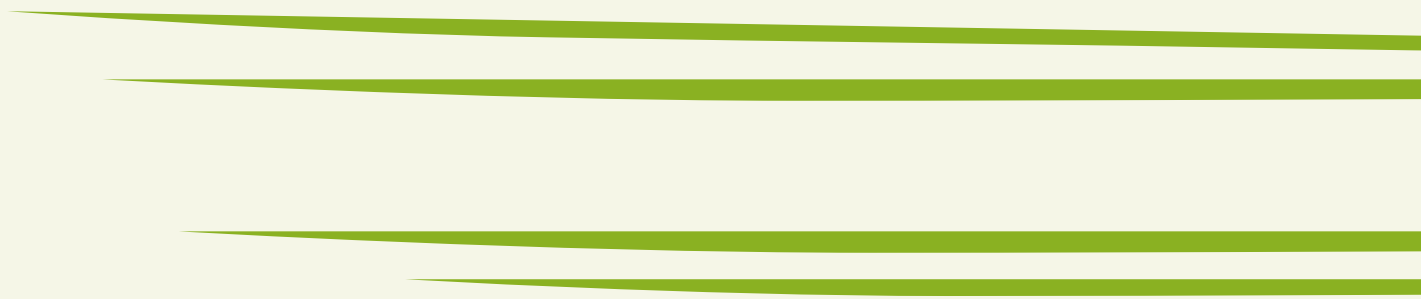


High Speed Two

A Greengauge 21 Proposition

June 2007





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Foreword

It is time for Ministers to press the start button on planning Britain's high-speed rail network. Not to do so would fly in the face of the advice from government advisers Sir Rod Eddington and Sir Nicholas Stern.

When questioned by the Transport Select Committee on 16 April 2007, Sir Rod explained that he thought high-speed rail using established technology had a key role to play in Britain and that planning should start now. The core message of Sir Nicholas Stern's report on carbon emissions is that the best economic result is to address the problem now: deferral will cost more. High-speed rail is one sure way to reduce carbon emissions by replacing a large proportion of domestic and short-haul European flights.

But what should a high-speed rail network look like – and what should be done next? In this report, we provide some answers. The next step – High Speed Two – is to build a line costing £11bn (present prices, with optimism bias adjustment) in the North West Corridor. It will connect the centre of London with the centre of Birmingham and with the North West. The development of this second high-speed line can be highly cost effective. It can attract private sector finance. It will complement and join High Speed One, which is opening to London St Pancras in Autumn 2007, and the wider benefits it will bring to the economy are immense. The additional capacity uplift it will provide for our major cities and their commuter routes is genuinely transformational. As described in this report, it would also give access to our key global gateway at Heathrow for the whole country.

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If capacity is the challenge, high-speed rail is the answer – not just for rail but across the transport modes: road, rail and air. This is how we can break out of the deadly embrace of congestion grid-lock. When account is taken of the recent, much higher than expected, growth in demand for rail, it is clear that the crunch will come soon enough. Notwithstanding the substantial improvements that can be wrought in the meantime by the use of longer trains on our existing network, capacity will run out just as soon as we could reasonably expect to have High-Speed Two up and running – if we start planning now.

This is not simply ‘another rail scheme’, but a means to support the development of the British economy in the decades ahead in a way that meets the wider sustainability challenge. It commands the support from all of those concerned about how the economy can continue to prosper while we face the strategic challenge posed by global warming.

*Greengauge21 is a
‘not for profit’ organisation
established to research
and develop the concept
of a high speed rail
network, and to promote
its implementation as a
national economic priority.*

Executive Summary

High Speed One, the UK's first complete high-speed railway line, opens to St Pancras International station in London in Autumn 2007. Before then, the Department of Transport will publish its 30-year rail strategy and highlight the critical challenges to be faced from the expected continuing growth in demand for rail travel which for ten years has out-paced growth on the road network.

Sir Rod Eddington clarified in April this year in front of the House of Commons Transport Select Committee that he believed – contrary to many interpretations of his influential report of December 2006 – that there was a role for high-speed rail in this country, provided it used proven technology. Moreover, he said that planning activity should start now.

But what would a second line, High Speed Two, look like, and what would it cost? Is it feasible at an affordable price and would it deliver wider benefits? How would it offer capacity gains that cannot be delivered through piecemeal investment on the existing network? These are the questions addressed in this report.

For a number of reasons, it is the North West Corridor that makes best sense for the next extension of high-speed rail in Britain. A high-speed railway between London and Birmingham, with links to the West Coast Main Line further north to link the North West, north Wales and Scotland, provided with direct connections using a spur into Heathrow airport, is what is needed to maximise value for money for High Speed Two. The total new route length, including the connections to the existing network and High Speed One, is 150 miles.

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Environmental impacts can be minimised by following existing railways and motorways. Costs per route mile are much lower than on High Speed One, and costs total £6.6bn, or £11.0bn with a 66% optimism bias adjustment for High Speed Two.¹

High Speed Two comprises a new fully segregated 300 km/h alignment linking the existing international High Speed One stations of St Pancras and Stratford International with Birmingham and the four-tracked Trent Valley section of the West Coast Main Line for services to the North West and Scotland, and has a connection into Heathrow Airport for direct high-speed services both from within Britain and from the near-continent. A candidate route (using the M40 and Chiltern railway corridors) is outlined in the report and has been used as the basis of the costings, but other corridors are available and would need to be tested through detailed studies and a full consultation programme. The Greengauge 21 route uses existing surface rail corridors to access urban areas, avoiding both disruption and costly tunnelling. New high-speed line stations would be required at Birmingham city centre (the refurbished but substantially unused Moor Street terminating platforms are one possibility), Birmingham International and at Heathrow.

A key feature of High Speed Two as proposed here is that it not only supports the operation of longer distance high-speed services, but also regional express services, broadening the spread of its benefits.

In this report, the key questions that have been raised about the wisdom of proceeding further with high-speed rail in Britain are answered. A new north-south high-speed railway has already been demonstrated to be better value for money than alternative approaches. High Speed Two has the potential to make a significant improvement to links between the south and the north of the country, redressing economic imbalances. It can form part of an environmentally sustainable transport sector by displacing wasteful and carbon-damaging short-haul air trips and by providing an alternative to the road network should national road pricing become a reality.

