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**National Infrastructure Commission call for evidence; Improving connectivity between cities in the north of England**

Network Rail welcomes the opportunity to contribute to the call for evidence by the National Infrastructure Commission concerning improving connectivity between cities in the north of England.

**To what extent are weaknesses in transport connectivity holding back northern city regions (specifically in terms of jobs, enterprise creation and growth, and housing)?**

Network Rail recognises the opportunity that exists to transform the economy of the north of England through improving connectivity between northern cities. This principle has been demonstrated in work we have done in the past as part of the work on Northern Hub which identified a 4:1 benefit cost ratio, including wider economic benefits. Separate work based on the same strategy by Transport for Greater Manchester identified a £2bn Gross Value Added benefit to the northern economy. More generically our market study programme has identified the wider link between time/cost of travel and economic output. This is why Network Rail is working as a member of the Transport for the North partnership to develop rail options for the transformation of the northern economy. The evidence base for this is detailed further in the following paragraphs.

The economic underperformance of the North relative to other parts of the UK and similar regions in other parts of the world has been cited in a number of studies and strategy documents. David Higgins' HS2 Plus report included statistics which showed that 66 of UK FTSE 100 companies are located in London and South East, and highlighted the lack of investment in transport per head, compared with London and South East. An article published by the Economist in 2014 found GDP per capita in Chicago to be 80% higher than in northern cities, despite their shared post-industrial context. One explanation put forward by the article is the strength of transport links between the central city and its metropolitan area. City centres provide the environment in which the knowledge economy thrives, so enhancing their accessibility is vital in supporting growth in this sector.

Network Rail's Long Distance Market Study

(<http://www.networkrail.co.uk/improvements/planning-policies-and-plans/long-term-planning-process/market-studies/long-distance/>) cited several pieces of research which suggested a statistically significant link between time/cost of travel between businesses and economic output.

Transport improvements have the potential to achieve agglomeration economies by bringing firms and their employees closer to business rivals and partners, enabling firms to access a wider labour supply and market and reducing trading costs. The market study suggests that the impact on business travel is particularly significant where travel times are currently moderate (e.g. for journeys of around 90 minutes).

These themes were explored further in the 2014 Steer Davies Gleave report *Transport Constraints and Opportunities in the North of England*. This highlighted the potential to enhance:

- Journeys between city regions – for example a 2009 study by economists at the Spatial Economics Research Centre (SERC) suggested that there was 40% less commuting between Manchester and Leeds than one would expect, given the cities' characteristics. High overall commuting costs (as measured by generalised journey time) have been identified as the main cause of this lower level of commuting.
- Journeys within city regions – demand for rail travel has grown significantly in recent years and crowding now poses a constraint to accommodating future growth. The quality of rolling stock and the environment around stations are also considered to be barriers to supporting higher levels of commuting by rail.
- Journeys to/from international gateways – in particular access to Manchester Airport, where rail connectivity is seen as a restricting factor in terms of a limited range of direct connectivity, the hours of railway operation not aligning with the daily pattern of airport passenger and employee demand, train service unreliability and airport services being affected by on-train congestion elsewhere on the network. The limited availability of gauge-cleared routes for freight is considered to be a constraint to the growth of the North's ports.

Network Rail believes that transport connectivity in the northern city regions is being held back by a number of factors, one of which is the absence of modern digital signalling systems that would allow more flexible rail services and reduce journey times between cities and regional conurbations.

Digital signalling unlocks the space needed to enable greater flexibility about where, when and how fast trains run. Digital Traffic Management creates options for new train paths that can be adjusted as demand changes from day to day, week to week and season to season. The result is a railway that meets the demand for faster journeys that join-up the economies of our core cities.

The transformational opportunity of creating a single functional economic area was identified by the One North; A Proposition for an Interconnected North report [http://www.manchester.gov.uk/downloads/download/5969/one\\_north](http://www.manchester.gov.uk/downloads/download/5969/one_north). Network Rail as part of the Transport for the North Partnership is contributing to the economic case being developed by Transport for the North to support the Northern Powerhouse.

**What cost-effective infrastructure investments in city-to-city connectivity could address these weaknesses? We are interested in all modes of transport.**

Network Rail is in the process of improving the capability of the infrastructure to support improvements in city-to-city connectivity across the north of England. The North West Electrification programme and Northern Hub programmes have been combined in the North of England programme and will provide the opportunity for the new Northern and Trans Pennine franchises to improve connectivity across the north. Further details on the current plans are included in the Enhancement Delivery Plan (<http://www.networkrail.co.uk/publications/delivery-plans/control-period-5/cp5-delivery-plan/>).

