



DON'T RAILROAD IT THROUGH

Rethinking HS2

By Adrian Quine

BRIEFING PAPER

EXECUTIVE SUMMARY

- High Speed 2 (HS2) is substantially over budget, over time and will deliver limited benefits. Based on the latest cost estimates, it will return just 78 pence of value for every £1 of taxpayers' money spent. Its motivation is political, not based on need, and it suffers from poor management and an excessively complex design.
- HS2 is unnecessarily fast for the relatively short distances it covers, will undermine access to intermediate stations and is likely to result in increased fares for travellers.
- Under HS2, a number of key northern cities destinations will lose direct trains to London, including Lancaster, Carlisle and Durham
- There is a need to expand capacity in rail lines. More capacity and speed improvements can be achieved in a smarter, quicker and less costly manner than is currently proposed by HS2.
- There are still sections of railway where 4 tracks are reduced to 3 or even 2 creating bottlenecks and severely limiting further growth. The mainlines do not directly serve cities such as Birmingham, Manchester or Leeds, requiring the use of slower regional connecting lines that halve speeds for the final 20-40 miles.
- There are a number of substantially less costly alternatives to current HS2 plans that could increase capacity. These include:
 - (1) upgrading existing routes with new signalling, doubling the number of tracks, reopening mothballed lines, and timetable redesigns;
 - (2) building new sections of conventional high speed, including between the mainlines and Manchester, Leeds and Birmingham, and upgrading northern sections of the mainlines;
 - (3) maximising current infrastructure by targeting bottlenecks on conventional lines, including building flyovers at key junctions, upgrading the Chiltern route to Birmingham or reopening the southern section of the Great Central railway, raising line speeds to at least 125mph;
 - (4) upgrading stations in London, Birmingham and Manchester; and
 - (5) improving passenger experience.
- In order to deliver the rail infrastructure of the future, the Government could also look to private sector to fund projects that are specifically tailored to passenger needs and save the taxpayer billions in the process.

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Much has been written about HS2 and specifically its escalating cost. The purpose of this policy paper is not to establish whether HS2 should continue in its current form; it is obvious that with the hugely escalating costs the current model is already dead in the water. This paper specifically looks at what value can be created from the status quo and what constituent parts – if any – have merit going forward either in their current form or adapted to produce better value for rail users and the taxpayer.

UK Rail passenger numbers have doubled over the past 15 years and are predicted to grow substantially in the future. The main West Coast Mainline (WCML) linking London with the West Midlands, North Western England and Glasgow is Europe's busiest mixed traffic railway and is running near capacity in places.¹

HS2 continues to be promoted as the only solution to the problem of capacity. This claim is overly simplistic and based on a fundamentally flawed premise. HS2 would create more capacity on certain sections of the WCML, however the current project is excessively complex and ideologically driven. There are smarter ways of achieving the same outcome for far less money and in less time.

HS2 fundamentally only solves a small fraction of the UK's rail infrastructure issues. It is also not the right specification to meet the needs of the people it purports to serve. Based on the ticket premium charged by other high speed and premium lines there is a danger that HS2 could end up pushing up ticket prices, discouraging greater rail travel between north and south.

The cost of HS2 has ballooned to such an extent that any economic benefits have been all but wiped out. This comes against a backdrop of other smaller UK rail enhancements programmes that have run massively over budget including:

- The 1999 West Coast Route Modernisation programme cost a staggering six fold more than planned.²
- The Great Western Electrification programme in 2013 rose from £874 million to £2.8bn.³

¹ Network Rail LNW Route Strategy Plan, updated March 2019, page 33 para 6.6.2: "LNW Route faces considerable and increasing demands. Linking people and goods to markets from London to Birmingham, Manchester and Liverpool to Scotland, and connecting towns and cities across the South East, Midlands and North West, LNW Route is the backbone of Britain and is fundamental to the Country's economic and social fabric and success". <https://cdn.networkrail.co.uk/wp-content/uploads/2019/06/Route-Strategic-Plan-London-North-Western.pdf>

² The National Audit Office report into the West Coast Route Modernisation programme dated 22 November 2006 said: The estimated final cost of the programme had increased six fold to £14.5 billion (in 2002), contributing to Railtrack being put into Railway Administration. <https://www.nao.org.uk/report/the-modernisation-of-the-west-coast-main-line/>

³ A BBC report on 24 February 2015 stated that the budget had trebled, see "Great Western electrification scheme 'one year behind schedule'", BBC, February 24, 2019, <https://www.bbc.co.uk/news/uk-england-hampshire-31610849>.

- Crossrail allocated a budget of £15.4 billion and was supposed to have opened in December 2018. It has currently spent £17.6 billion and is still under construction with opening delayed until early 2021.⁴

There have been concerns about the viability of the HS2 project from the start, largely falling on deaf ears. The specification was always over ambitious, over engineered and there remains disconnect between misplaced or over simplistic aspiration and need. The Adam Smith Institute's first policy paper on the topic, released in 2008, identified some of these concerns but the HS2 project has continued unabated.⁵

The cost of HS2 has already nearly doubled since inception from £30 billion to £56 billion and its own chairman has predicted that costs will rise further to £86bn. It is even mooted by senior industry figures that this figure could top £100bn. HS2 is the most expensive rail project on earth and is certainly considerably higher per kilometer than projects elsewhere in Europe.⁶

The Government's HS2 review, announced in August, is a welcome step.⁷ It is absolutely right to scrutinise the project following eye watering cost blow-outs. If the Government wants to ensure best-use of taxpayer money and expand capacity, HS2 should be terminated in its current form with immediate effect. While the UK needs rail investment to increase capacity on the main north/south corridors, HS2's current model must be challenged.

THE CHALLENGE

The challenge is to create a future-proof railway that serves a diverse range of users, not just long distance intercity passengers between major hubs.

HS2 is highly inflexible and almost entirely based on fast non-stop journeys between London and Birmingham, Manchester and Leeds. These markets are already well served on the existing WCML and East Coast Main line (ECML), with the added benefit that these 'classic' 125mph routes also serve other key destinations along the way which HS2 would bypass.⁸⁹ The East Midlands and Sheffield are also well served via the Midland Main Line (MML), which is set to get a whole new £600

⁴ Gill Plimmer, "Over-budget Crossrail costing £30m per week," Financial Times, January 25, 2019, <https://www.ft.com/content/6e63cfe6-20bc-11e9-b126-46fc3ad87c65>.

⁵ Nigel Hawkins, "High speed fail: Assessing the case for HS2" (London, UK: Adam Smith Institute, October 26, 2011), <https://adamsmith.org/research/high-speed-fail-assessing-the-case-for-hs2>.

⁶ Lucy Pasha-Robinson, "HS2 'will be most expensive railway on Earth at £403m a mile'," Independent, July 16, 2017, <https://www.independent.co.uk/news/uk/home-news/hs2-high-speed-railway-most-expensive-world-403-million-mile-michael-byng-a7843481.html>.

⁷ Grant Snapps, "Government announces independent review into HS2 programme" (London, UK: HM Government, August 21, 2019), <https://www.gov.uk/government/news/government-announces-independent-review-into-hs2-programme>.

⁸ Virgin Trains, "Railway Route Map," <https://www.virgintrains.co.uk/stations-destinations>.

⁹ London North Eastern Railway, "LNER destinations & route map," <https://www.lner.co.uk/our-destinations/>.

million train fleet from 2020.¹⁰¹¹ Despite the WCML and ECML dating back to the mid-19th century both lines are now electrified and have a maximum speed of 125mph: current trains running along the routes achieve impressive ‘start to stop’ average speeds in excess of 100mph.¹²

THE GROWING CONSUMER DEMAND

Rail demand has more than doubled over the past 20 years.¹³ Capacity on parts of the WCML and ECML is tight.¹⁴ This is a particular problem on the southern end of the WCML. There is a need to alleviate log jams that can occur and build capacity for future growth. HS2 is not the right answer. It is a ‘sledgehammer to crack a nut’ solution.