The planning and design of High Speed Two in the North West Corridor needs to start now.

¹In 2007 prices, using High Speed One contract prices applied to the Greengauge 21 candidate design concept for High Speed Two. Government appraisals are obligated to add an optimism bias adjustment of 66% at the early stage of projects to avoid the likelihood of cost overrun.

The benefits of High Speed Two

Fast, reliable, safe journeys between the major cities in the North West Corridor and London

The release of capacity on the overcrowded West Coast Main Line between the West Midlands and London, allowing an expansion of commuter services to the major growth areas of Milton Keynes/South Midlands and more rail freight, reducing lorry

Extension of Eurostar services to Birmingham and Manchester

Introduction of a network of high-speed trains to a new surface transport hub at Heathrow, eliminating the need for carbon-inefficient flights to Manchester, Paris, Brussels, etc.

Release of capacity for local & regional services in the Birmingham – Coventry corridor and at New Street

Reduced demand for motorway travel with an easing of congestion on the national motorway network

High quality access to the major global gateway for business travel at Heathrow, extended across the nation

Faster links for Glasgow and Edinburgh to London, with 3h45 journey times, and a reduction to 3h00 as further improvements are incorporated (including from a speed-up of the Scottish domestic network)

The creation of a cross-London regional express network building on the Javelin service and connecting in key regional centres in the wider south east (Oxford, Milton Keynes)

The introduction of a set of services radiating from Heathrow to Bedford, Milton Keynes, Oxford (and locations further west such as Bristol and Cardiff as/when existing lines are electrified)

The introduction of international services at Stratford (without slowing down Eurostar's St Pancras services)

A speed up of longer distance services from the wider South East (Gatwick, Southampton and Reading) to the North West and Scotland

A major stimulus to the renaissance and further regeneration of the cities of the Midlands, the North and Scotland

The basis for future extension to serve the 'Eastern Corridor' with high-speed rail at a later date

1

Introduction

Decision time on the future of our national transport systems is fast approaching. Rapid demand growth on rail (up 10% year-on-year despite unpopular fares rises) is continuing into 2007. We have growing congestion on our roads and at airports and a growing realisation that transport cannot be excluded from the measures needed to tackle global warming. It all makes this summer's expected White Paper on longer term rail strategy hugely important.

In January 2006, Greengauge 21 published its Manifesto for high-speed rail in Britain, seeking to prompt a serious debate. The publication of the Eddington Transport Report in December 2006 led many to conclude that this long-awaited report was dismissive of high-speed rail. But, as Sir Rod made clear to the Transport Select Committee in April 2007, this was not the case.

Sir Rod Eddington is dismissive of the new technology system MAGLEV, but he is clear that high-speed rail using the proven technology that has been deployed across Europe and in Asia does have a role to play in Britain. Indeed, in answering the Select Committee's questions, he was even clear on the route that should be adopted and suggested that planning work on it should start now.

Over the last 18 months, something of a consensus has emerged, at least on the most likely candidate for High Speed Two. This would be a North West Corridor route connecting central London (and High Speed One) with Birmingham and the North West. Greengauge 21 believes that it is very important that the route is developed in such a way that it can also serve Heathrow Airport. With Open Skies now agreed, Heathrow's role as the leading international gateway in Britain will be reinforced: the country as a whole needs fast links to it. Heathrow's value can be enhanced by having high-speed rail fulfil the role currently provided by wasteful, environmentally damaging short-haul flights, from the near-continent as well as from the northern half of Britain.

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So, how can this be achieved – and what might it cost? What wider benefits might it bring? And when is it needed, given that the policy thrust of greatest concern to Ministers is likely to be the need for transport capacity to help grow the economy sustainably?

None of the detailed studies needed to give final and definitive answers to these questions have yet been carried out. But it is possible to show what High Speed Two might look like and what it might cost now. This is the purpose of this report from Greengauge 21: to illustrate the option in front of us on high-speed rail.

Two points need to be flagged at the outset.

Whatever is shown here will be certain to change at least in detail as studies get under way and consultation is carried out with all interested parties. This is an illustration of just one way which High Speed Two might be crafted. It may not turn out to be the best once detailed analyses are carried out. But the purpose in offering it now is not to attempt to pre-empt decision-making on plans and alignments, but to answer the strategic questions on its potential costs and value.

The second point is this. Britain needs a clearly joined-up transport strategy that is responsive to its growth expectations, to our changing view on environmental matters and a strategy that addresses matters of social policy too. Greengauge 21 sees a need for a small network of high-speed lines so that carbon emissions from the transport sector can be minimised even in a growing economy. In the longer term, that means providing north-south capacity by high-speed rail to both the western and eastern sides of the country and ensuring that all of the English regions, and Wales and Scotland, benefit from it. Nevertheless, the focus here is on the next step: High Speed Two.

2

What would High Speed Two look like?

The successful development of a second high-speed line in Britain rests on having clarity of objectives. We believe that, following the Eddington Transport Study, it is clear that investment should be prioritised to support the growth of the economy in the most sustainable way through providing effective links within and between the successful and expanding city regions, and between them and the key international gateways.

The specific objectives of high-speed rail in Britain can therefore be identified as being:

- to provide additional capacity for travel between the UK's city regions;
- to provide effective links between the city regions and the international gateways;
- to improve the long term sustainability of the UK transport system;
- to facilitate sustainable development of all the UK's regions.

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The pattern of growth in Britain is a key factor determining where the greatest pressure will arise on our transport networks. This will influence investment priorities in the provision of additional capacity. As we know, this growth pattern is uneven, with greatest pressures being felt in London and the wider South East. High-speed rail offers a unique way to address the challenge this creates:

- It offers the means to achieve a step-change in commuting capacity into London from the prime growth areas of the home counties. It does this by providing the capacity to operate new longer distance commuter services into central London (as planned for Kent with the Javelin fleet) and by the huge release of line capacity on the existing main lines it will parallel, as the current 'InterCity' services are superseded
- It provides an accessibility boost to the major city regions it serves, providing a dynamic and sustainable stimulus to commercial development outside the wider South East. This benefits the major city regions of the Midlands, the North and Scotland, adding to the attractiveness of development in what are now seen as peripheral locations. This in turn will have the effect of easing demand pressures in the South East.

