October 2010

Northern

Route Utilisation Strategy
Draft for Consultation

NetworkRail

Foreword

Investment in infrastructure is key to sustainable economic growth. However, with the nation's finances severely constrained there are tough choices to be made. Increasingly, the country will need to prioritise investment in infrastructure based on the contribution which it can make to economic growth, jobs and private sector investment, as well as on people's quality of life and the environment.

The draft Northern Route Utilisation Strategy (RUS) sets out the priorities for rail investment in the north of England for the next 20 years. We believe that the options recommended can both meet the increased demand forecast by this RUS, and act as a catalyst for economic growth.

The north of England has seen significant growth in demand for rail services in the last 15 years. Economic growth, modal shift related to road congestion and car parking charges, and changes in working arrangements have seen more passengers and freight relying on rail.

The industry has responded well: train and freight operating companies have increased the number of services, enabled by significant investment from Network Rail, central and local government and other bodies.

However, as this draft second generation RUS shows, growth in passenger and freight demand is forecast to continue over the next 10 – 20 years. With the railways already nearly full, this growth poses significant challenges.

In just ten years' time passenger growth on all peak services into Leeds, Liverpool, Manchester, Newcastle and Sheffield could be as much as 30 – 45 per cent. Looking beyond to 2029 these growth figures are in the 60 – 70 per cent range. In any terms, this is a huge increase in demand.

We are already meeting the short-term challenges. Work is underway to improve journey times between and peak time capacity into cities like Liverpool, Manchester, Leeds and Sheffield, and we are planning a major upgrade of Manchester Victoria station. We are also undertaking a programme of loading gauge enhancements to facilitate growth of intermodal freight traffic.

In just ten years' time passenger growth on all peak services into Leeds, Liverpool, Manchester, Newcastle and Sheffield could be as much as 30 – 45 per cent. Looking beyond to 2029 these growth figures are in the 60 – 70 per cent range. In any terms, this is a huge increase in demand.

These improvements alone, however, will not meet the levels of demand forecast in this RUS. We have to find value for money improvements to the railway to allow more trains to run to more destinations, more frequently and quickly than today.

This RUS proposes that a number of such improvements should be implemented between 2014 and 2024.

It recommends implementing the Northern Hub plans, making it possible for 700 more trains to run across the North every day.

Longer trains into several cities across the north of England and some additional peak services are also recommended, as are opportunities for track layout improvements in South Yorkshire and at Liverpool Lime Street.

Continued enhancement of the freight network is another priority, with routes to Immingham docks a particular focus.

Finally, a rolling programme of electrification, including the Midland Main Line – one of the best ways of providing a cheaper, more efficient and even more environmentally friendly railway – is recommended.

In the longer term, high speed links between the north and London could improve connectivity and free up capacity on existing routes. However, this RUS demonstrates that we cannot neglect the existing network.

Continued investment in rail is necessary if our transport infrastructure is to meet the current and future needs of people and businesses across the north.

Network Rail and our industry partners believe that this RUS provides a robust strategy for the rail industry in the coming years and I would like to take this opportunity to thank industry colleagues who have worked with us on this RUS.

We welcome your comments on this draft for consultation. We have not set specific questions, however we would particularly appreciate feedback on the demand forecasting methodology and the options we have recommended.

The deadline for responses is 14 January 2011 and we intend to publish the final RUS next spring.

Paul Plummer
Director, Planning & Development

Executive summary

Introduction

Since June 2005, the Network Licence has required Network Rail to publish Route Utilisation Strategies (RUSs), which establish the most effective and efficient way to use the capacity available across the network.

Network Rail has since then published, and continues to publish, RUSs that will, upon completion of the programme, cover the whole of its network.

The Network Licence also requires Network Rail to 'maintain' established RUSs, those that have been approved by the Office of Rail Regulation (ORR). This has led to the development of a 'second generation of RUSs', of which this Northern RUS is the first.

Scope and planning context

Apart from the national Freight and Network RUSs, the first generation of RUSs all had a strict geographic scope to consider when identifying gaps and options. As part of the second generation, the Northern RUS does not have a strict geographic scope to consider but broadly covers the north of England. The area covered by this RUS has already been considered in a number of geographic RUSs: those for the North West, East Coast Main Line, Merseyside, Yorkshire and Humber, and Lancashire and Cumbria.

The gaps and recommendations of these first generation RUSs have been reviewed in the light of funded interventions for Control Period 4 (CP4) and Control Period 5 (CP5), including the Secretary of State for Transport's announcement in 2009 of the electrification of a number of routes in the North West, and a set of passenger growth forecasts to 2024 and the Strategic Freight Network (SFN) forecasts for 2019 and 2030. Account has also been taken of RUS recommendations that change those published in earlier RUSs.

