

The Midland Express Rail Link (MERLIN) – a solution for integrating a new hub airport at Luton with Britain’s developing High Speed Rail Network

Dear Sir

I wish to contribute to the deliberations of the Independent Airports Commission. I am writing not as a transport professional but as a layman; working for a large UK bank. However I have an interest in transport infrastructure and think I have something useful to add to the debate.

The “Bigger and Quieter” paper published by the Policy Exchange in October 2012 by Tim Leuing proposed 4 runways be constructed at Heathrow just west of the existing site. Although an intriguing concept I could only support this particular proposal if it were possible to simultaneously increase airport capacity and reduce overall noise and emissions pollution at the same time. Living just a few miles west of Gloucester and experiencing obtrusive aircraft noise only a few times a year I feel slightly awkward aligning myself with those proposing major airport expansion. My view is that if the country really does need a very large hub airport, then at least it should be located in an area that will disturb the fewest number of people, and that effectively rules out Heathrow.

I understand that the Mayor of London, Boris Johnson, has called for a more timely investigation than the remit that the Government has given the Independent Airport Commission, and I support that view. According to press reports the Mayor’s Team will be examining options for Stansted and both inner and outer Thames Estuary options. The purpose of this short paper is to look at the implications and potential synergies between developing a new hub airport at different locations and integrating it with Britain’s developing high speed rail network. It suggests that Luton Airport (the second best option evaluated in the “Bigger and Quieter” paper) possesses a geographically advantageous location and could readily be incorporated into an extended high speed rail network by the construction of what I’ve termed the “Midland Express Rail Link” (MERLIN). The resulting enhanced connectivity means that Luton should be considered a serious contender for any shortlist of options.

High Speed Rail Network

The recent HS2 proposal for Phase 2 serving the North-West and North-East of England is welcomed. With future extensions to Scotland and between London and Bristol / South Wales using a combination of new and existing line along with upgraded infrastructure for the Cross-Country and Trans-Pennine corridors, it is not difficult to envisage that most British cities could be linked by a comprehensive high-speed rail network. Indeed only one major gap would remain; that for a second north-south high speed line (HSL) from London direct to the East Midlands and North-East. It is this second north-south HSL that has potential implications for a new hub airport built to the north of London.

A second north-south high speed line

GreenGauge21 the high speed rail pressure group have advocated a national network organised around two north-south high speed lines, one serving the north-west initially following the M40 motorway and the other serving the north-east, initially following either the M1 or M11 motorways. The underlying assumption being that each line would support around 12 trains per hour (tph). In contrast the HS2 proposals consist of a Y-shaped network where the core London to West Midlands trunk section will be operated at a maximum design capacity of 18 tph. This highly intensive usage is reflected in the very positive BCR and will provide a huge uplift in rail capacity. The only downside is that it is not quite sufficient to provide all major cities in the north with frequent services to London - to do that requires 25 – 30 tph and explains the calls for either the core section of HS2 to be 4-tracked or for a second HSL to be built.

However if HS2 with its 18 tph can cater for around 75% of the demand for high speed rail services from London to the North, and if the services chosen to be run cover the most financially attractive and socially beneficial, then the economic case for providing a second HSL to cover the remaining 6 – 8 tph is likely to be marginal at best. For any second HSL to be worthwhile it would have to serve more than one purpose and do so as economically as possible. Integration with a major hub airport north of London could provide the required rationale.

Rail options for Stansted

If Stansted were to be developed into a major 4-runway hub then surface access would need to be dramatically improved. At least two proposals have already been suggested. The first involves an extension of Crossrail 1 from Stratford in a 6 mile tunnel and hence along a new alignment closely following the M11 motorway. The second envisages an extension of Crossrail 2 along a 4-tracked Lea Valley line. Although both these options would provide considerable capacity enhancements, journey times would be relatively poor as Crossrail trains are not designed to run at more than 90mph. Furthermore, accessibility to Stansted from the north and west by rail is very poor.