Many destinations along the existing ECML/WCML and the MML have had a significant improvement in both frequency and speed. This is largely because of stopping intercity trains at intermediate stations. The result is record passenger numbers with increasing demand for new services from a range of locations, balancing the UK economy. HS2, on the other hand, would only serve a few specific city centres. Demand for direct connectivity from intermediate stations is growing, as some people are substituting to intermediate changes because they find them more convenient to park at than large city centre stations (See Table 1).

TABLE 1. PASSENGER GROWTH AT INTERMEDIATE WCML STATIONS POST 2008 UPGRADE

WCML	2011	2018	% INCREASE
Milton Keynes	5.2m	6.8m	30.77%
Rugby	1.6m	2.5m	56.25%
Coventry	5.2m	7.6m	46.15%
Stafford	1.75m	2.34m	33.71%
Stoke on Trent	2.3m	3.1m	34.78%
Macclesfield	1.26m	1.67m	32.54%
Wilmslow	0.99m	1.6m	61.62%

¹⁰ East Midlands Railway, “Trains, tickets & service information,” <https://www.eastmidlandsrailway.co.uk/>.

¹¹ “East Midlands Rail (EMR) launches a ‘new era’ for rail services,” Global Railway Review, August 20, 2019, <https://www.globalrailwayreview.com/news/87371/emr-launch-new-era-rail/>.

¹² Current trains are capable of 140mph but this is subject to upgrading the signalling.

¹³ Department for Transport, “Rail Factsheet” (London, UK: HM Government, December 2018), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/761352/rail-factsheet-2018.pdf.

¹⁴ “LNW Route Strategic Plan” (London, UK: NetworkRail, March 2019), <https://cdn.networkrail.co.uk/wp-content/uploads/2019/06/Route-Strategic-Plan-London-North-Western.pdf>, 33.

The WCML, ECML and MML suffer from legacy issues, such as track rationalisation undertaken by British Rail in the 1980s. While some lines have been restored as part of the WCML upgrade completed in 2008 there are still sections of railway where 4 tracks are reduced to 3 or even 2 creating bottlenecks and severely limiting further growth.¹⁵

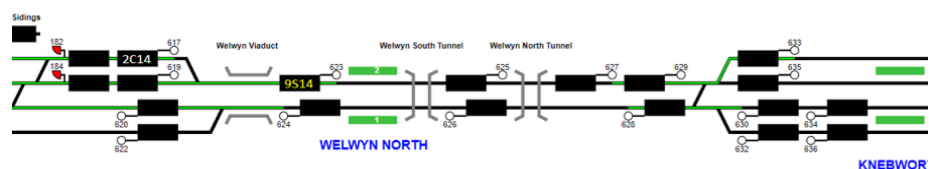
Consumer trends are also changing. Passengers now value reliable Wi-Fi connectivity, ticket price and seat comfort over shaving a few minutes off journey times. This fact does appear to have resonated with HS2 as they have shifted the focus from speed to capacity. This, however, severely weakens the already shaky HS2 business case.

THE WELWYN BOTTLENECK ON THE EAST COAST MAINLINE

For example, on the ECML at Welwyn in Hertfordshire the line narrows from 4 tracks to 2 (one in each direction) over a 2 mile section, creating a bottleneck. To make matters worse, local trains stop at Welwyn North station in the middle of the narrowed 2 track section further restricting capacity.

The diagrams below show where 4 tracks (2 in each direction) are reduced to 2 for a short section over Welwyn viaduct, Welwyn North station and Welwyn south and north tunnels. The northbound lines are at the top of the diagram with the southbound lines at the bottom. A search using website Open Train Times provides a live link to the traffic on the rail network showed the problem of congestion at Welwyn over a random 10 minute period.¹⁶

FIGURE 1: WELWYN BOTTLENECK, REGIONAL TRAIN (2C14) AWAITS FASTER TRAIN (9S14)

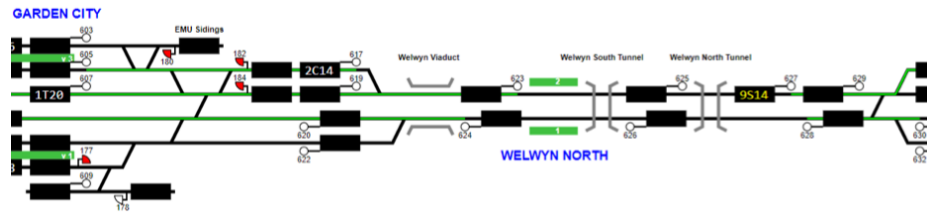


Northbound train number 2C14 on the slow line waits at a red signal as fast train number 9S14 has just overtaken it and entered the single northbound line over the viaduct.

¹⁵ "£9bn West Coast Main Line Revolution — Starts 14 December," *RailNews*, December 11, 2008, <https://www.railnews.co.uk/news/2008/12/11-west-coast-revolution.html>.

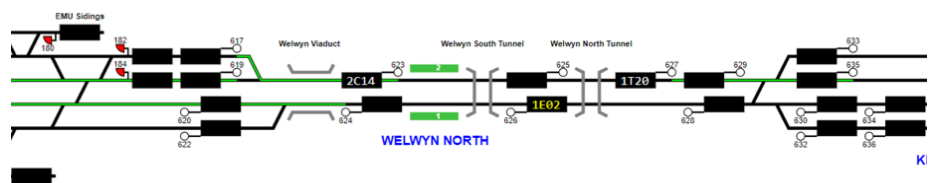
¹⁶ See <http://www.opentraintimes.com>

FIGURE 2: WELWYN BOTTLENECK, REGIONAL TRAIN (2C14) AWAILS SECOND FASTER TRAIN (1T20)



Train 2C14 remains stuck at the red signal while a second faster train number 1T20 is given priority to enter the single northbound line (track in green shows the route that has been set).

