9.6 The provisional service pattern has service levels being maintained at 2 per hour for Derby, however there is a risk that this could be reduced if the timetabling is revisited in the future. It is vital for the future connectivity of Nottingham and Derby, as well as other parts of the region such as Chesterfield, that the existing levels of service are at least maintained.

9.7 At this stage HS2 have confirmed that this is only a high level service pattern and one of several potential options for use of the released capacity. It is therefore important for the prosperity of the D2N2 area that policymakers continue to engage with HS2 to ensure that they are aware of the importance of maintaining existing levels of service.

9.8 It is crucial that a connection to the Midland Mainline, allowing classic compatible services to run onto Nottingham among other cities in the East Midlands region, be provided. This will be vital for ensuring that the benefits of HS2 are spread and maximised throughout the region. The sooner HS2 can make some firm commitments on the service patterns and retaining existing levels, the more certainty the area will have about its future connectivity.

9.9 As the approach to released capacity emerges, the authorities that make up the D2N2 will need to consider how the transport infrastructure will impact on the economic vitality and development of the regions that are not directly served by the network. Specifically, this relates to the more densely populated parts of the D2N2 region and those that are deprived.

9.10 Of course, it will not be viable to serve every part of the region with heavy rail. However, there will be opportunities to improve connections to some of the areas where sufficient passenger numbers make it viable.

9.11 Overall, while the shape of the local and regional transport infrastructure beyond HS2 is not yet clear, it is important that a coordinated and integrated strategy emerges at the local authority and LEP levels over the course of the consultation period. This would help to cement the status of Toton as a regional transport hub that is capable of generating sufficient passenger numbers and thereby capable of boosting the economic prospects of the region as a whole. This will be a fundamental consideration on the part of Government as it fixes the HS2 route throughout its current consultation period.

Importance of continued wider investment in transport

9.12 Building on this point about understanding how released capacity will be used to improve connectivity across the region, if the benefits of Toton are to be maximised across the region, then it is crucial that Toton is well connected to the economies around it, most notably the cities of Nottingham and Derby. If this does not occur then many of the potential benefits could be lost.

9.13 Already committed upgrading on the MML will deliver a reduction in journey times between London and Nottingham and London and Sheffield of 5 and 8 minutes respectively. According to the East Midlands Councils, the overall wider economic impacts on the East Midlands and South Yorkshire are estimated at £450 million. This highlights the benefits to the region and suggests that the region should strive to maintain service levels. Furthermore, electrification is expected to be complete by 2020, which means that the benefits will be realised earlier than those arising from HS2 and so this provides some certainty for individual users and businesses.

9.14 With this in mind, it is important that local policymakers continue to emphasise the importance of continued investment in other local transport investment. HS2 will not be operational until 2032, and between now and then, other crucial upgrades and investments will still be needed. In addition to this, other investments are needed to ensure that the wider region is linked to the Toton station so that benefits can be spread as widely as possible.

9.15 The relevance of the transport network within the D2N2 region and the East Midlands as a whole is that it will be one of the key determinants of how the indirect benefits are distributed across its districts. Specifically, this relates to connecting the region's population to the jobs that are created in those parts of the region that will directly benefit from the HS2 network.

9.16 Importantly, the existing rail network is undergoing a number of major initiatives as mentioned earlier in this report, including electrification of the Midland Mainline, the extension of the NET2 tram network and the new railway station at Ilkeston. These projects should be aligned with the HS2 network where possible. In particular, the viability of extending the tram network to other parts of the region, such as Ilkeston and Long Eaton in Erewash, could be explored. It should also be noted that the northern parts of Derbyshire need to consider their options in relation to other parts of the HS2 network, such as the proposed stations in South Yorkshire and the Manchester region.

Cross party geographical support

9.17 There is considerable positive support across the country, across parties and boundaries, for the investment in HS2. Ensuring that this cross party support is collaborative and integrated will be crucial to maximising the benefits of certain parts of the network. Toton is a particular example where the station is not located within one city and as a result it will impact across many boundaries. It is therefore important that all relevant areas have an integrated approach to how to facilitate the associated growth. It will be important that there is cross boundary support and collaborative working to ensure that everywhere within the region can benefit as much as possible from the station in Toton.