A new HSL, similar to the Greengauge21 “eastern” M11 option would provide the desired uplift in capacity from London to Stansted and indeed would help pay for the very expensive first 20 miles or so out of London. As a minimum any new line would extend to intercept the ECML at Huntington, ideally it would extend to join the “eastern branch” of HS2 around the Nottingham / Toton Interchange area. Critically though it would not provide direct connections to the West Midlands and North-West, and this is a major shortcoming.

Topographically Stansted may be an ideal location for an inshore hub airport and could be made convenient for much of London. However, as regards access from most of the rest of the country, it would be far from ideal.

Rail options for Luton

Although compared to Stansted the topography would be more challenging, the geography of Luton is far better. Despite being near to London no flights would actually need to fly over great swathes of built-up area and it is also on the right side of London to serve as a national hub and beats both Stansted and Gatwick in this respect. Luton is connected to London via the Midland Main Line (MML) which supports both InterCity and the soon to be enhanced Thameslink services. Expanding Luton Airport may increase demand on these services beyond their projected capabilities. Consideration should therefore be given to ways to increase rail capacity still further and provide better access to the Midlands and North.

The Greengauge21 M1 motorway “eastern” HSL proposal would be the most comprehensive option. Running from St Pancras to Toton Interchange in the East Midlands and following the motorway for significant stretches it would provide the capacity, connectivity and short journey times that a Luton hub airport would need from both London and most major cities in the North. Although not included in the original Greengauge21 proposals –access to the West Midlands and North-West could be achieved by a spur connecting to HS2 at Birmingham Interchange. However it would be expensive, and as suggested, the BCR just might not stack up.

Introducing the Midland Express Rail Link (MERLIN)

To achieve many of the same objectives as a full scale HSL, but at significantly lower cost, this paper proposes the development of a new Midland Express Rail Link (MERLIN). However rather than duplicating HS2 with a similar line some 20 miles further east, the idea would be to develop a scheme that is complimentary to HS2. As envisaged it would offer a combination of relatively high speeds, certainly above 125mph, with stops serving a Luton Hub Airport and all the major urban centres between London and the Midlands that will be bypassed by HS2.

Figure 1 illustrates at a conceptual level the MERLIN network required to support a major hub airport at Luton. Effectively it forms a “mini-Y” that fits within the larger Y-shaped HS2 network and provides a fast and high capacity link from London to Luton Airport and also links the airport with both the West Midlands and North-West on one hand and the East-Midlands and North-East on the other.

Critically though it would mesh with the existing rail network, see Figure 2, so that connections to Birmingham and the North-West would be via a link onto the WCML at Milton Keynes. Similarly connection to the East Midlands and North-East would be made via a link onto the MML just south of Leicester. In addition to providing a fast and high capacity connection from London to Luton Hub Airport and then onwards towards the north it would offer the following advantages:

- Depending on the precise scheme implemented, the important centres of Milton Keynes, Northampton, Coventry and Leicester could be incorporated into an expanded high speed rail network. A criticism often levelled at the HS2 proposal is that it doesn't serve these centres.

- It might be possible to provide the centres of Nottingham, Derby and possibly Sheffield with quicker services than would be possible via HS2. This is because using HS2 will require a change at either Toton or Meadowhall, thus extending journey times.
- The two trains per hour envisaged travelling along the core section of HS2 from Heathrow to Manchester and Leeds would no longer be required – freeing up valuable slots for other HS2 services, perhaps to the Continent.

The major issue is that at present this rail link does not exist. Luton Airport is served by the Midland Main Line (MML) but that only connects the airport to Nottingham, Derby and Sheffield and despite the promised electrification the route is not particularly fast. A major gap is that it doesn't connect to the West Midlands and North-West. As with any outline concept there are many ways it could be implemented. The search is therefore for the most cost effective solution.