FIGURE 3: WELWYN BOTTLENECK, REGIONAL TRAIN (2C14) ALLOWED TO ENTER STATION



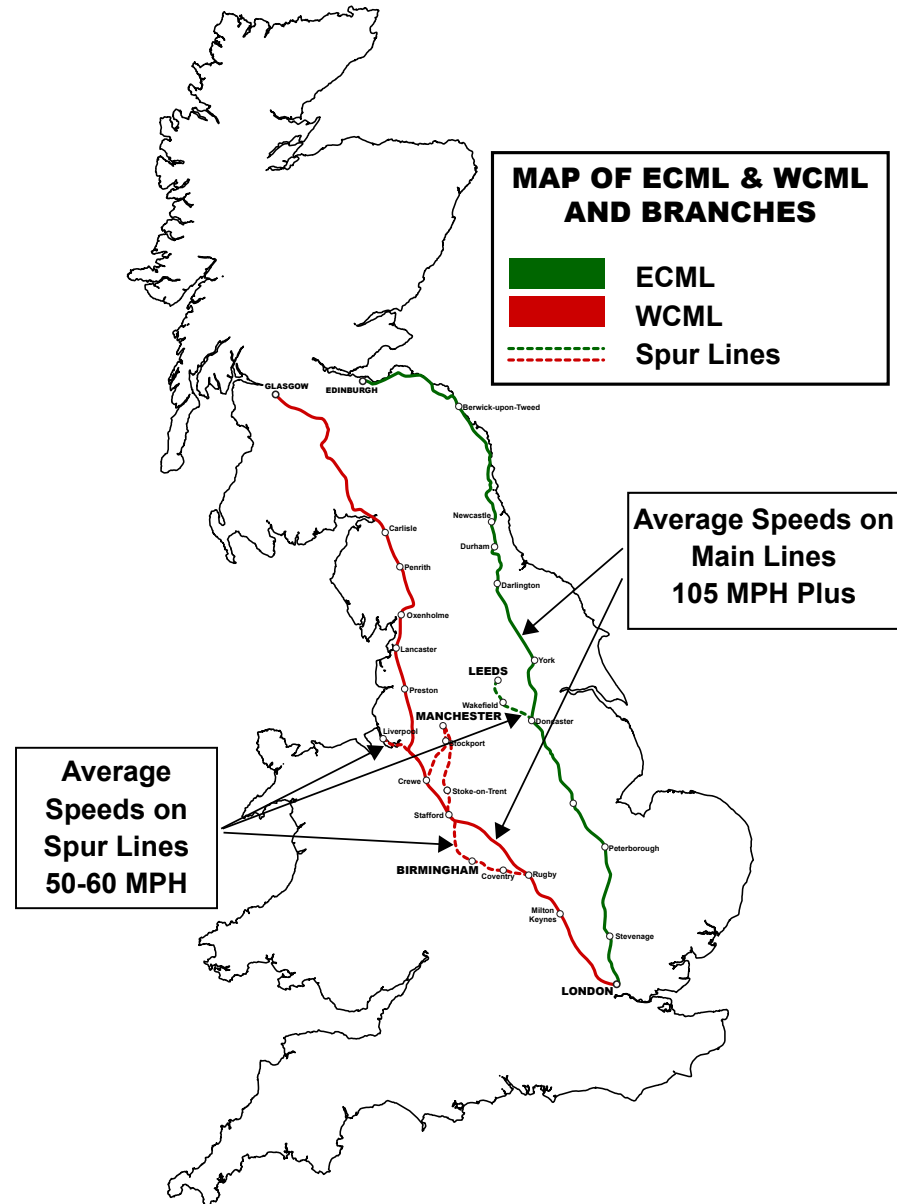
After the passage of the two faster trains (9S14 and 1T20) train 2C14 is allowed to enter the single line and make its stop at Welwyn North station.

If the line did not narrow from 2 tracks to 1 in each direction train 2C14 would have been able to continue its journey unhindered and capacity on the line would have improved. Network Rail's predecessor 'Railtrack' proposed a second viaduct with two new tracks to plug the gap but the scheme never got off the ground.

THE USE OF SLOWER REGIONAL CONNECTING LINES FOR BIRMINGHAM, MANCHESTER OR LEEDS

The biggest issue with the two classic routes north from London is that they don't directly serve the three key markets – Birmingham, Manchester or Leeds. Liverpool is also off the direct WCML route. Trains complete their journeys via much slower spur or connecting/feeder lines for the final 20 to 30 miles which reduces overall journey time disproportionately. The average speed on these routes is around half of that on the WCML/ECML. With only one track in each direction on these spur lines which also have many intermediate stations served by local trains conflict is an issue which limits both speed and capacity.

FIGURE 4. EAST COST MAIL LINE AND WEST COAST MAIN LINE SPURS



THE CASE AGAINST HS2 IN ITS CURRENT FORM

HS2 is a product of political thinking, poor management and overly complex design. The project has been mismanaged from the outset, with too much emphasis on a misguided belief that it was the only solution to Britain's ailing rail network. HS2 was and remains the wrong answer to the right question – how do we improve our railway system for future generations?

Consumer and travel patterns are rapidly changing. By the time the long planned HS2 is complete the business case will no longer stand up. It is over engineered and unnecessarily fast for the relatively short distance over which it travels.

It poses too many logistic and engineering problems, such as trains not being able to travel through tunnels at 250mph, because of pressure build up. In addition there is the political and economic cost of contentious compulsory land purchases and environmental concerns. Other options need to be explored.

According to the Financial Times, HS2 Ltd has been engaged in the largest land acquisition project since the Second World War involving thousands of homes and properties.¹⁷ By July 2018, it had already spent £1.6 billion out of its £2.8 billion budget – around 57% – but had only acquired 30% of the land needed.

More concerning, however, is the recent damning report about financial irregularity highlighted in the Daily Mail.¹⁸ While these allegations remain unproven, the fact that a major infrastructure project of this type should be so publicly criticised is alarming and does raise serious questions about the corporate governance at HS2 Ltd.

Much of the current state of paralysis is down to previous governments failing to define a robust brief that pre-specified the route without objectively considering cheaper and more suitable alternatives. The project has been over designed by engineers – the 250mph speed was never more than a vanity scheme and highlights how past politicians and current civil servants have become seduced by spin ridden soundbites over economic reality. A lack of pragmatism has allowed budgets to balloon to unrealistic levels.

HIGH COST, LITTLE BENEFIT

The business case for HS2 was based on an initial budget of £30 billion. This quickly nearly doubled to £56 billion and the figure now stands at closer to £86 billion, according to the head of HS2. This is nearly 3 times the original estimate, all before a single rail has been laid or train departed.

If ever there was a starker reminder of the ludicrous cost of HS2 it is to be found in the Taxpayers Alliance's report¹⁹ highlighting 28 new or upgraded transport projects that combined come in at £45.1 billion, around half the current HS2 price tag and that assumes no more rises which is optimistic at best. These projects highlight the extraordinarily high cost of HS2.

In 2016/17 the Department for Transport (DfT) commissioned railway civil engineer and cost specialist Michael Byng to check the project's cost model. Byng concluded in 2017 that the true cost would be £106.4 billion plus an additional £7 billion for the trains.²⁰ At the time this was around double HS2 Ltd's own figure of £55.7bn. Byng's combined figure of £113 billion would produce a negative cost/benefit ratio of 0.78, that is, it will return just 78 pence for every £1 of taxpayer money spent. The DfT claimed it did not recognise Byng's calculations or provide

¹⁷ Gill Plimmer, "HS2 under fire for delaying payments on compulsory land deals," *Financial Times*, July 13, 2018, <https://www.ft.com/content/070dcea4-8130-11e8-8e67-1e1a0846c475>.

¹⁸ Mark Hookham, "Serious Fraud Office probes HS2 contracts: Troubled rail scheme in new crisis over whistleblower's 'lethal' dossier," *Mail On Sunday*, August 25, 2019, <https://www.dailymail.co.uk/news/article-7391629/Serious-Fraud-Office-probes-HS2-contracts-Troubled-rail-scheme-new-crisis.html>.

¹⁹ "The Great British Transport Competition" (London, UK: *Taxpayers' Alliance*, May 2019), https://www.taxpayersalliance.com/the_great_british_transport_competition.

²⁰ Edward Malnick, "High Speed 2 will cost £106.4 billion – almost double the amount claimed by Theresa May – official review panel told," *The Telegraph*, September 21, 2019, <https://www.telegraph.co.uk/politics/2019/09/21/high-speed-2-will-cost-1064-billion-almost-double-amount-claimed/>.

any alternatives. With costs currently escalating his foresight into the true costs is proving far more credible than HS2's.

WHY HS2 IS NOT THE RIGHT MODEL FOR THE UK

LIMITED NEED FOR ULTRA-HIGH SPEED IN THE UK

High speed lines are substantially more expensive to build than conventional lines. Any time savings must be significant to justify the high capital outlay. The 2008 joint transport research centre made up of the International Transport Forum and the OECD argued that high speed rail requires significantly enhanced infrastructure and this is an expensive option.²¹

High speed rail works well where it connects two major centres of populations separated by long sparsely populated distance. Routes such as Paris to Bordeaux – 499km in 2h 09min or Beijing to Shanghai – 1318km in 4h 30min are prime examples of where concept, design and demand are properly aligned. By comparison, London to Birmingham at around 150km is less than a third of the distance of the French TGV line and almost one-tenth of the Chinese line. London to Birmingham trains currently take only one hour and 20 minutes, including 3 stops en-route. There is currently one morning non-stop train from Birmingham to London taking one hour and 13 minutes to complete the journey.