Certainty on progression of Phase 2 and Toton station will help attract investors

9.18 The more certainty there is around the fact that HS2 Phase 2 will happen, and that there will be a station at Toton, the more investors and developers can plan for the medium to long term. This will be important to securing early investment and particularly residential development ahead of the actual opening date of Toton and HS2.

Retain flexibility so as to enable plans to adapt as the future develops

9.19 Whilst certainty of service patterns and certainty of project delivery will help to reassure and attract investors, it is also important to walk a careful line between this and retaining flexibility so as to allow plans to continue to adapt in the future as the economy changes. This is true both from a planning perspective in terms of providing developers with flexibility to enable them to alter development proposals to fit with current market trends, but also for the use of capacity release, as travel patterns and demand may change in the future, thus meaning that slightly adapted service patterns would be better for supporting the local economy.

Importance of collaboration between planners, developers and officials

9.20 We believe that the most appropriate way to maximise the benefits at Toton will be to promote housing uses initially but not to the detriment of future commercial uses. In order to enable this growth to occur and to quickly respond to market needs, this requires a collaborative approach where planners work closely with developers to discuss and agree their development approaches and visions for the area.

9.21 Flexibility will be key – for example changing plans in Ebbsfleet will allow the developer to alter their plans to fit with current market conditions. The main implication for the proposed development at Toton is that the commencement of residential development in the vicinity of the HS2 station does not mean that other mixed uses will not be built in the future and official must remain flexible to ensure that this development is delivered as efficiently and productivity as possible.

Skills development

9.22 Derby is in an excellent position to take advantage of the high tech manufacturing jobs related to rolling stock. In order to maximise the benefits of the manufacturing of rolling stock and the potential depot at Staveley, however, it will be important to ensure that the local economy is well placed to train and upskill the relevant workforce in time for when the jobs come on-stream.

Recommendations for further work

Further analysis on the options for capacity release and the associated benefits

9.23 Network Rail should report on their options for capacity release strategies shortly. HS2 also continue to work on the options for how released capacity should be used. These recommendations are likely to be around the logistics of which routes should be served, frequencies and service patterns. Once there is more information available it would be sensible for the client to quantify its views on which of these options would offer better economic benefits for the region. We would suggest the following approach to this:

- Engage with HS2 and Network Rail to discuss options for released capacity service patterns.

- Quantify the economic benefits of these options to the region by considering commuter flows, productivity differentials and estimating local incomes and expenditure impacts.

Furthering the evidence base around step change impacts

9.24 The latest strategic case released by HS2 Ltd finally publicly acknowledges that the existing appraisal methods are not appropriate to capture the benefits of HS2. HS2 Ltd remain interested in novel approaches to estimating the transformational benefits of HS2 and have a work programme designed to further this research.

9.25 Whilst the KPMG approach is an interesting start, firstly it is being refined to hold other factors constant (skills etc), which is liable to reduce the estimated impacts and so should be viewed as illustrative at this stage, and secondly, it still does not allow for transport to attract net additional activity to the UK.

9.26 Policymakers are beginning to realise that in order to make informed decisions about large infrastructure investments such as HS2, we need a step change model to consider the potential for places to completely transform and future patterns of growth to look nothing like the past. We recommend continued work to further to evidence base in this area. Specifically for the D2N2 area, relevant aspects to be considered would include: how passenger growth in the future may outstrip the DfT's models and what distribution it might have; and how investment into the area could be net additional to the UK, and what this means for its economic value.

Further research into maximising the benefits of Staveley depot

9.27 This report provides some initial high level estimates of the job generation potential at the proposed Infrastructure Maintenance Depot at Staveley. However in order to understand the wider job creation and spin off opportunities associated with it, further research would be required. In order to ensure that the IMD proposition fits with wider regeneration aims for the area and to maximise its potential to get local unemployed people into work, improve opportunities and reduce deprivation, it would be sensible to undertake further analysis.