MERLIN – London to Luton Hub Airport

Finding the space for additional terminal capacity in London is difficult. The Midland Express Rail Link finds a cost effective solution by utilising terminus stations at both St Pancras and Euston. St Pancras could be used as the terminus for the Luton Airport Express plus existing services to the East Midlands. There is scope for the four current Midland platforms to be lengthened somewhat and for an additional 4 platforms to be constructed immediately to the west. Euston would continue to host WCML Intercity traffic, but a new short tunnel would provide a new connection between the Euston approaches and the MML. From here new tracks would be built parallel to the MML for the few miles to Elstree. From there a new line would follow the M1 corridor to near Junction 10 where a new station would be constructed to serve both the airport and act as regional interchange. This proposal is feasible, indeed north of Elstree this proposal is very similar to "Route 5" selected for further study by HS2 Ltd.

Many commentators have suggested that HS2 run in the M1 corridor with stations serving Luton, Milton Keynes and Northampton. A major drawback would be that the very high frequency required for HS2 necessitates that all trains follow the same stopping pattern. However frequent station stops make it impossible to run a genuinely high speed service. The author supports the current proposed alignment of HS2 (with no intermediate stations between Old Oak Common and Birmingham Interchange) but suggests that the M1 corridor serving the intermediate urban centres makes sense as a complimentary parallel express route. Carrying the residual WCML and MML Intercity traffic in the post HS2 world, the MERLIN would not be so intensively used, speeds would be lower and there would be more scope for intermediate stops. The MERLIN would have more in common with the Japanese Shinkansen high speed rail network that accommodates a mix of non-stop and stopping services that serve intermediate stations than HS2 which shares more characteristics with the French LGV network and involves non-stop running over long distances.

MERLIN – Luton Hub Airport to Milton Keynes

If Luton develops as a major hub airport, high frequency services will be needed to the Midlands and North-West. Providing these new services would be expensive and might require on-going subsidy. The MERLIN provides the option of diverting all West Coast expresses via Luton Airport, and then via a new 20 mile section of line following the A5 corridor re-join the West Coast route, entering Milton Keynes from the south-east. The advantage of this scheme is that the West Coast services would run anyway but an additional stop at Luton Airport would increase patronage.

A new route from Euston to Milton Keynes via Luton Hub Airport need not be any longer than the current route. The result is that fast trains from Euston to Milton Keynes via Luton Airport would probably take no longer than current services that have one intermediate stop at Watford for example. Indeed if the new route could be aligned for higher speed, services might be quicker. Of course, a greatly expanded Luton Airport would accelerate development at Milton Keynes and the new rail link would provide a high quality link between them. Effectively the scheme would result in a 6 track railway between London and Milton Keynes (4 via Watford on the Classic WCML and 2 via Luton Hub Airport on MERLIN) thus providing extra room on the existing West Coast classic route for more commuter and freight services.

MERLIN – Milton Keynes to Watford Gap

North of Milton Keynes the MERLIN could take over the existing West Coast fast lines. However intensive traffic levels may require this 4-track section to be widened to 6-tracks in which case the new lines would run parallel to the existing ones but realigned slightly at Wolverton for higher speeds. Since both WCML and former MML express trains will share the new infrastructure, there should be sufficient traffic to justify reasonable levels of investment in route straightening to permit higher speeds. At Roade the WCML splits with the fast lines routed via Bugbrooke and the slow lines routed through Northampton. The MERLIN would initially follow the Northampton route before running parallel to the M1 motorway which offers a much straighter alignment than the current fast lines. The latter could be repurposed as dedicated freight lines. The MERLIN would re-join the West Coast at either Watford Gap or slightly further north using the northern section of the Northampton loop to provide the connection into Rugby. Northampton Parkway, a major park and ride interchange with direct access to the motorway could be constructed at Watford Gap.

As described the MERLIN could provide direct access to Luton Airport from the WCML. However, the scheme would only make sense if direct WCML services using the MERLIN offered passengers faster journeys than could be achieved by catching HS2 to London and then Luton Airport Express back out to the airport. However this appears to be the case.