There is a further capacity advantage. High-speed lines would all be built to a larger (European) loading gauge, allowing the operation of full-size bi-level trains (and the Alstom Duplex train in daily high-speed operation in France exploits this facility). This offers much needed flexibility to accommodate growth, achieving a 40% uplift when train fleets are replaced, with no associated infrastructure costs.

It is not practical to seek to connect all of the major city regions with a single line. High Speed Two cannot simultaneously link the cities of London, Birmingham, Manchester, Nottingham, Sheffield, Leeds, Newcastle, Glasgow, Edinburgh, Bristol and Cardiff. Priorities have to be set, and in the view of Greengauge 21, preferably within a strategic, multi-modal, framework.

The priorities need to be based on a business case analysis of the options available. It makes sense to have High Speed Two provide the best return possible from a single high-speed line. For various reasons, this points towards a route from London to the West Midlands and North West as a priority. These reasons are:

- The North West Corridor is likely to experience the greatest pressure across the rail network over the next 15-20 years
- It offers the opportunity to achieve the greatest immediate add-on benefit from the extension of Eurostar services
- It connects the two biggest English city regions to the capital and also confers benefits for both Scotland and Wales
- It provides the best means of combining in a single development new capacity to both central London and Heathrow
- It offers the prospect of a significant reduction in the demand for carbon-inefficient short-haul domestic and near-continent airline services
- Once developed, the options to extend high-speed services further north through a suitably optimised programme of upgrade to existing lines can add further benefit
- It can be developed in such a way that use can be made of existing and underused or soon-to-be redundant high-speed passenger station capacity and depot facilities in London, keeping its costs down
- It can be developed in a way that benefits destinations over an east-west axis, through new direct links to Heathrow
- Once developed, it can offer the capability for access from a subsequent 'Eastern Corridor' high-speed line ('High Speed Three') to access Heathrow as well as central London.

No other corridor offers these strategic advantages.

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These advantages are reflected in the specification for High Speed Two developed by Greengauge 21 and set out below. A specific alignment, which of course will have to be the subject of detailed studies and widespread consultation, can then be developed to meet this specification, with appropriate consideration of all the key issues.

Greengauge 21 has examined a sample candidate solution in terms of a specific route, in order to provide a costing, to test its compatibility with other projects and its feasibility and to assess its strategic environmental effects.

3

Where would High Speed Two go?

Specification for High Speed Two

In detail, to fulfil the objectives identified, High Speed Two is required to:

- Connect the stations at St Pancras and Stratford International with the centre of Birmingham and with the capacity-enhanced (four tracked, Trent Valley) section of the West Coast Main Line with a fully segregated route, capable of generally supporting 300km/h high-speed operation
- From the route thereby created, provide in each direction for direct interchange-free access to Heathrow Airport capable of supporting high-speed services both to High Speed One and to the locations served by High Speed Two.

While there are several ways in which this specification could be met, conceptually High Speed Two could take the form illustrated in Figure 1.

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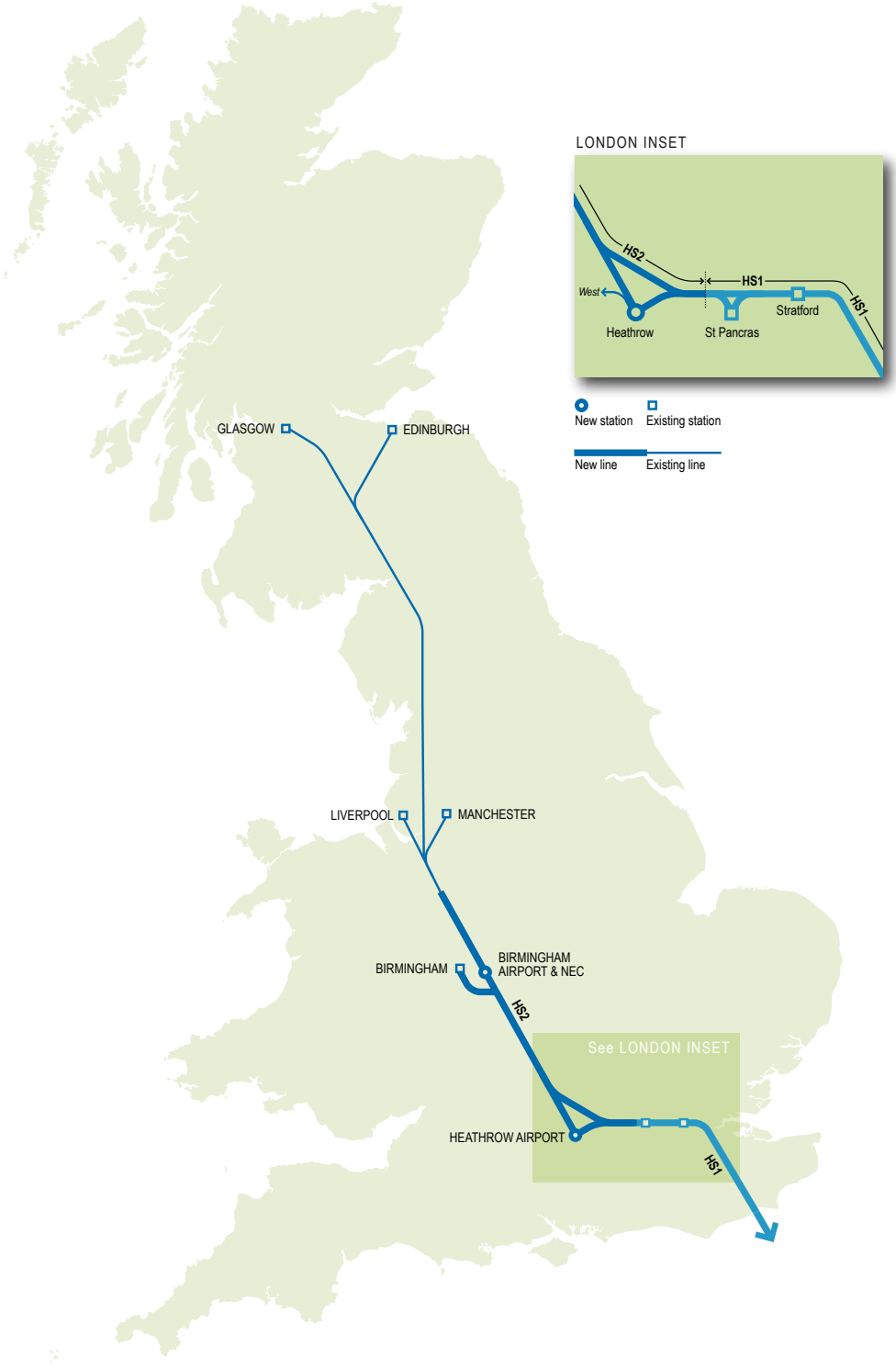