Each first generation gap can be broadly categorised as follows:

1. gap that will have been addressed by the end of CP4 (the baseline for this RUS) so is 'closed'
2. gap which will still be a gap at the end of CP4 but for which the previous RUS recommendation is still appropriate
3. gap which will still be a gap at the end of CP4 but for which the intervention needs reviewing due to more recent changes
4. gap that has changed sufficiently that the previous intervention may not be entirely appropriate.

This RUS, along with the first generation of RUSs, is designed to inform the next High Level Output Specification in 2012 by feeding into Network Rail's Initial Strategic Business Plan, to be published in summer 2011.

Categories 3 and 4 have shaped most of the Northern RUS gaps and the vast majority of "first generation" gaps fall into category 2. There has been an assessment of the extent of the gap, and options generated where appropriate. These options have been appraised to understand which most appropriately meet the identified gap and offer the most value for money.

This RUS, along with the first generation of RUSs, is designed to inform the next High Level Output Specification (HLOS) in 2012 by feeding into Network Rail's Initial Strategic Business Plan (ISBP), to be published in summer 2011. The ISBP will identify outputs that Network Rail, in consultation with its industry partners, thinks the Governments for England and Wales, and Scotland may consider buying in CP5, the interventions necessary to achieve them and their costs. This RUS also looks at the period beyond current train operator franchises, and therefore aims to inform the next round of franchising affecting the north of England.

The Northern RUS process has been overseen and directed by the Stakeholder Management Group which comprises representatives from the Train Operating Companies (TOCs), Freight Operating Companies (FOCs), the Department for Transport (DfT), Network Rail, the Association of Train Operating Companies (ATOC), Passenger Focus, the Passesnger Transport Executives (PTEs) and the ORR (as observers).

Forecast changes in demand

Recent industry studies, including RUSs, have shown that industry standard models tend to underpredict observed passenger growth in the regional centres.

City-wide car parking supply and cost, and structural change (the proportion of city centre workers employed in office-based sectors) have been cited as potential reasons for this unexplained peak growth.

The UK economy was in recession from the fourth quarter of 2008/09 until the third quarter of 2009/10 and the effect on future rail demand is still unclear. However, the most recent data suggests that in many rail sectors demand continued to increase during the recession and demonstrates high growth in the post-recession recovery period.

High and low growth scenarios have been produced to 2029. The high growth scenario has been used to identify gaps and forms the central case for growth at the option appraisal stage. The low growth forecast will be used to show a comparison between the method taken forward and the traditional PDFH method.

The following table shows the expected peak growth in rail demand into the five CP4 HLOS city stations on all services.

Despite the recession, growth is expected to be relatively high to 2014 due to the increase in structural change. A 42-44 per cent increase in demand is forecast on all services into Leeds and Manchester in the peak by 2019 and peak growth into all five HLOS cities is expected to be between 62 and 72 per cent by 2029 in the high scenario.

Peak forecast increase in passenger demand into the five CP4 HLOS cities on all services

	Growth – 2014	Growth – 2019	Growth – 2024	Growth – 2029
Leeds – low	7 %	16 %	25 %	36 %
Liverpool – low	5 %	17 %	28 %	42 %
Manchester – low	7 %	17 %	25 %	37 %
Newcastle – low	12 %	19 %	26 %	34 %
Sheffield – low	5 %	14 %	23 %	33 %
Leeds – high	20 %	42 %	53 %	68 %
Liverpool – high	13 %	32 %	46 %	63 %
Manchester – high	21 %	44 %	57 %	72 %
Newcastle – high	21 %	37 %	49 %	62 %
Sheffield – high	15 %	35 %	48 %	62 %

Freight forecasts are those developed nationally to 2019 and 2030 for the Strategic Freight Network (SFN).

The changes in freight tonnages to be moved by rail were mapped across the network from which a forecast of future demand for freight train paths per day by line of route was derived. This is shown in more detail in **Chapter 3**.

The following table shows the forecast change in freight demand by commodity to 2030.

The route with the largest number of additional train paths per day is the Immingham – Scunthorpe – Knottingley corridor.

Forecast change in freight demand by commodity to 2030

	2006	2030	Average annual growth	2006	2030	Average annual growth
Solid fuels	51	41	25 %	8	5	-2 %
Construction	21	32	28 %	4	5	1 %
Metals + ore	18	19	25 %	3	3	0 %
Ports non bulk	12	50	26 %	4	17	6 %
Domestic non bulk	2	25	23 %	1	12	11 %
Total	116	25	46 %	23	45	3 %

Northern RUS gaps and recommendations

The Northern RUS identified nine gaps from the process described above. The gaps are listed below, along with the recommendations made by this RUS or those previously.