Table 1 illustrate that a direct service from Manchester to Luton Airport via the WCML + MERLIN would offer comparable timing to taking HS2 to London followed by an airport shuttle to Luton. The fastest option though would be HS2 from Manchester to Birmingham Interchange followed by a conventional WCML+ MERLIN train direct to the airport. As far as Birmingham to Luton traffic is concerned, the direct service to Luton is significantly quicker than using HS2 to Euston and an airport shuttle to Luton. These figures confirm that if Luton Airport were to be developed into a major hub

then linking the WCML to Luton via the MERLIN would be a realistic option for improving accessibility from the airport to the West Midlands and North-West.

MERLIN – Watford Gap to Leicester

North of Watford Gap a new 20 mile section of line would be required to enable trains for the East Midlands to connect with the MML at Wigston, just south of Leicester. Broadly following the M1 corridor the MERLIN would be aligned for high speed and could provide useful journey time savings compared to the current speed restricted MML route. This could prove to be important.

Table 2 illustrates that the fastest route for passengers travelling from Sheffield to Luton Airport would be via HS2 to London followed by Luton Airport Express. Changing at Toton for a service along the existing MML to the airport would be no faster than a direct MML service all the way from Sheffield. However, for passengers from Nottingham, there is little difference between using a direct MML service to the airport compared to travelling on HS2 via Euston. However if MERLIN could provide a 15 or 20 minute acceleration compared to current MML timings, MERLIN could be competitive to HS2 even for passengers originating in Sheffield and wishing to travel directly to Luton Airport.

The figures suggest that accelerating services by some 20 minutes would make the MERLIN competitive to HS2 for two markets: Sheffield to Luton Airport and Nottingham to London – see Table 3. Providing competitive timings to HS2 is significant as it reduces the need for London to Leeds services to stop at Toton, thus speeding them up. Direct Nottingham and Derby to London services have the advantage of saving the time and inconvenience of a change at Toton plus the MERLIN would also bring Leicester into the orbit of high speed rail.

Rail options for Luton Hub Airport - Conclusion

Geographically Luton Airport is well placed to serve both its main London and the South-East market and also much of the North. Substantial investment would be required to upgrade rail infrastructure from the Capital to the airport, but when complete would provide the basis for an extension to the North. This short paper sets out the case for developing the Midland Express Rail Link (MERLIN), a scheme that has many of the benefits of a new HSL but that by an intelligent reconfiguration of the existing rail network that combines relatively modest lengths of new construction in combination with reuse of upgraded existing lines, would have a much lower cost.

Heathrow / Luton Dual Hub Airport

A single national hub airport confers many advantages. However very large airports have a huge effect on their local environments and are therefore difficult to accommodate. An alternative is to develop a “dual hub airport” where two somewhat smaller airports connected by fast transport links effectively operate as one hub. Typically this would result in Heathrow maintaining its current size and all incremental development being focussed on a second airport.

The “Heathwick” proposal is one such idea, with a high speed rail link designed to whisk airside passengers between Heathrow and Gatwick. This would be associated with the construction of a second runway at Gatwick. However the scheme would be very expensive and the environmental disturbance caused by the new link would most likely be excessive considering the relatively low levels of traffic.

Another idea is to operate Heathrow and Stansted as dual hubs. This could be achieved by extending Crossrail to Stansted along with a second runway at Stansted. Here the rail link would cater for a wider mix of traffic, but transit times would be extensive.

In the case that a single large hub airport was deemed unworkable and a dual hub was seen as the only practical solution, an option proposed in this paper would be to operate Heathrow and Luton as a dual hub airport with 2 runways each. This seems reasonable given that of all of London’s airports, Heathrow and Luton are the two airports closest to where their customers live. Further, this could be a very flexible option as both Heathrow and Luton airports could conceivably be expanded to ultimately incorporate 4 runways each, giving a total of 8 runways should demand eventually warrant this level of expansion beyond the original 2 + 2 runways. The precise location of these additional runways could be determined by trade-offs between local environmental considerations and the extent to which advances in aircraft technology reduce noise and pollution. Thus if there were dramatic falls in the noise and pollutants emitted by new generation aircraft, Heathrow might be selected for further development. However if progress was slower, Luton could be developed further on the grounds that fewer people would be affected.