Figure 1 High Speed Two Network

This would support a pattern of new high-speed services as follows:

- London – Birmingham
- London – Manchester
- London – Liverpool/Preston/Carlisle
- London – Glasgow/Edinburgh
- Birmingham/Manchester – Paris/Brussels/Amsterdam
- Heathrow – Paris/Brussels/Amsterdam
- Heathrow – Birmingham
- Heathrow – Manchester
- Heathrow – Glasgow/Edinburgh

These services are illustrated in Figure 2.

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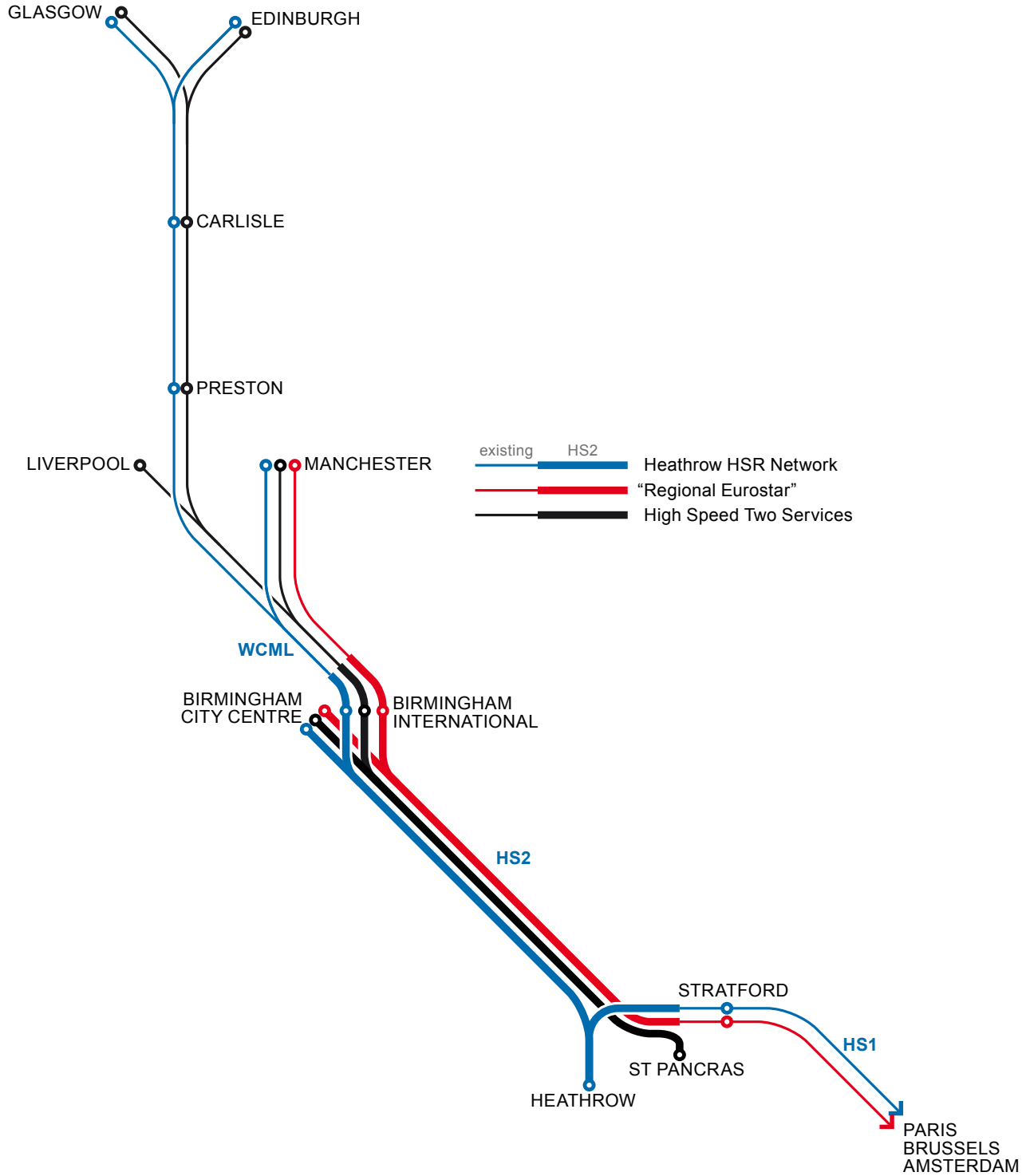


Figure 2 High Speed Train Services with HS2

Greengauge 21: Candidate Design for High Speed Two

The following scheme is one of several concepts that would meet the specification for High Speed Two.

There are several existing transport corridors between London and Birmingham – the M1, the West Coast Main Line, the M40 and the Chiltern Line. There is also the disused track-bed of the Great Central Railway available for some of the route. Each of these corridors, separately or (more likely) in combination could support an effective design for High Speed Two. The candidate scheme described here follows a combination of the Chiltern and M40 alignments to seek an overall optimum for a route that also serves Heathrow efficiently. It minimises adverse environmental impacts by maximising the use of existing transport corridors. The only new high-speed stations to be provided would be in the centre of Birmingham (where an existing station can be readily adapted and extended), at Birmingham International/National Exhibition Centre and at Heathrow (the latter two requiring new stations).

The scheme makes very extensive use of existing surface rail corridors to access urban areas, avoiding disruptive and extensive tunnelling work. Greengauge 21 has been able to draw on the conclusions of work it commissioned from Lloyd's Register Rail, who examined the feasibility of this design philosophy.

The new route would be built to a larger gauge allowing the operation of bi-level (duplex) trains as needed. Environmental standards would match those developed for High Speed One.