The UK's two main north/south rail routes are fundamentally different from the TGV network in France. The WCML and ECML provide a far more intensive timetable serving multiple medium distance destinations, and in so doing create an even spread of regular connectivity across the country.

For example an ECML London to Edinburgh train typically stops between four and seven times and a WCML service between London and Glasgow around six times. Even shorter distance trains between London and Birmingham, Manchester, Liverpool and Leeds all stop three times along the routes. The timetable, while not perfect, is designed to maximise the flow of passengers, not just on an 'end to end basis' but also to/from and 'between' key intermediate stations.

High speed and ultra-high speed networks are often viewed as the best way of connecting pairs of major cities and in so doing creating modal shift from air to rail. There is certainly a business case on long distance 'point to point' high density routes of 250 miles or more apart, but in the UK distances are generally much shorter undermining the need for these very high speed trains.

²¹ OECD & International Transport Forum, "The Economic Effects of High Speed Rail Investment" (University of Las Palmas, Spain: *Joint Transport Research Centre*, May 2012), <https://www.itf-oecd.org/sites/default/files/docs/dp200816.pdf>.

The majority of high speed lines run at 300kph (186mph) however HS2 has been designed to run at 400kph (250 mph) which would bring only very marginal benefits over such a short distance.²²²³

Trains on the current classic routes (WCML and ECML) are technically capable of travelling at 225kph (140mph), so the actual difference between this and normal TGV speeds of 300kph (186mph) is marginal especially over the UK's relatively short distances.

HS2 has unnecessarily used 400kph (250mph) speeds in its modelling to promote more impressive 'end to end' journey times.²⁴ However, with so many tunnels at the southern end of the route HS2 trains would not be able to travel at the proposed full line speed except over very short sections. This highlights a fundamental flaw in the business case with significant unnecessary cost.

Britain looked at Europe and many other parts of the world that were building high speed lines when HS2 was conceived. The UK only has one high speed route: HS1 which connects London St Pancras to the Channel Tunnel and beyond onto the TGV network in France. This project appropriately separated international Eurostar trains from the local commuter network in the UK. Kent has never had any 100mph plus intercity lines over which Eurostar trains could have operated efficiently.

LOSS OF HIGH SPEED SERVICE AT INTERMEDIATE STATIONS

HS2 has focused almost entirely on the London to Birmingham, Manchester and, to a lesser extent, Leeds routes. However, many intermediate stations along the classic routes have seen significant growth. Diverting long distance trains on to HS2 threatens future growth and adversely impacts a widespread area.

Further north where HS2 trains extend onto the classic lines there is a real risk that communities in North Cheshire, Lancashire and Cumbria will actually end up with a worse service pattern than is currently the case. The HS2 draft timetable²⁵ proposes that the cities of Lancaster, Carlisle and Durham lose their direct trains to London requiring passengers to change en-route.

Many smaller stations have seen significant increases over the past 5 years. Oxenholme Lake District up 38% from 420k to 580k and Penrith up 29% from 440k to 570k.²⁶ HS2 proposes that once HS2 trains join the classic line they run non-stop from Preston to Scotland which would be a retrograde step.

²² Economic Affairs Committee, "The Economics of High Speed 2" (London, UK: House of Lords, March 2015), <https://publications.parliament.uk/pa/ld201415/ldselect/ldeconaf/134/134.pdf>, 22.

²³ Economic Affairs Committee, "Rethinking High Speed 2" (London, UK: House of Lords, May 2019), <https://publications.parliament.uk/pa/ld201719/ldselect/ldeconaf/359/359.pdf>, 37.

²⁴ High Speed 2, "Route map," <https://www.hs2.org.uk/where/route-map/#8/52.463/-1.878>.

²⁵ Department for Transport, "High Speed Two (HS2) Phase Two Economic case advice for the Department for Transport" (London, UK: Department for Transport, July 2017), Appendix 1b Scheme service pattern: Full HS2 - page 64. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/628526/CS866_A_HS2_Phase_2a_Economic_case.pdf.

²⁶ Office of Rail and Road, "Estimates of station usage," <https://www.hs2.org.uk/where/route->

The proposed HS2 timetable shows time savings of between 30 minutes and an hour depending on destination. However, intermediate stations that will lose out as services on the WCML and ECML classic routes are slowed down to compete with HS2. While some commuter stations close to London could benefit from extra capacity that HS2 will bring to the classic routes, many destinations further up the lines will end up with a worse service than at present (See Table 2).

TABLE 2, DESTINATIONS CURRENTLY SERVED BY FAST INTERCITY SERVICES THAT WILL BE BY-PASSED BY HS2

	TRAINS PER HOUR	JOURNEY TIME/MINUTES
WCML STATIONS		
Rugby	1	48
Coventry	3	57
Stafford	1	76
Stoke on Trent	2	84
Macclesfield	1	100
Warrington	1	103
Stockport	3	113
ECML STATIONS		
Peterborough	4	46
Grantham	2	60
Newark	2	74
Doncaster	3	91
Wakefield	2	116
MML STATIONS		
Wellingborough	2	47
Market Harborough	2	54
Leicester	4	62
Derby	2	83
Nottingham	2	98

Proponents of HS2 claim that communities north of the route will benefit by extending HS2 trains to Scotland along the classic routes, but this claim omits some very important caveats.

The WCML has a maximum speed of 110mph, and in many places it is much slower. The current tilting rolling stock has an ‘enhanced permissible speed’ (EPS) of 125mph, enabling these trains to achieve a roughly 15 minute time saving over the most twisty section of track between Preston and Glasgow/Edinburgh. HS2 trains, however, will not be built with this tilting mechanism so will be ‘speed restricted’ when traveling over this section of line making them slower than the current fleet of tilting trains.²⁷ Even after the proposed full HS2 route is constructed half the distance between London and Glasgow will continue to be on the existing WCML.

In an effort to get passengers to Scotland as fast as possible, HS2 proposes eliminating stops in Lancashire and Cumbria, further eroding the current timetable. Passengers from Lancaster, Oxenholme, Penrith and Carlisle will lose their regular direct trains to London and will instead have to change at Preston into HS2 services.²⁸ Furthermore, the further north you travel the less impressive the time savings are as a percentage of today’s current service. The journey time savings also do not take into account the delivery of brand new bi-mode Hitachi ‘Azuma’ trains on the ECML which will result in shorter conventional journey times as they have faster acceleration in electric mode than previous trains.²⁹

TABLE 3. TIME SAVED CLAIMED BY HS2 BASED ON ASSUMED 250MPH RUNNING

LONDON TO/FROM	JOURNEY TIME BEFORE HS2 (HOURS:MINS)	JOURNEY TIME AFTER HS2 PHASE 2 (HOURS:MINS)	REDUCTION AFTER HS2 PHASE 2
Carlisle	3:15	2:34	0:41 (21%)
Chesterfield	1:45	1:15	0:30 (29%)
Crewe	1:30	0:55	0:35 (39%)
Edinburgh	4:22	3:40	0:42 (16%)
Glasgow	4:30	3:40	0:50 (19%)
Liverpool	2:14	1:34	0:40 (30%)
Newcastle	2:50	2:17	0:33 (19%)

²⁷ Network Rail is currently exploring ways of allowing non tilt trains to travel up to 125mph on limited sections of the WCML

²⁸ High Speed 2, “Where we go,” <https://www.hs2.org.uk/where/route-map/#8/52.463/-1.878>.

²⁹ “LNER LAUNCHES NEW AZUMA SERVICE ON FLYING SCOTSMAN ROUTE,” UKInbound, August 2, 2019, <https://www.ukinbound.org/member-news/lner-launches-new-azuma-service-on-flying-scotsman-route/>.

There has been no official announcement on HS2 fare levels other than vague suggestions that they would remain largely in line with the current model. However, other dedicated high speed networks charge premium fares and given HS2's high construction costs it is simply not credible to assume that premiums would not apply.