MERLIN – Linking Heathrow and Luton Airports

Clearly if Heathrow and Luton were developed as dual hub airports then in addition to high quality links to London, it would be essential to have very good links between them. This is particularly the case since many firms have located along the M4 corridor to benefit from proximity to Heathrow. However if Luton was developed as effectively a Heathrow “overflow” in the event that environmental considerations ruled out additional runways at Heathrow, then it would be essential to provide excellent links from the M4 corridor to Luton without having to travel via London. This would have the further advantage that it would effectively join the M1 and M4 economic corridors and would therefore be expected to provide further aggregation benefits in the arc stretching from the west to north of London.

Fortunately such a link would not be difficult to construct. The MERLIN could easily be extended south-westwards from Luton to Heathrow Airport – see Figure 3. HS2 Ltd has already designed outline proposals for a link from Heathrow Terminal 5 to the main HS2 line near Ruislip. It would be

relatively straight-forward to extend this line alongside the M25 to join MERLIN just east of Hemel Hempstead. Incorporating the HS2 Heathrow link into the wider MERLIN scheme would improve the marginal economics of the former dramatically. It would also have the wider benefit of reducing congestion on this notoriously congested section of the M25.

Summary

Developing new hub airport capacity involves consideration of many issues. One of these is the ease of access of the airport to non-London locations, particularly those in the Midlands and North. Whatever the merits of Stansted in terms of topography and low population density of the immediately surrounding area, there is no denying that it would be difficult and expensive to provide fast and effective rail access from the West Midlands and North West. Similarly, a new airport in the Thames Estuary would suffer from the same issue of remoteness.

Luton by contrast has a more difficult topography but its geographical position is far superior affording relatively straight-forward access to all points north. It is literally on the route of a possible future High Speed Line from London to the North-East and if that level of investment couldn't be justified, as outlined in this paper, the MERLIN would provide an alternative that could be developed at lower cost but provide both the capacity and connectivity required. In the event that environmental and political constraints prohibit the development of a single hub, a Heathrow / Luton "dual hub" could be a viable alternative and could easily be served by a short extension of the MERLIN from Luton to Heathrow that incorporates the proposed HS2 Heathrow spur.