The route would connect into High Speed One immediately north of St Pancras, so that services could operate over High Speed Two from either St Pancras International or High Speed One (Stratford, Ebbsfleet Parkway, Ashford and continental Europe). Connections into Euston are also provided, as an alternative central London destination for domestic high-speed trains.

It would proceed westwards with an upgrade to existing lines to join, initially and briefly, the WCML corridor. It would then proceed in a new tunnel to near the North Pole Eurostar depot into which a new connection would be provided.

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It would then follow the largely unused track-bed of the former Great Western Main Line alongside the Central Line of London Underground. A delta junction in the Northolt area would be provided for a tunnelled access route to Heathrow.

The line would follow the existing Chiltern Line and M40, with a tunnelled section under the railway alignment through High Wycombe. It would incorporate the existing Chiltern Line north of Princes Risborough to a point south of Banbury where it would follow the M40 motorway north westwards. Then, west of Warwick, where the motorway and existing rail lines come alongside one another, the new line would switch to follow a northwards alignment, adjacent to the M42 motorway passing east of Birmingham and with a new high-speed station provided at Birmingham International Airport/ National Exhibition Centre. Extension of this route north westwards would culminate in a connection to the four track section of the West Coast Main Line.

A branch from the new line would follow the existing Chiltern route into central Birmingham, making use of a redundant four track right-of-way to create a fully segregated route.

Thus, while high-speed services would not traverse central Birmingham (a requirement which would give rise to the need for a through station, built underground at costs that have been estimated elsewhere at around £1bn), Birmingham International would offer high-speed services northwards as well as southwards from the Midlands, and Birmingham city centre would have a direct, non-stop link to central London, to Heathrow and, via High Speed One, to Europe (Paris, Brussels etc).

Connections would be provided to the existing railway in the vicinity of Princes Risborough (and possibly Bicester) and Banbury to facilitate further new services and to ensure that the areas through which the new line passed would experience better services too. Some enhancements to existing lines would also be needed.

Wider Service Opportunities

In addition to the pattern of new services that High Speed Two would support shown in figure 2, this candidate design solution identified by Greengauge 21 would provide for a set of regional express services, extending the Javelin train service on High Speed One as follows:

- North/East Kent – Stratford – Heathrow
- North/East Kent – Stratford – Oxford/Milton Keynes

The Milton Keynes and Oxford services would use the East West Rail link currently being advanced by local and regional authorities as a priority to serve the Sustainable Communities growth areas. Connection to Bicester and Oxford requires either a new connection in the Bicester area or an upgrade of the Princes Risborough – Aylesbury route as well². These lines would need to be electrified. The high-speed cross-London regional express network is illustrated in Figure 3.

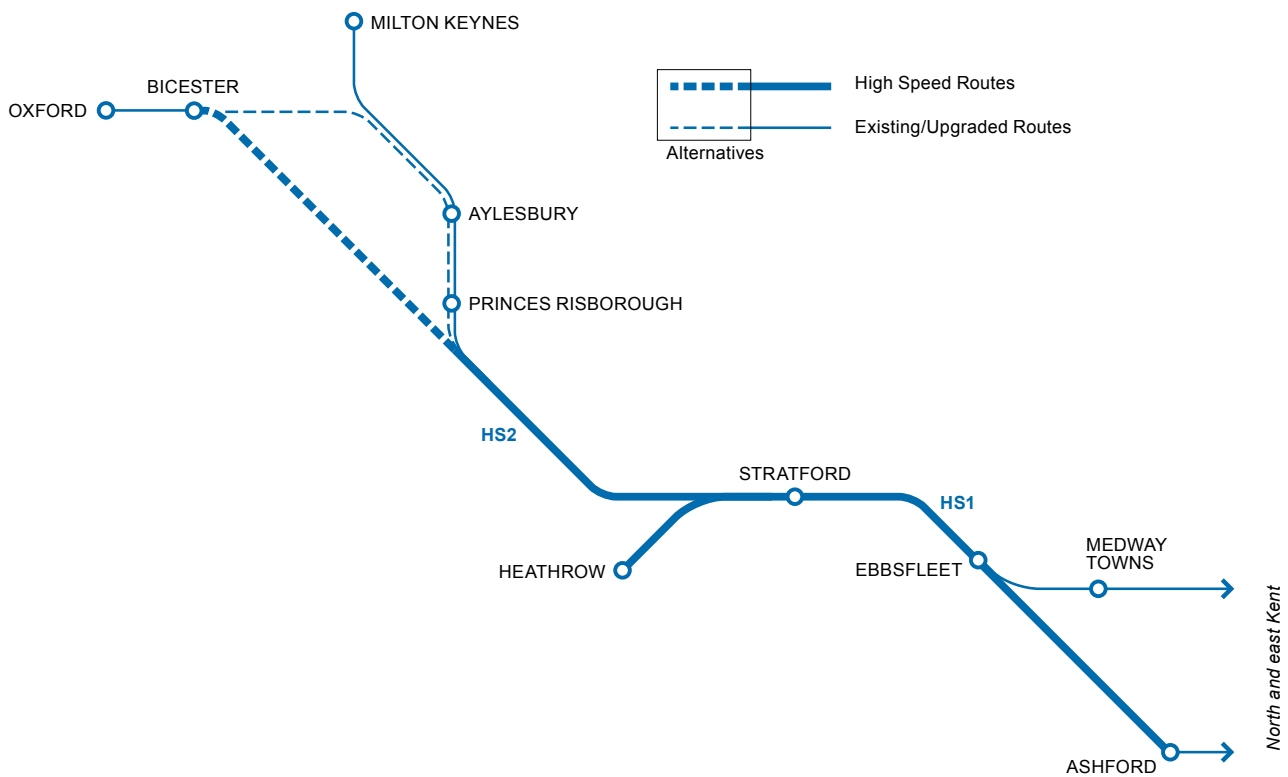


Figure 3 A Regional High Speed Network for the Wider South East

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Furthermore, there would be scope, with appropriate electrification of existing lines, to extend several other services over the new high-speed line such as:

- Bournemouth/Southampton/Gatwick/Oxford – Birmingham International – North West
- Coventry/Leamington/Banbury/ – St Pancras (or Euston)
- Cardiff/Bristol – Oxford – Heathrow
- Milton Keynes/Bedford - Heathrow.