Through the Trans Pennine Route Upgrade Network Rail is developing a scheme that will improve connectivity by reducing the journey time between Manchester and York via Leeds by up to 15 minutes and electrify the railway between Manchester, Leeds, York and Selby. The detailed development work will be completed by December 2017 and could be implemented for the December 2022 timetable. The programme is anticipated to have a significant impact on the operation of the railway during construction; therefore Network Rail will also develop alternative delivery options to minimize disruption.

Maximising the benefits of this upgrade plan will require the digital modernisation of signaling and train control, delivered in an accelerated timeframe. The Digital Railway proposals being developed by industry seek to achieve modernisation of the Trans-Pennine infrastructure, rolling stock, operational and control systems by 2026, enabling an even greater level of return to be realised from existing infrastructure investment. Not only will this deliver large operating cost efficiencies it will provide lower cost options to meet local priorities for:

- Putting more trains on the existing network to enable new services for passenger and freight customers. Utilising digital technology will deliver these benefits earlier than conventional infrastructure upgrades.
- Providing better connections that convert capacity into new choices about where trains start, stop, and where they go to. Digital signaling delivers greater flexibility to rapidly change service patterns and increase capacity.
- Delivering greater reliability, enabled by the removal of dated track-side assets and through the introduction of modern digital traffic management. Traffic Management also enables greater flows of real-time information to passengers and freight operators to improve the experience of rail transport.

The rail industry is currently developing the Initial Industry Plan for investment during Control Period 6 (2019-2024) which will include priority rollout of digital signalling systems to enable the benefits of greater connectivity to be derived for key northern cities. This will be finalised in early autumn 2016, supported by an outline business case that articulates the economic benefits of a rolling 25 year programme of investment in digital railway modernisation.

Through the Transport for the North Partnership Network Rail is undertaking development work to inform the Northern Transport Strategy which for rail focuses on the development of a Northern Powerhouse Rail Network which will offer transformational journey times and frequencies identified as conditional outputs in the One North report.

Emerging findings from this work show that entirely new lines, or in some cases major bypasses and cut-offs may be needed to deliver the conditional outputs in full. On the existing network, express, semi-fast, local and freight services run on the same, often two-track railway, limiting its capability to deliver the transformational changes. The city-to-city corridors being considered by the Strategy comprise:

- Liverpool to Manchester Airport / Manchester – upgrades to deliver aspirational journey times of 20 minutes. There may be the potential to use the proposed HS2 infrastructure to cover approximately half the distance. Our initial work indicates such an option would require a new line from Liverpool to the proposed HS2 route.
- Manchester to Leeds / Sheffield – options to deliver a 30 minute journey time. Our work so far suggests that very significant sections of new railway would be needed to achieve the conditional outputs for journey time and frequency.
- Leeds / Sheffield to Hull – moving towards the Transport for the North vision of Leeds to Hull in 45 minutes and Sheffield to Hull in 50 minutes through electrification and the construction of additional tracks.
- Sheffield to Leeds – the proposed HS2 route offers significant potential to provide a fast link.
- Leeds to Newcastle. We are exploring options to make more intensive use of the HS2 eastern leg connection to the East Coast Main Line to address the key constraint of capacity to the east of Leeds as well as options on the East Coast Main Line.

Network Rail's current development work is scheduled for completion in late 2016 and will identify the options and associated costs for these upgrades to the equivalent of Network Rail's GRIP 2. This work will make further use of the Digital Railway solutions described earlier. Further details can be found in the Northern Transport Strategy; autumn report at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/480711/northern-transport-strategy-autumn-report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/480711/northern-transport-strategy-autumn-report.pdf)

### **Which city-to-city corridor(s) should be the priority for early phases of investment?**

The immediate priority is the completion of the committed programme of enhancements set out in the Hendy review in tandem with franchisee-led enhancements to timetables and rolling stock. The remainder of CP5 will see the further completion of the North West electrification project and the Northern Hub including the Ordsall Chord. This will be followed in CP6 by delivery of the upgrade of the cross-Pennine route linking Leeds and Manchester via Huddersfield. The focus will then shift to the delivery of the Northern Powerhouse Rail programme alongside further upgrades to the 'classic' network.

Network Rail's Long Distance Market Study produced service level conditional outputs for key city pairs on the basis of their potential to deliver against a range of strategic goals, including improving business to business connectivity and reducing road congestion. The conditional outputs relating to connectivity are expressed as aspirations for services of differing characteristics, with the 'best possible' category used to denote the flows for which service improvements might be expected to deliver the highest value. The following flows within the north fall into this category:

- Leeds to Manchester
- Leeds to Sheffield
- Liverpool to Manchester
- Manchester to Sheffield

These conditional outputs predate the One North vision for a Northern Powerhouse and its associated conditional outputs. As such they do not represent transformational opportunity of creating a single functional economic area, which is the subject of separate economic evidence being developed by Transport for the North.