Appendices

Figure 1: The Midland Express Rail Link / HS2 Interface

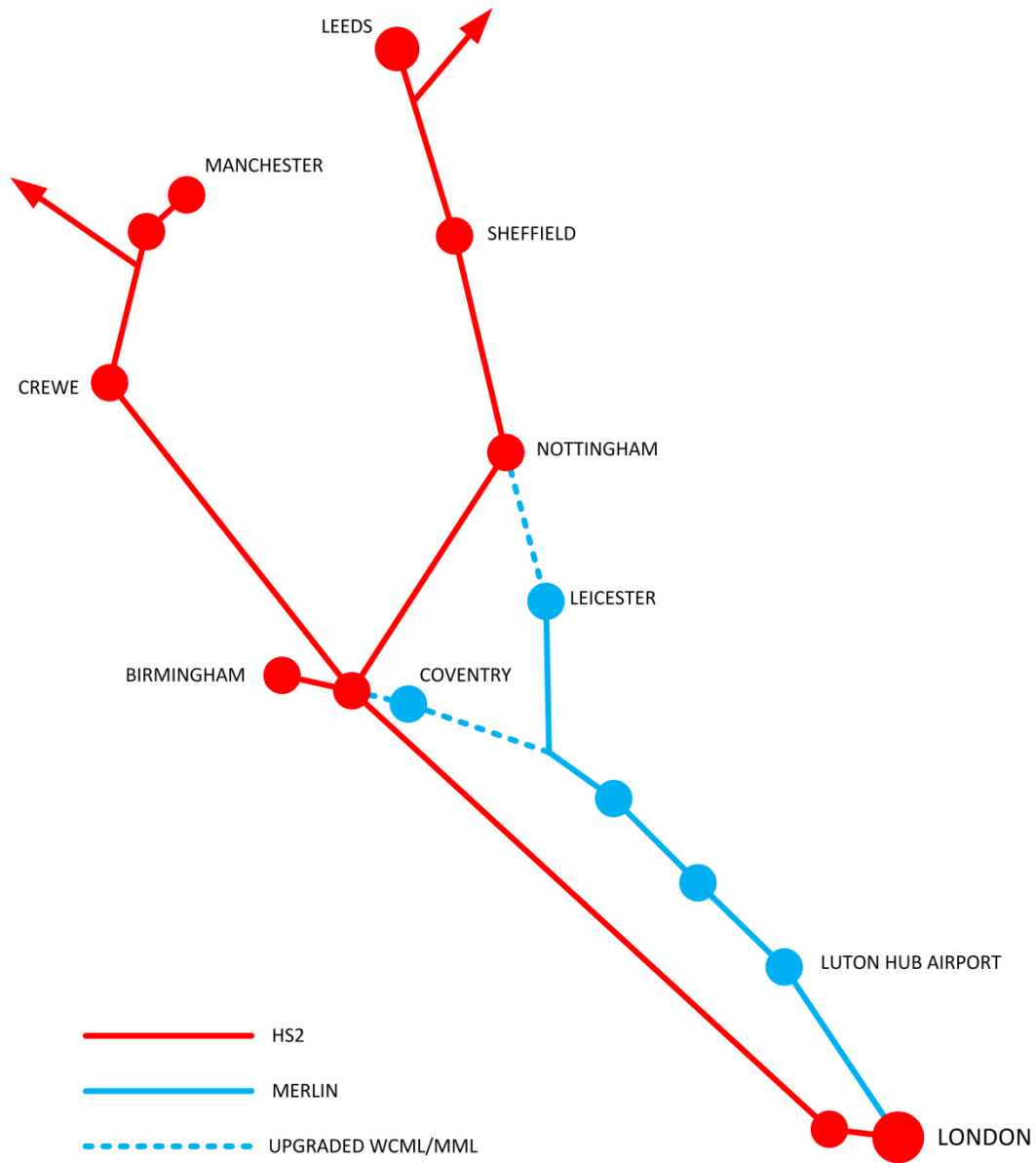