While it is accepted that at times the extra capacity and yield management of advance fares will provide value, there is a real concern about the cost of walk on 'peak' and 'off peak' tickets which provide valuable flexibility for passengers to travel when they want. The industry body, *The Rail Delivery Group* is currently undertaking a review of UK rail fares which are often seen as too crude, expensive and offering poor value for money.³⁰

When Southern Eastern Railway started running domestic East Kent to London services on HS1 fares rose between 20% (peak) to 35% (off peak). At the same time services on the classic route were cut back from 2 to 1 per hour, with fast trains scrapped resulting in journey times taking 50% longer. Passengers were left with either accepting a service reduction taking longer or paying the premium to arrive 20 minutes earlier on HS1.

HS2 say that fare levels will be set by the DfT, rather than the franchise operator. However over the past decade given the balance between taxpayer and passenger has shifted significantly in the direction of the latter it is inconceivable that the fare paying passenger will end up not paying a premium. This premium may be justified on the basis of recouping the cost of building the infrastructure on a user-pay basis, but increased prices weakens the case for the project. Due to the slowdown of other trains, there will also be little alternative for customers, therefore decreasing accessibility.

The Government's current proposal, despite widespread criticism of the franchising system, is that HS2 is run by one monopoly rail operator with no competition. Furthermore this same operator will also run services on the classic WCML, eroding any chance of competition and the potential for lower fares, improved service standards and a more efficient operating structure. Lack of competition on the UK's long distance rail network has been highlighted in two recent ASIs recent policy papers.³¹

HS1 is not the only premium rail service to levy higher fares. Heathrow Express charges 76% more than Heathrow Connect for a return ticket (109% more for a single). Gatwick Express charges a 13% premium for its non-stop London Victoria

³⁰ Rail Delivery Group, "Fares reform proposals (2018-)," <https://www.raildeliverygroup.com/about-us/priorities/fares-reform-proposals.html>.

³¹ Sam Dumitriu, "A Third Way For Britain's Railways," Adam Smith Institute, May 3, 2018, <https://www.adamsmith.org/research/thirdwayrail>. Adrian Quine, "How To Make Long Distance Work: Fixing Britain's Railways With Open Access," *Adam Smith Institute*, March 4, 2019, <https://www.adamsmith.org/research/how-to-make-long-distance-work-fixing-britains-railways-with-open-access>.

to Gatwick Airport services over Southern Rail's own regular trains, despite saving only 1 to 2 minutes on the journey time.

Given that current UK premium rail services cost between 13% and 109% more than classic trains it is extremely likely HS2 would adopt this model, especially given the huge cost increases. Below is a forecast of the potential extra cost of long distance rail travel after HS2 should a premium fares model be adopted.

TABLE 4. WCML FARES TABLE BASED ON CURRENT (OCTOBER 2019) PRICE OF A STANDARD CLASS 'OFF PEAK RETURN' TICKET. PRICE ADJUSTED TO REFLECT CURRENT HS1 (35% PREMIUM) FARES VS EXISTING ROUTE

LONDON TO/FROM	CURRENT FARE	HS2 FARE	ADDITIONAL COST	TIME SAVED
Birmingham	£56.70	£76.55	£19.85	0h 37m
Manchester	£89.60	£121.00	£31.40	1h 00m
Preston	£95.40	£128.80	£33.40	0h 44m
Oxenholme	£106.20	£143.35	£37.15	0h 39m (Change at Preston)
Glasgow	£147.00	£198.45	£51.45	0h 54m

TABLE 5. ECML FARES TABLE BASED ON CURRENT (OCTOBER 2019) PRICE OF A STANDARD CLASS SUPER OFF-PEAK RETURN TICKET. PRICE ADJUSTED TO REFLECT CURRENT HS1 (35% PREMIUM) FARES VS EXISTING ROUTE

LONDON TO/FROM	CURRENT FARE	HS2 FARE	ADDITIONAL COST	TIME SAVED
Leeds	£113.50	£153.25	£39.75	0h 50m
York	£113.50	£153.25	£39.75	0h 30m
Newcastle	£141.70	£191.30	£49.60	0h 33m
Edinburgh	£147.40	£199.00	£51.60	0h 45m
Glasgow	£147.00	£198.45	£51.45	0h 54m

The additional cost/time savings per hour pro rata ranges from an additional £31.40 per hour to/from Manchester to an additional £90.18 to/from Newcastle. These are the cheapest flexible off peak/super off peak standard class return fares. Peak travel and first class fares are between 200% and 450% higher than standard class 'off peak return' fares.

If HS2 introduced a premium fares policy similar to HS1 or the Heathrow/Gatwick Expresses, passengers would be driven away from rail onto other forms of transport such as road or air. Long distance trains can often be more expensive than flying.³² Far from creating more of an even balance between ‘north and south,’ premium fares would create a wedge which would directly affect social and economic development in the north of England and Scotland.

THE UK’S RAIL SERVICE IS ALREADY NOT FIT FOR PURPOSE, HS2 WOULD MAKE IT WORSE

The UK’s long distance rail sector is heavily regulated and not subject to the rigours of the free market. In the main there is no competition resulting in high fares, lacklustre service and monopoly practice whether delivered by the public or private sector. The franchise model provides little incentive to either innovate or be competitive as highlighted in our recent policy paper on long distance rail competition.³³ On routes with limited competition fares are 40% cheaper³⁴ compared to where there is a sole operator.

THE ALTERNATIVES

1 - UPGRADE EXISTING ROUTES

There has been significant investment in both the WCML and ECML. HS2 supporters argue that the WCML’s life expired, however in 2008 it benefited from a £10 billion upgrade and has been transformed over the past decade.^{35,36} There is scope to improve existing infrastructure in a way that delivers both more capacity and faster journey times.

WEST COAST MAIN LINE (WCML)

The current fleet of Pendolino trains introduced in 2005 are designed to run at 140mph, however this is hampered by the current signalling system. Network Rail has been working on digital train control that allows services to run both faster and closer together.^{37,38}

³² Dylan Lewis, Ben Clatworthy, “Flights cheaper than trains for majority of long-distance UK trips,” *The Times*, August 23, 2019, <https://www.adamsmith.org/research/thirdwayrail>.

³³ Matthew Lesh, “How To Make Long Distance Work: Fixing Britain’s Railways With Open Access,” *Adam Smith Institute*, March 4, 2019, <https://www.adamsmith.org/research/how-to-make-long-distance-work-fixing-britains-railways-with-open-access>.

³⁴ Matt Kilcoyne, “Bring In Airline Style Competition To Allow Rail To Soar,” *Adam Smith Institute*, May 3, 2018, <https://www.adamsmith.org/news/airline-competition-train-report-quine>.

³⁵ Committee of Public Accounts, “The Modernisation of the West Coast Main Line” (London, UK: House of Commons, June 2007), <https://publications.parliament.uk/pa/cm200607/cmselect/cmpubacc/189/189.pdf>.

³⁶ Comptroller and Auditor General, “The Modernisation of the West Coast Main Line” (London, UK: National Audit Office, June 2007), <https://www.nao.org.uk/wp-content/uploads/2006/11/060722.pdf>.

³⁷ “Changing the signals on Britain’s railways,” *BBC News*, April 25, 2015, <https://www.bbc.co.uk/news/magazine-32446717>.

³⁸ NetworkRail, “What is the Digital Railway?,” <https://www.networkrail.co.uk/stories/what-is-the-digital-railway/>.

The introduction of a very high frequency timetable in 2008 has seen passenger numbers double with three trains per hour from London to Manchester and London to Birmingham, compared to the one and two trains per hour respectively prior to the introduction of tilting Pendolino and voyager trains.³⁹

Although HS2 proponents claim that the benefits of 250mph speeds at the southern end will outweigh the slower speeds on the classic line, the overall end to end journey time is marginal with only a 19% time saving between London and Glasgow or 17% between Edinburgh & London.