The first and second of these would have the benefit of a faster journey. The third category would not necessarily be faster than a trip with an interchange at Paddington, but would offer the overwhelming advantage of a direct, single seat, journey from a very wide range of locations in the South West and South Wales to Heathrow. It would also achieve this without adding to the constraints on operations through Reading. This group of service opportunities is illustrated in Figure 4.

High Speed Two creates the means to free up capacity on existing railway lines. It will be possible to intensify local and regional services on the following key routes:

- The southern section of the West Coast Main Line (Rugby – London)
- The Chiltern Line into Marylebone
- The Coventry – Birmingham corridor
- Banbury – Leamington – Coventry.

It will also free up capacity for additional freight services on the busiest route in the country (the West Coast Main Line) as well as on the Southampton – West Midlands corridor.

² These routes are currently the subject of a proposal to introduce passenger services to support the very high levels of growth expected in the area.

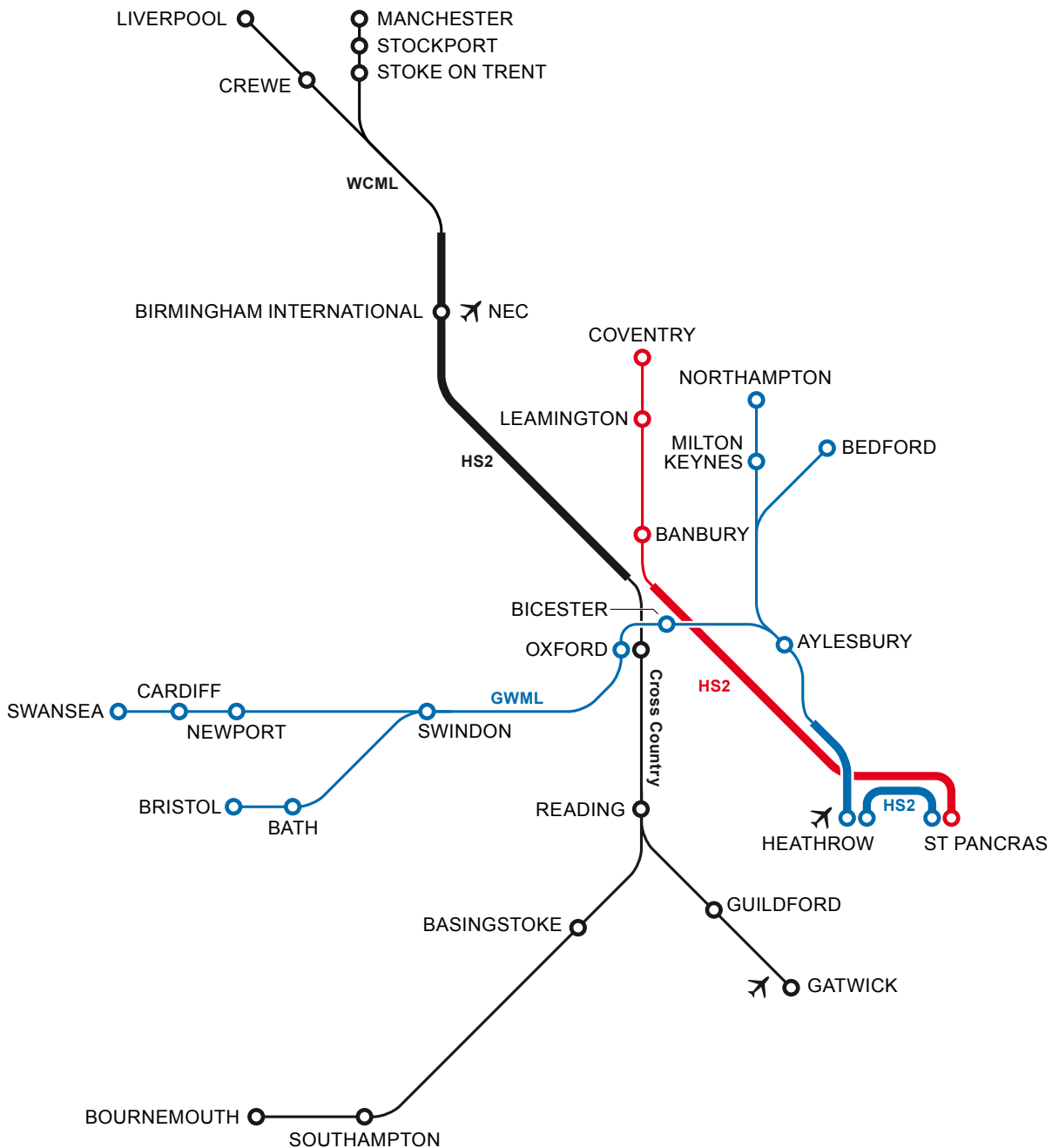


Figure 4 Illustrative Wider Service Network Opportunities for High Speed Two

4 *What would be the benefits of High Speed Two?*

High Speed Two, as described here, brings a very wide set of benefits across the country:

- For the West Midlands, the North West and Scotland, it provides new capacity for very fast and reliable journeys to London, which will bring direct improvements in productivity and a boost to regeneration and development in the city regions;
- For London, High Speed Two provides an important cross-London link, with fast, non-stop travel between Heathrow and central London;
- For travellers from Birmingham and Manchester, direct international services to Paris, Brussels and Amsterdam will be available;
- For Stratford in east London, regular international services and direct connections to Heathrow would boost current regeneration efforts;
- For the rail industry, there will be benefits from higher safety standards and a step-change in the quality of service that can be offered;
- For the wider South East, High Speed Two provides a range of new journey opportunities: a high-quality cross-London express network, with the Javelin fleet operating express commuter services over High Speed One from Kent and cross-country connections from Southampton, Gatwick, Reading and Oxford to the Midlands and the North;

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- For users of the existing railway network, particularly the West Coast Main Line and the Chiltern line, High Speed Two releases capacity for more intense local and regional services;
- For air travellers, it provides an alternative to environmentally-damaging short-haul domestic and European flights, and provides direct surface access to Heathrow from the Midlands, the wider south-east and from the west for long-haul flights. It would be an excellent complement to the Airtrack scheme, allowing the transformation of Heathrow into a surface transport hub;
- For the UK, there would be system-wide benefits from a modal switch towards the railway, relieving pressures for development on motorways and airports and resulting in lower overall carbon emissions from the transport sector.