There is not yet sufficient evidence to identify which corridors should be the priority for early phases of investment, although poor east-west connectivity is most frequently cited as a key concern which will not be fully addressed by HS2. Network Rail continues to work with Transport for the North to develop the priorities for the transformation of the economy envisaged by the Northern Powerhouse which will inform the priorities.

In the longer term, completion of HS2 will be vital in strengthening connectivity with the Midlands and London. A revised option recently announced for Leeds station will help ensure strong linkages between HS2 and the existing network, strengthening integration between HS2 and future Northern Powerhouse rail options. Digital modernisation of existing infrastructure will also enable full operational interoperability between HS2 and existing rail services, enabling HS2 services to extend beyond the newly built lines as demand and connectivity patterns change over time.

A similar opportunity to integrate the station solution for Manchester between the existing network, HS2 and future Northern Powerhouse Rail expansion has led Network Rail, Manchester City Council, Transport for Greater Manchester, HS2 Ltd and Department for Transport to come together in creating a station board chaired by Network Rail.

**What are the key international connectivity needs likely to be in the next 20-30 years in the north of England (with a focus on ports and airports)? What is the most effective way to meet these needs, and what constraints on delivery are anticipated?**

The focus for international passenger connectivity in the north is Manchester Airport, currently the third largest in the UK in terms of passenger traffic and the largest outside London. The Northern Powerhouse Rail Network has Manchester Airport at its heart and proposes further development of options to reduce rail journey times from major cities. City regions will work with other northern airports to develop plans for improved connectivity.

For freight, the priority will be on access to the North's major ports. Network Rail's Freight Market Study (<http://www.networkrail.co.uk/improvements/planning-policies-and-plans/long-term-planning-process/market-studies/freight/>) identifies the importance of the northern ports. Forecasts indicate the highest volumes to be to/from Immingham, where by 2043 more than 2 paths per off-peak hour are expected to be required comprising intermodal and coal traffic, and Teesport, which is expected to generate a requirement for between 1.5 and 2 paths an hour. It is expected that the Transport for the North freight strategy work stream will identify the importance of Port of Liverpool and other ports which have seen significant investment since the forecasts that inform the market study were produced.

The Northern Transport Strategy recognises the need to respond to freight growth through the following measures:

- Accommodating longer trains with greater tonnages
- Providing sufficient gauge clearance
- Supporting the development of further Strategic Freight Interchanges
- Working with freight operators to identify demand for additional freight capacity
- Examine the scope for the electrification programme to facilitate the greater use of electric traction for freight.

Any potential new cross-Pennine tunnel could also be used to support future freight growth.

Transport for the North is developing a strategy to enhance international connectivity, which will include improving surface access to airports and interventions to support the attractiveness of northern ports. This evidence base will further inform Network Rail's development work on potential interventions.

Digital modernisation will transform the economics of the Northern rail freight industry – increasing business competitiveness and the region's place as a hub for international trade. It unlocks capacity that allows more freight paths that compete more cost effectively with road, and improved connectivity to major ports, such as Liverpool. Traffic Management creates the scope for more flexible timetabling that responds to demand.

**What form of governance would most effectively deliver transformative infrastructure in the north, how should this be funded and by whom, including appropriate local contributions?**

Network Rail welcomes the opportunity to work with northern partners through Transport for the North and plays a full part of the Transport for the North Partnership. A Memorandum of Understanding is in place with Transport for the North and Network Rail's chairman Sir Peter Hendy sits on the Partnership Board.

Network Rail has recognised the opportunity to strengthen the performance of its business through increasing devolution through the Route structure. This has driven the recent changes to align central functions clearly to delivering for the routes. This will allow us to strengthen our relationship with Transport for the North still further.

The railway is a national network and must be managed as such to deliver the maximum of benefits possible for the whole UK. There are activities Network Rail believes are best managed at a network level that can be described as the role of a system operator, such as the long-term planning of the network and capacity planning. In the role of system operator Network Rail believes it is well placed to work in the Transport for the North partnership to develop the rail proposition in the context of the wider railway network.

Network Rail has carried a significant amount of detailed strategic development in this area and would value, with our partners in Transport for the North, the opportunity for a more detailed discussion with the commission to share this further.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Jo Kaye", written in a cursive style.

**Jo Kaye**

Director, Network Strategy & Capacity Planning