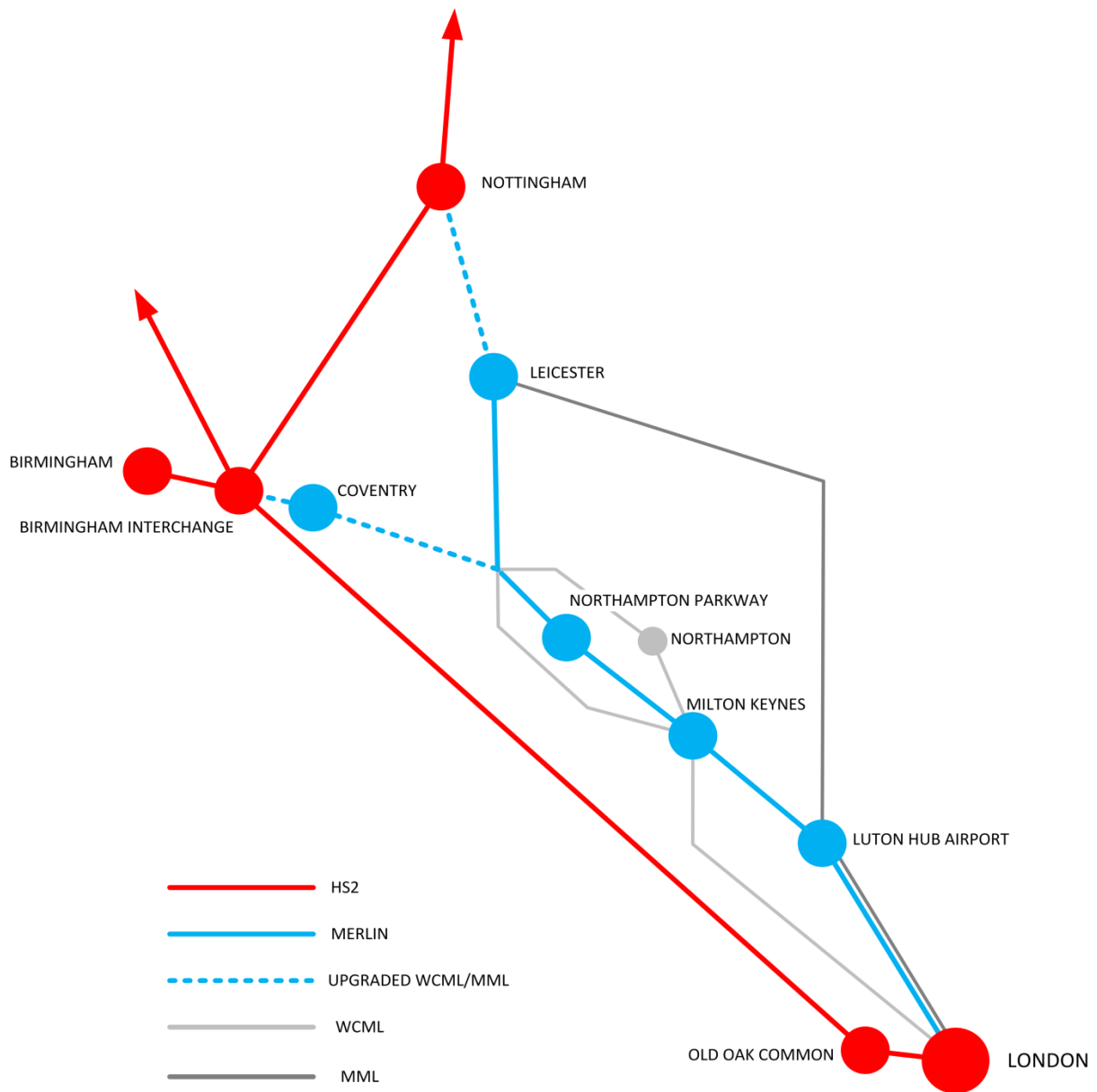
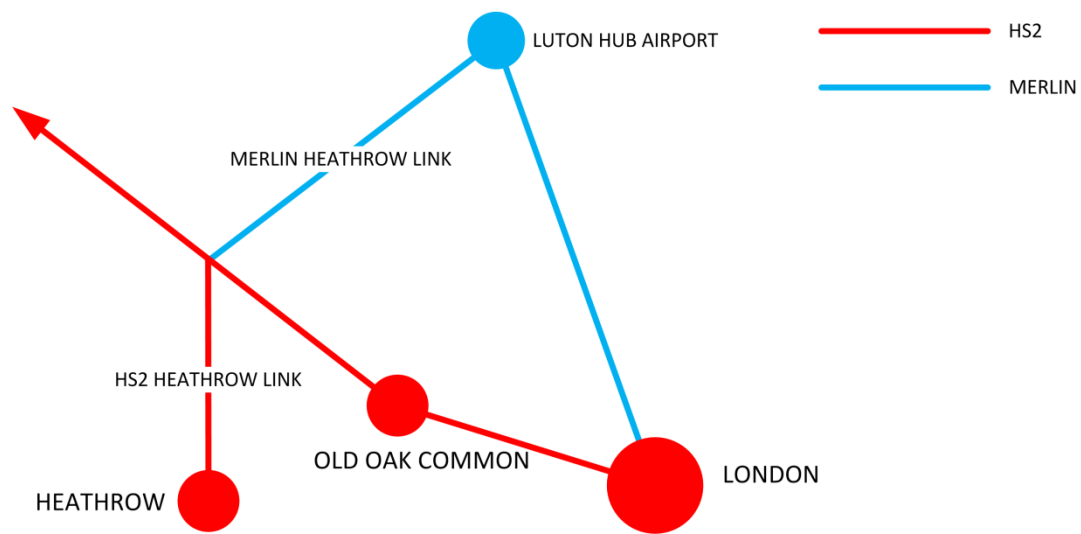