The current signalling system allows a minimum headway between trains of 3 minutes, in theory accommodating 20 trains per hour. However, sharing the line with lower speed passenger and freight trains means this figure drops in half to a maximum of nine InterCity trains per hour off peak extending to eleven in peak times.

Digital signalling has the ability to increase traffic flow fairly using technology already developed. However, there are a number of caveats that would preclude this, including WCML having too much mixed traffic from slow moving freight trains through to 125mph tilting Pendolino passenger trains, lack of platform capacity at terminus stations and complex stopping patterns.

However there are solutions. If funds from HS2 were diverted to more locally focused initiatives, it would provide far wider benefits at less cost than the current HS2 scheme. These are explored in the discussion below about maximising the current infrastructure.

EAST COAST MAIN LINE (ECML)

The ECML is not as high frequency as the WCML, but does provide fast and frequent services between London and Leeds, taking just over 2 hours. The southern part of the line is currently being re-signalled and will be the first long distance route in the country to adopt digital signalling technology.

Some existing ECML electric trains are designed for 140mph. The new Azuma trains currently have a maximum speed of 125mph. Conventional signalling has hampered speeds above 125mph because of insufficient braking distance.

The ECML is the only long distance route that has limited competition from Open Access operators. There is some 'head to head' competition between London and at a few stations along the route including: York, Doncaster and Grantham. Where there is competition fares have fallen by up to 40%. There remains capacity for new services on the ECML further undermining the HS2 lack of capacity argument.

To encourage greater use of the ECML more capacity needs to be found. This can be achieved by removing bottlenecks including:

³⁹ Between 2006 and 2018, Virgin Trains journeys grew by 105 per cent, compared with growth of 59 per cent across all train operators and 62 per cent in the long-distance sector. Global Railway Review, "Virgin Trains on track for 50 million passengers ahead of HS2," <https://www.globalrailwayreview.com/news/80027/virgin-high-frequency-timetable-growth/>.

- Two new tracks at Welwyn in Hertfordshire to remove the bottleneck where 4 tracks are narrowed to two over the viaduct and two nearby tunnels
- Restore original four track section north of Huntingdon to Peterborough
- Multiple four track sections/dynamic loops between Grantham and Doncaster/York and between Northallerton and Tursdale, south of Durham.
- Explore the reopening of the mothballed Leamside line from Tursdale to Newcastle to relieve pressure on the two track section through Durham.

This would create a largely four track railway along the whole of the ECML from London to Newcastle and in so doing increase capacity for new services and faster non-stop London to Leeds trains.

On the MML the restoration of 4 tracks north of Bedford from the current 2 or 3 post 1980s rationalisation would create greater capacity. This could also provide a new freight corridor linking into the new Oxford to Cambridge line at Bedford then connecting onto the upgraded Chiltern line or reopened Great Central line.

REDESIGN THE TIMETABLE

Frequency has improved the current WCML, and to a lesser extent the ECML, timetable. However, this is based around a one size fits all clock face pattern. While this model generally works for high density short distance interurban and suburban journeys, where ‘turn up and go’ regularity is necessary, longer distance trains serve a different market. Most InterCity passengers are either ‘one off’ or semi-regular business or leisure users rather than daily commuters.

The current very high frequency timetable on the WCML is wasteful as it runs the same number of trains seven days a week and does not factor in peak and trough demand. Virgin Trains discounts some seats to try and fill over capacity but charges very high fares to travel in the peak. The result is many shoulder peak trains are very lightly loaded while the first off peak trains are crowded.

This ‘tail wagging dog’ approach is crude and wasteful when in fact supply should be matched to demand, and not the other way around. There is a growing trend among rail operators to run shorter trains at closer intervals with only a few carriages. This is undesirable as it uses up valuable paths and adds to rail congestion.

As long distance rail is increasingly becoming a ‘book ahead’ system, with turn up and go peak fares having risen 350% over the past 20 years, the focus needs to be on running longer trains when they are needed rather than short trains at high frequency.

There has been much discussion about starting HS2 from the north (stage 2b – western branch of the Y route) rather than stage 1 from London to Birmingham.

OPTION 1: CAPITALISE ON HS2 SURVEYED ROUTES TO BUILD CONVENTIONAL HIGH SPEED LINES

There is a much stronger case for the northern section of HS2 than the London to Birmingham section, which is posing the greatest engineering challenge and proving the most costly to construct. The existing routes between Birmingham and Manchester are slow, twisty and congested. The proposed HS2 route from Manchester to Crewe/Birmingham has merit but only if this is constructed to be fully compatible with the current railway network rather than a hugely expensive stand-alone line.

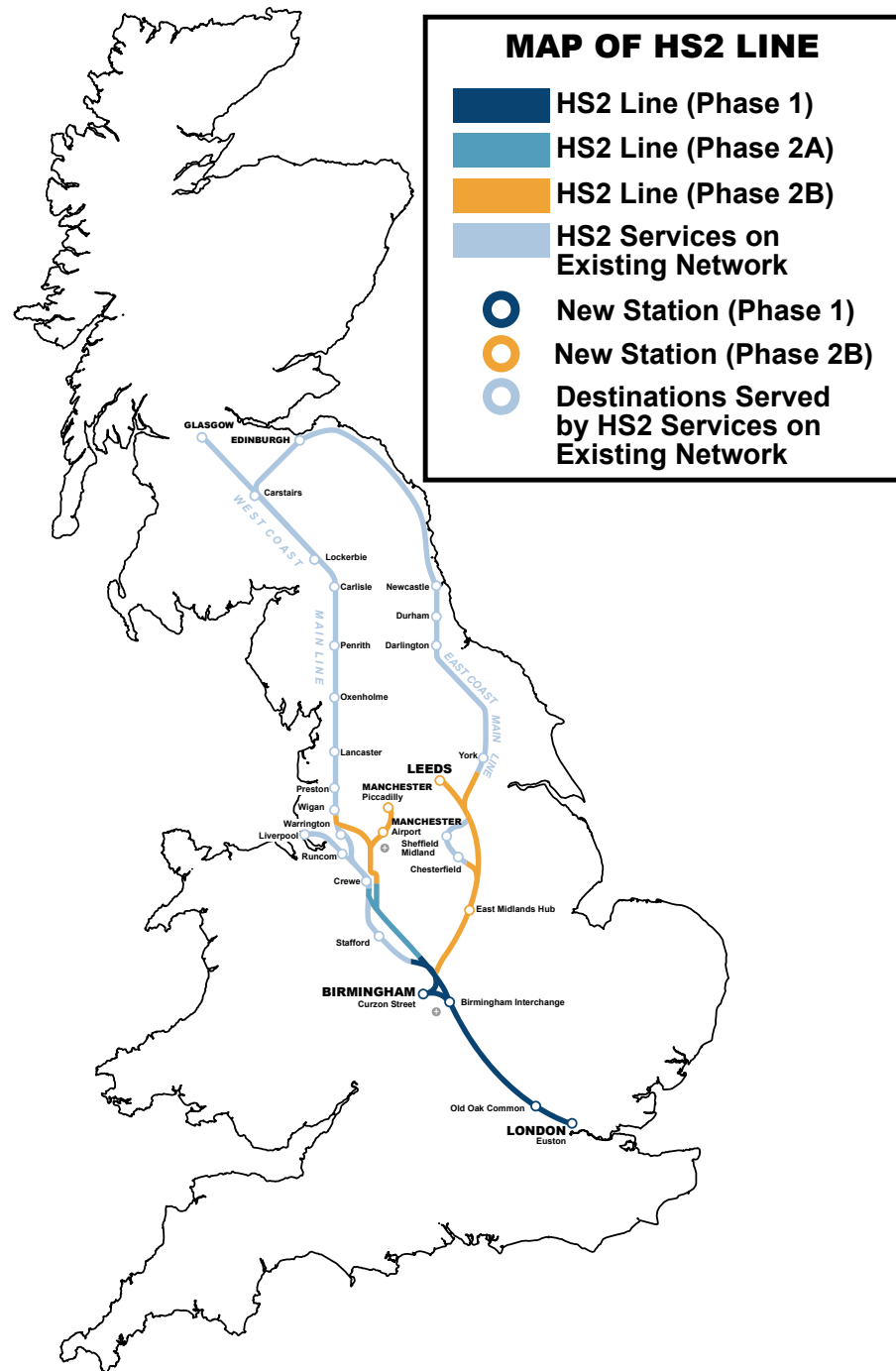
Given the relatively short distance between Manchester and Birmingham there is no justification for this to be an ultra-high speed line. The focus should be on creating a new classic high speed route with 125mph or 140mph to relieve pressure on the Birmingham to Stafford and Colwich/Norton Bridge/Crewe to Manchester spur routes.