Journeys in the North West Corridor from London to the major centres in the West Midlands the North West and Scotland will be 30 minutes quicker than on the existing upgraded West Coast route and very much more reliable. Journey times to and from Heathrow will offer substantial journey time savings of an hour or more, from places such as Birmingham and Manchester.

5 What will the scheme cost?

The capital costs of the Greengauge 21 conceptual design for High Speed Two, using the outturn costs of High Speed One as a guide, in 2007 prices, are:

- London – Birmingham £4.262bn
- Connection to the West Coast Main Line (Trent Valley section) via Birmingham International (NEC/Airport) £1.204bn
- Heathrow branch (both directions), new station at Terminal 5 £1.176bn.

The total cost of High Speed Two is therefore £6.642bn in 2007 prices. This includes:

- All engineering costs, including for new stations at Heathrow and Birmingham International, and an upgrade to Moor Street Terminus in Birmingham
- Consequential costs on the existing railway, and new connections to it
- Depot connection (North Pole)
- Land acquisition and compensation
- All overheads, including design and project management.

It does not include rolling stock capital costs, nor optimism bias adjustment.

With a 66% optimism bias allowance, project costs would be £11.0bn for the full High Speed Two scheme or £7.1bn for the 110 mile London – Birmingham route.

6

How does this fit with future development of the high-speed network?

Reference has been made already to the attraction of a further high-speed route in due course to serve the eastern side of the country as part of a strategy for high-speed rail. Such a line should allow, together with High Speed Two, all the English core cities as well as Cardiff, Glasgow and Edinburgh to gain from high-speed rail.

An Eastern Corridor north-south high-speed line could be developed from High Speed One+Two in several ways. One approach would be an add-on to the High Speed Two alignment at Birmingham International from which an extension to Derby, Sheffield, Leeds and the North East can be readily configured. This may overload the core High Speed Two route however, and an alternative and potentially better approach (remembering the primacy of the capacity objective) would involve the creation of a parallel eastern line into London. As with High Speed Two, this might follow an existing surface access right of way to contain capital costs. If it is configured to maximise capacity benefit in the South East, it may well make sense, Greengauge 21 believes, to provide a new facility that links London with Stansted Airport and Cambridge, offering capacity relief to both the East Coast Main Line and the West Anglia route into London, as the southern part of an alignment that can then be projected northwards to the East Midlands, Yorkshire/Humber and the North East.

Such a route would create the opportunity to use, at least on a limited basis, the connection from the Lea Valley into High Speed One at Stratford, so that services from Scotland, the North East, East Midlands and Stansted could access Heathrow directly using the link that High Speed Two provides across London.

7 *How can it be delivered?*

Phasing

The London – Birmingham section, costing £7.1bn, could represent a first phase of High Speed Two. Like High Speed One, it is possible to break its construction down into sections. The two further sections (to Heathrow and onwards to West Coast Main Line) could be added subsequently. There are other permutations possible: a more modest extension from High Speed One to Heathrow could be built first; a connecting route to the West Coast Main Line could precede the route into central Birmingham.

Whichever way the project is phased, demand projections carried out to support the Eddington review show that substantial new rail capacity is needed within the next 10-15 years. Given the long lead times for planning, consultation, design, construction and testing, it could be expected to take 15 years before the first phase is operational. Work must clearly start now, as highlighted by Sir Rod Eddington in his evidence to the Transport Select Committee.

It would be easy to miss the urgency of the situation and it would be a mistake, in Greengauge 21's view, to vacillate. There is, after all, a solid body of evidence on the case for high-speed rail carefully put together in the period 2001-3³. Moreover, demand projections that fail to take into account the strong upsurge in rail carryings in 2006 that have continued into 2007 will seriously underestimate the scale of the capacity crisis rapidly approaching. With current annual growth rates of 10%, the starting point for assessing capacity needs has to be shifted upwards, even if a more typical 3-4% growth is assumed over the longer term.

³ See DfT website for a summary of the work by Atkins et al. The Eddington Transport Study provides some further assessment including in appraisal results released in response to Freedom of Information requests.

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Often the least risky approach for government is to 'wait and see'. This cannot be the prudent approach here, where there are no other sustainable plans to provide a meaningful increase in national transport network capacity, and where the evidence points to transport movement becoming a drag on economic growth if nothing is done.

Financing

Based on experience from Europe, financing High Speed Two should not be a problem. There is significant commercial value in high-speed rail, which means that it is possible to use the private sector finance route to inject equity and finance into the project, unlike with other rail infrastructure investments. This would allow public sector funding to be spread over a 20-30 year time-span and would also allow the scheme to stay off the Government's balance sheet. It has been demonstrated that there is plenty of market appetite for private sector financing of high-speed rail schemes, based on PPP and PFI models – there are two PPPs for high-speed rail underway in France, for example.

Moreover, there are opportunities to develop a transport strategy with road pricing at its core, integrated with development of the railway network. While decisions have yet to be made on how to use any funds generated by road user charging, associating these funds with significant improvements in the rail network would clearly improve the public acceptability of a road pricing strategy. It is also notable that the long distance intercity sector will over the next decade yield substantial franchise premia for the government, a powerful signal of the commercial value of this sector.

Next steps

Taking forward High Speed Two will be a significant undertaking. It will involve consultation across the country with local and regional government, businesses, passenger groups, environmental bodies, the railway industry and the public – consultation both on the concepts outlined here and at a later stage on the proposed design and alignment.

To establish a proposed design for High Speed Two will require further development of a shortlist of candidate routes, not only the one outlined here by Greengauge 21, but other routes that might have different advantages. This work will need to be informed by detailed feasibility analysis to establish the economic and environmental impacts of the specific scheme before applications for legal powers can be made.

8

Conclusions

We sought, through the Manifesto released in January 2006, to stimulate a sensible debate on high-speed rail in Britain. This report has built on the principles set out in the Manifesto to illustrate what a 'next step' might look like, as High Speed One – the Channel Tunnel Rail Link - nears completion.