Figure 2: The Midland Express Rail Link (MERLIN) Network



Note: MERLIN represents an intelligent reconfiguration of the existing rail network that combines relatively modest lengths of new construction in combination with existing upgraded lines. Complimenting HS2 it serves a number of important urban centres between London and the Midlands including a stop at an expanded Luton Hub Airport

Figure 3: The MERLIN - Heathrow / Luton Dual Hub Airport – Connection



Note: Extension of MERLIN to Heathrow utilises the proposed HS2 Heathrow link. The latter would form at least a third of the total extension required to link Heathrow and Luton Airports

TABLE 1

Manchester

Manchester to Luton Airport - WCML+ MERLIN	1h 48m
Manchester to Euston - HS2	1h 08m
Change at Euston / St Pancras	0h 20m
St Pancras to Luton Airport - MERLIN	0h 18m
	1h 46m
Manchester to Birmingham Interchange - HS2	0h 38m
Change at Birmingham Interchange	0h 30m
Birmingham Interchange to Luton Airport - WCML + MERLIN	0h 55m
	1h 23m

Birmingham

Birmingham to Luton Airport - WCML + MERLIN	1h 05m
Birmingham to Euston via HS2	0h 49m
Change at Euston / St Pancras	0h 20m
St Pancras to Luton Airport - MERLIN	0h 18m
	1h 27m

TABLE 2

Sheffield

Sheffield to Luton Airport - MML	1h 45m
Sheffield to Meadowhall	0h 05m
Change at Meadowhall	0h 10m
Meadowhall to Euston - HS2	1h 09h
Change at Euston / St Pancras	0h 20m
St Pancras to Luton Airport - MERLIN	0h 18m
	1h 22m
Sheffield to Meadowhall	0h 05m
Change at Meadowhall	0h 10m
Meadowhall to Toton - HS2	0h 18m
Change at Toton	0h 10m
Toton to Luton Airport - MML	1h 02m
	1h 45m

Nottingham

Nottingham to Luton Airport - MML

1h 12m

Nottingham to Toton

0h 10m

Change at Toton

0h 10m

Toton to Euston - HS2

0h 51m

Change at Euston / St Pancras

0h 20m

St Pancras to Luton Airport - MERLIN

0h 18m

1h 09m

TABLE 3

Time

Sheffield

Sheffield to London - MML

2h 00m

Sheffield to Meadowhall

0h 05m

Change at Meadowhall

0h 10m

Meadowhall to Euston - HS2

1h 09h

1h 24m

Nottingham

Nottingham to London - MML

1h 30m

Nottingham to Toton

0h 10m

Change at Toton

0h 10m

Toton to Euston - HS2

0h 51m

1h 11m

Glossary

ECML	East Coast Main Line The primary rail corridor from London to the North-East
HS2	Second UK high speed line from London to the North
HSL	High Speed Line
LGV	“Ligne de Grand Vitesse” – French high speed rail network
MERLIN	Midland Express Rail Link Proposed in this paper, a new rail corridor linking London with both West and East Midlands and an important component for improving access from a Luton Hub Airport to the North
MML	Midland Main Line The primary rail corridor from London to the East Midlands and North-East
WCML	West Coast Main Line The primary rail corridor from London to the West Midlands and North-West

Correspondence

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Submitting evidence and proposals to the Airports Commission

Dear Sir

I wish to confirm, before the 28th Feb 2013 deadline, that I wish to submit a short paper for consideration by the Airports Commission concerning "Synergies between new hub airport capacity in the South-East and Great Britain's developing High Speed Rail Network".

I am writing purely as an interested layman but understand that Sir Howard Davis is hoping to build a more inclusive approach to decision making.

Yours faithfully



Airport Proposals <Airport.Proposals@airports.gsi.gov.uk>

Feb
28

[REDACTED]

Thank you for your notification of intent. I can confirm receipt. I can also confirm that we are interested in receiving submissions from all parties, whether individuals or organisations. We look forward to receiving your paper.

Regards

[REDACTED]

[REDACTED]