There would be significant benefits of connecting this new line with the proposed Northern Powerhouse Rail East West route linking Liverpool/Manchester to Leeds and beyond providing opportunities for through services from Birmingham to Leeds and beyond via Manchester/Manchester Airport.

The eastern branch of the HS2 'Y' route linking Birmingham to the East Midlands and Leeds could be scrapped. Instead the existing Midland Main Line and ECML could be upgraded to allow for faster and more robust services.

To create more capacity and faster journey times to Sheffield and Leeds one option would be to build a new conventional high speed spur from the ECML near Retford to Sheffield or to upgrade the current route through Worksop and then follow the proposed HS2 Y route to Leeds but at conventional 125/140mph speeds. Another option would be to build a new spur direct to Leeds from its closest point on the ECML north of Doncaster.

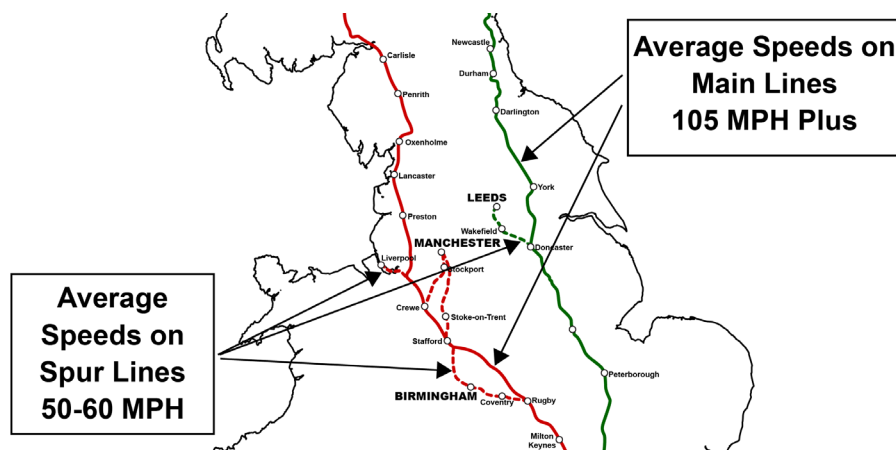
FIGURE 5: HS2 ROUTE MAP



OPTION 2: UPGRADE SPUR ROUTES TO/FROM WCML AND ECML

The current spur lines linking the existing classic routes to Birmingham, Manchester, Liverpool and Leeds are slow and outdated. Average speeds along these spur routes are half that of the ECML/WCML and undermine the overall benefits of these generally good 125mph railways. Eg: London to Warrington (entirely on the WCML) is 181 miles taking 1 hour and 43 minutes, whereas London to Manchester (same distance) takes 2 hours and 5 minutes because of slow running over the spur routes at the northern end.

FIGURE 6: EXISTING SPUR ROUTES



The spur lines account for only a small percentage of the overall end to end mileage, yet they create a disproportionate adverse effect. It is the equivalent of investing in full fibre broadband to a central cabinet then using copper wire to connect the last mile to local homes and thus losing the benefits of full fibre speed.

3 - MAXIMISING THE CURRENT INFRASTRUCTURE

Network Rail has gradually begun addressing some of the most pressing issues and has introduced some pioneering small scale schemes to improve performance at bottlenecks. The scrapping of HS2 in current form would provide a perfect opportunity to address some of the chronic issues that hamper growth on the existing routes.

These include:

- Eliminate bottlenecks with flyovers at key junctions caused by flat rail crossings.
- Extend MML electrification from Kettering to Nuneaton diverting freight away the congested southern end of the WCML.
- Create connection between MML and new Oxford to Cambridge line at Bedford for freight traffic.
- Restore four tracks on along the majority of the WCML, ECML and MML.
- On lighter used two track sections create dynamic loops: long layby lines allowing slower trains to keep running while being overtaken by faster trains (similar to crawler lanes on single carriage A roads) where 4 tracks are not justified.
- Upgrade the Chiltern route diverting London to Birmingham trains this way.
- Reopen the southern section of the Great Central route as far north as Rugby
- Run longer trains with less frequency during times of peak demand.
- Match supply to demand rather than the current other way around.

Precedents have been set already with a number of similar schemes delivering huge benefits. This includes the 1983 opening of a new 13 mile section of track so the ECML bypassing the heavily speed restricted Selby swing bridge and more recently the creation of railway flyovers at Reading, Hitchin and Norton Bridge eliminating conflict at these busy junctions which formerly had flat rail crossings.⁴⁰

⁴⁰ Keith Barrow, "Network Rail completes Norton Bridge flyover," *International Railway Journey*,

Future schemes should endorse digital signalling technology using proven ETCS Level 2 technology — and ultimately upgrading to level 3 technology when proven — to improve both flow and capacity and introduce ‘automatic train control’ to maximise braking performance to reduce journey time and increase flow and efficiency.⁴¹⁴²⁴³

Raise line speeds from 125mph to 140mph. Current journey times are already 25% faster than before the 2008 upgrade to the WCML but there is considerable scope to improve these further.

Notwithstanding the ability to increase capacity on the WCML, the terminus station at London Euston is not fit for purpose. Built in the last 1960s, the station is wasteful and needs a redesign to accommodate more trains. A detailed proposal to the HS2 Bill Select Committee on 11 October 2016, known as the Euston Express proposal, details an alternative and more cost effective plan to HS2’s own plan for a dedicated HS2 station alongside the current terminus.⁴⁴

The Euston Express proposal is designed to fully integrate both HS2 and classic WCML services into the existing station, rather than HS2 having a standalone station alongside. The current layout of Euston station is wasteful with scope to create additional platforms within the existing footprint providing additional capacity for a post digital signalled classic WCML rather than HS2.

The Euston Express scheme also delivers enhanced capacity at Euston station within the existing footprint for a lower cost with far less disruption than is the case with the HS2 scheme.⁴⁵⁴⁶

The current demolition of buildings around Melton Street adjacent to Euston Station if not required for additional classic train platforms could be used for residential or commercial development.

March 29, 2016, <https://www.railjournal.com/regions/europe/network-rail-completes-norton-bridge-grade-separation/>.

41 ETCS Level 2 is a proven model that creates significant capacity enhancements without the need for new lines.

42 Thales, “European Train Control System (ETCS),” <https://www.thalesgroup.com/en/european-train-control-system-etcs>.

43 Siemens, “Automatic Train Control,” <https://new.siemens.com/global/en/products/mobility/rail-solutions/rail-automation/automatic-train-control.html>.

44 Sam Price, “HS2 Bill Select Committee Petition No. 691” (London, UK: House of Lords, October 2016), https://www.parliament.uk/documents/lords-committees/High-Speed-Rail/HOL-00691_Sam_Price_Petitioner.pdf.

45 Sam Price, “HS2 Bill Select Committee Petition No. 691” (London, UK: House of Lords, October 2016), https://www.parliament.uk/documents/lords-committees/High-Speed-Rail/HOL-00691_Sam_Price_Petitioner.pdf, 43.