At the annual RAIL conference held in March 2006, rail industry delegates only narrowly voted in favour of proceeding with high-speed rail. A year later, a clear majority agreed it was the right way forward. In the interim, several factors have combined to drive forward this consensus:

- Growth in rail use has accelerated, creating what are now generally recognised to be pressures that will not be met through incremental change alone. Moreover, high-speed rail is increasingly understood to be a means to address capacity short-falls
- Our friends at SNCF in France have demonstrated that while MAGLEV has its proponents, 'conventional' high-speed rail, conceived as an evolutionary development of existing rail technologies, is capable of seriously high speeds: this year, a speed of 365 miles/hour was achieved. In service, 200 miles/hour is becoming the new standard
- The continuing good progress with High Speed One, with the splendid new terminal at St Pancras and the construction of the Javelin fleet is bringing home the reality of high-speed rail in Britain and begging the question: do we stop here?

High Speed Two

A Greengauge 21 Proposition

But there have been doubters. Sir Rod Eddington's Transport Report published in December 2006 was widely misunderstood as being hostile to high-speed rail, a misconception only put right five months later when Sir Rod was cross-examined by the House of Commons Transport Select Committee.

Others have noted the successes abroad with high-speed rail but have put forward various arguments against proceeding with its development in the UK:

(a) It's too late for Britain to start now.

Starting now, High Speed Two could be up and running by (say) 2022. There are measures available to sustain the expansion of rail capacity in the interim. But it is right to say that we really cannot afford to wait any longer given a realistic view of project lead times

(b) High-speed rail costs in Britain are much higher than elsewhere, making it a financial non-starter.

We have shown that a substantial High Speed Two, if costed at the rates applicable to High Speed One, inflated to current construction price levels and made subject to H.M. Treasury's 66% 'optimism bias, would cost around £11.0bn. This is much better value because High Speed Two can use the High Speed One assets in the London area, as described in the report, and prudent design avoids the need for extensive new station construction (High Speed One, by way of contrast, has four new stations over a 70 mile route length).

(c) The wider benefits often attributed to high-speed rail cannot be proven and may not materialise in Britain

The wider benefits that high-speed rail brings are very substantial indeed, if calculated using the Department for Transport's new methodology for calculating agglomeration benefits. A project that provides the scale of transport travel time and travel punctuality benefits, for business, tourism and other travel sectors, is precisely the type of project that scores heavily in improving national economic competitiveness. As described here, High Speed Two will also bring much needed commuter and railfreight capacity.

(d) High-speed equates to high energy use and therefore, in a post-Stern world, makes no sense because of the carbon emissions implications.

The laws of physics mean that energy consumption increases as a function of speed but, in practice, it is perfectly feasible to match (and even reduce) the energy and carbon cost of high-speed rail compared with today's conventional trains. Prudent system design, with attention to train aerodynamics and weight has meant that energy (and thus carbon emissions) have not increased in Japan as train speeds have progressively increased from 210 km/h to 320 km/h. High-speed trains operating on high-speed lines can be designed from the outset to exploit gradient changes, coasting at higher speeds, using regenerative braking systems and without any need to slow down and accelerate again at junctions and other speed constraints. High-speed trains can avoid the use of fossil fuels altogether, dependent on future energy policy. We know that users of Eurostar services between London and Paris are responsible for only one tenth of the carbon emissions that the equivalent air journey entails⁴. As the Eddington report showed, the scope for savings because of travellers switching from short haul airlines is very significant, and worth between £2bn and £4bn. It is the one area where there is a plausible alternative to the carbon-damage caused by flying.

(e) It's not possible to build high-speed rail without very costly tunnelled access to city centres.

High-speed rail can be built into central London and central Birmingham with much less need for expensive and lengthy tunnelling works than were needed for High Speed One, as explained in this report.

(f) Britain is so intensively developed that it would not be possible to develop a suitable route without widespread property and environmental implications.

The line described in this report would require the demolition or relocation of only a handful of properties. By following existing active transport facilities closely, the incremental environmental impact is minimised.

(g) It would be better to do something else (variously: keep plugging away at upgrades to existing rail lines or build a brand new line for rail-freight instead).

⁴ AEAT research for Eurostar, 2007

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Existing line upgrades are expensive, have been shown to be worse value for money than building new lines where the capacity need exists and are, of course, hugely disruptive. Rail freight would benefit more from the capacity freed up by high-speed (passenger) rail on existing main lines because these are lines linked to the ports and to a growing network of modern freight terminals: this connectivity cannot be achieved with a new freight line.

(h) Britain's inter-city rail lines are fast already, so unlike other countries, there aren't any big journey time savings to be had.

Existing inter-city lines are (West Coast Main Line apart) now significantly slower than they were 10-20 years ago, as the intensity of service precludes lengthy non-stop operation. High Speed Two is designed to plug into the enhanced capability of the West Coast route, while relieving the capacity-constrained southern part of it

(i) The biggest problem is congestion on the rail lines into the major cities, and so it would be better to concentrate on schemes for commuters.

Capacity pressures on the rail network are most severe in the South East but they extend northwards 100 miles or more because of the mix of services that has to be operated. High Speed Two offers a step change in the capacity of the rail network to provide more intensive commuter services, both into London from a broadly-defined north-western quadrant and across the West Midlands (where the critical Coventry – Birmingham – Wolverhampton corridor will have space freed up for local and regional services).

All of these points have been addressed in this report by our candidate High Speed Two, a line in the North West Corridor linking central London and Heathrow with the West Midlands and the North West.

High Speed Two is, however, not just a further capital project designed to improve rail travel. It is a means of achieving a structural change that re-balances the regions of England and provides the most environmentally sustainable basis for linking Cardiff and Edinburgh/Glasgow and the largest English cities both to London and its international gateway at Heathrow. This is a project that will make investment in the major provincial cities of immensely greater value, since central area developments in these cities will have accessibility advantages currently only experienced by London. This is a way of taking some of the pressure off the wider South East and presenting radically different development opportunities for Britain's economy as it grows into the new century.

Britain does not have a particularly good record in its planning of major infrastructure, an issue that government is currently seeking to address through major revisions to the process, as advocated in the Barker and Eddington reports. Greengauge 21 believes that it is essential that lessons are learned from past mistakes and that this time, the job is done properly. There is no reason why high-speed rail should not command widespread support across the community. Consultation and openness are both essential ingredients in a way forward. High-speed rail confers many benefits, and, as studies have already shown, it rates more highly than any other approach that could provide the necessary transport capacity over the decades ahead.