46 Map of proposed new HS2 station alongside the current station at Euston: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/528986/C220-ARP-CV-DPP-01A-580103-AP03-P03.pdf

The greatest capacity constraint on the network is at the southern end of the WCML, south of Rugby. Beyond this point around half of all passenger trains diverge away from the WCML towards Birmingham and the West Midlands on the spur line. This spur line has only two tracks and is congested with both fast London to Birmingham, local and cross country services all competing for paths.

The obvious solution is to divert London to Birmingham express services away from the WCML. This does not require building an expensive and ultra-high speed HS2. There are two options that would achieve this objective:

1. Upgrade the Chiltern line to 4 track. The proposed HS2 station at Old Oak is adjacent to a mothballed line that links straight onto the Chiltern route to Birmingham.

The upgraded Chiltern route should be electrified and upgraded to 125mph running with 4 track/dynamic loops along the entire route or at key sections. The mileage between London and Birmingham on both the WCML and Chiltern routes is almost identical.⁴⁷

2. Reopen the southern section of the Great Central railways far north as Rugby where it would connect with the WCML and a new or upgraded existing spur at Rugby from the WCML to Birmingham via Coventry and Birmingham Airport.⁴⁸

The Great Central line could form a core freight route diverting these slower trains which use a disproportionate number of paths on the WCML. It would also open up new passenger journey opportunities between the Chilterns and WCML at Rugby. There have been suggestions that reopening the entire Great Central could be an alternative to HS2, however there are significant engineering hurdles in the East Midlands. Given the biggest capacity constraints on the WCML are between London and Rugby there is little justification for rebuilding the Great Central route north of Rugby.

4 - UPGRADE STATIONS

LONDON

Regardless of whether HS2 is built or not there is certainly a case for new platform capacity in London to cope with extra northbound trains in the future. Most of the London mainline stations are essentially either full or nearly full although this can also be attributed to current timetabling and dwell time.

⁴⁷ RailMiles, "Mileage Engine," <http://rmme.railmiles.me/>.

⁴⁸ Ross Clark, "There is a far better option than HS2 – and it already exists," *The Spectator*, August 3, 2019. <https://www.spectator.co.uk/2019/08/there-is-a-far-better-option-than-hs2-and-it-already-exists/>.

The proposed new station at Old Oak Common is a good 2nd option as it in effect creates a new London terminus even though its location is not centrally located.⁴⁹ However, with frequent Crossrail connections into central London this could prove to be a pragmatic solution. Unlike inflexible terminus stations, a new through station at Old Oak Common has the ability to connect onto other routes creating future new ‘cross London’ journey opportunities without the need to change stations and relieving pressure of the London Underground network.

Old Oak Common is perfectly placed to connect to an upgraded Chiltern and or Great Central line.⁵¹

BIRMINGHAM AND MANCHESTER

Capacity at both Birmingham New St and Manchester Piccadilly is similarly constrained as is the case in London. The current HS2 proposal is to build a brand new station at Birmingham Curzon Street⁵² and an extension at Manchester Piccadilly.

In principle both these options are worthwhile as they will encourage future growth at Britain’s second and third largest cities. However before committing to these large scale construction projects in the middle of densely populated areas, a thorough independent cost/benefit analysis needs to be undertaken with due focus on the alternatives.

5 - IMPROVE PASSENGER EXPERIENCE

As working habits change, the expectations of passengers on long distance trains are similarly changing. Rail’s share of the long distance market is increasing and on some routes rail has overtaken air. One of the principal reasons people prefer train over plane or car is because they can work even if the ‘end to end’ journey is longer. Rail travel can be considered productive time with robust Wi-Fi.

However all too often modern trains are cramped and badly laid out – especially in standard class with hard uncomfortable airline style seating. Tray tables are often angled so that it’s difficult to use a laptop and Wi-Fi is often slow and unresponsive or even non-existent. Reliable Wi-Fi features highly on passenger’s wish lists and should be an important priority.⁵³ Many people would choose to take the train over the plane as they can work throughout the journey even when rail is slower than air.

In today’s digital age the priority for the industry now must be to roll out trains that are business friendly and provide enough space and comfort for people to work and relax. This trend undermines the business case for HS2, where very high speed

⁴⁹ Londonist, “Inside Old Oak Common: London’s Big HS2 Hub,” <https://londonist.com/london/transport/inside-old-oak-common-london-s-next-big-transport-hub>.

⁵⁰ HS2, “Old Oak Common,” <https://www.hs2.org.uk/stations/old-oak-common/>.

⁵¹ RAILSCOT, “London Extension (Great Central Railway),” <https://www.hs2.org.uk/stations/old-oak-common/>.

⁵² HS2, “Birmingham Curzon Street,” <https://www.hs2.org.uk/stations/birmingham-curzon-street/>.

⁵³ Chris Blackhurst, “High-speed rail? We care more about whether the wifi on trains works,” *The Independent*, August 23, 2019, <https://www.independent.co.uk/news/business/analysis-and-features/hs2-high-speed-rail-trains-wifi-seating-a9075011.html>.

over relatively short inter-city distances is less important than was the case a decade ago.⁵⁴

Lack of capacity across the whole of the UK acts as a barrier to innovation as passengers can't vote with their feet.⁵⁵ Greater competition on long distance Inter City routes brings significant benefits to passengers with lower fares, improved service and lower running costs.

PRIVATE SECTOR INVESTMENT

There is also a case for the Government seeking private sector investment in viable lines. A willingness of the private sector to get involved with a specific project is an indication that it has a positive value to society, as it would receive enough patronage to be profitable in its own right. In the past, a private company by the name of Great Central sought to reopen the Great Central Railway as a goods and passenger route between 1996 and 2003.⁵⁶ The total cost was estimated to be £8 billion, including reopening sections all the way to Liverpool. The project was rejected by the Blair Government. These type of private sector led and funded projects should be encouraged, as they not only have the ability to deliver a system that is specifically tailored to passenger needs but also save the taxpayer billions in the process.

CONCLUSION

The key to delivering a better value railway is applying open mindedness, pragmatism and flexibility. The HS2 debacle is shamefully symbolic of the current state of the industry, where the status quo remains unchallenged and ideology is allowed to flourish. The poor decision making, lack of basic financial scrutiny and wilfully inadequate basic checks and balances has created a massive black hole with virtually nothing to show for it. There are a significant number of smaller schemes that would deliver far greater value per pound spent than is the case with the current full HS2 proposal.

The rail industry is all too often not just profligate but also inept in its execution. If the country is to thrive it desperately needs good efficient infrastructure but there needs to be a far more coordinated approach that joins the constituent parts for the common good. From the absurdly over engineered and costly HS2 project there are elements of the scheme that remain worthwhile and can be harnessed. How-

⁵⁴ Centre for Transport and Society, "The Digital Revolution and Worthwhile Use of Travel Time: Implications for Appraisal and Forecasting" (March 2015), <https://www.nao.org.uk/wp-content/uploads/2006/11/060722.pdf>, Page 4.

⁵⁵ Matt Kilcoyne, "Bring In Airline Style Competition To Allow Rail To Soar," *Adam Smith Institute*, May 3, 2018, <https://www.adamsmith.org/news/airline-competition-train-report-quine>.

⁵⁶ Ross Clark, "There is a far better option than HS2 – and it already exists," *The Spectator*, August 3, 2019.

ever there should be no blank cheque and each part that survives needs to create real social and economic value.

The rail industry is notoriously incestuous and is run almost entirely by engineers and career railway people rather than innovators. While many in the industry have a valuable knowledge base there remains a lack of pragmatic leadership and entrepreneurial thinking. Existing practices need to be challenged and gold plated engineering solutions cast aside unequivocally. Delivering real value has to be at the forefront of future thinking.