Gap 1 – Peak crowding on routes affected by electrification of additional routes in the North West

Recommended options include a peak shuttle between Liverpool and Manchester via Warrington Central and lengthening of peak services on the Atherton corridor into Manchester. Analysis of the issues faced by a possible change in the service proposition on the Bolton corridor into Manchester has been undertaken to inform the strategy after completion of the electrification programme on this route.

Gap 2 – Accommodating peak services into the Manchester Piccadilly station area

Previous RUSs and this RUS have recommended additional and lengthened services into Manchester Piccadilly. This RUS has found that these can be accommodated with some recommended timetable alterations. However, a number of the lengthened services needed at Manchester Piccadilly operate to/from Manchester Airport to make best use of capacity at Manchester Piccadilly, as well as providing through services. As a result of constraints at Manchester Airport a fourth platform has been recommended to accommodate longer trains on the Bolton and north cross-Pennine corridors.

Gap 3 – Peak and off-peak crowding on the Leeds – Manchester route taking into account journey time improvements

The Yorkshire and Humber RUS recommended the operation of five interurban services on the route together with some peak hour train lengthening, which this RUS supports. However, passenger capacity on north cross-Pennine services is expected to increase further, partly as a result of previous RUS recommendations. In addition, this RUS has recommended a peak semi-fast service between Huddersfield and Leeds to provide sufficient capacity into Leeds in the peaks, and lengthening of existing services between Leeds and Manchester via Huddersfield to provide sufficient capacity into Manchester in the peaks.

Gap 4 – Peak and off-peak crowding between Sheffield and Manchester

Planned lengthening of the existing Liverpool – Norwich services in line with recommendations made in the East Midlands RUS will provide additional capacity on this route. In addition, lengthening of peak services between Cleethorpes and Manchester Airport to deal with growth west of Doncaster is recommended to accommodate passenger demand over the period of this RUS.

Gap 5 – Peak crowding on the Retford and Penistone lines and additional calls at Elsecar

The circumstances on these two routes into Sheffield have changed since the Yorkshire and Humber RUS was published. The use of the equivalent of 2x23m vehicle units is expected to provide sufficient capacity on these routes over the period of the RUS. Reinstatement of stops at Elsecar station are also recommended, if value for money linespeed improvements can be identified.

Gap 6 – Insufficient freight capacity on the Immingham – Scunthorpe – Knottingley corridor

A set of infrastructure interventions comprising signalling upgrades and a new turnback facility at Knottingley is recommended to provide sufficient capacity to accommodate expected growth to 2030.

Gap 7 – Peak crowding on the Ilkley, Skipton and Wakefield Westgate corridors into Leeds.

The RUS has checked whether the Yorkshire and Humber RUS recommendations on certain corridors into Leeds are sufficient to accommodate the new demand forecasts. It was found that the previous recommendations of train lengthening, additional services and higher capacity rolling stock are expected to provide sufficient capacity on these corridors over the period of the RUS.

The emerging strategy takes account of the output of previous RUSs, the recommendations in this RUS and other relevant developments.

Gap 8 – Accommodating peak services into Leeds station

Several infrastructure interventions are recommended to provide sufficient track capacity to accommodate the recommended train lengthening and additional services into Leeds station over the period of the RUS.

Gap 9 – Strategic connectivity across the north of England

Option two of the Manchester Hub Study is recommended to meet this gap, along with the recommendations from other RUSs which are aimed at improving connectivity on routes outside the scope of the Manchester Hub Study. The recommendations of the study are being developed as the Northern Hub Project. A copy of the Manchester Hub Study can be found on Network Rails' website at **www.networkrail.co.uk**

Emerging strategy

The emerging strategy takes account of the output of previous RUSs, the recommendations in this RUS and other relevant developments. It is split into three sections covering the time to the end of the current control period in March 2014, the next two five-year control periods, and the long term.

Short-term strategy 2009-14 (CP4)

Background

Although the last year of the period from April 2009 to March 2014 is the baseline for this RUS, an overview of the strategy for CP4 is included here as a lead into the strategy recommended for future control periods.

The strategy for CP4 consists primarily of measures to increase capacity on peak passenger services into Leeds, Sheffield, Manchester and Liverpool, to improve cross-Pennine passenger services throughout the day, to improve journey times and service levels from Yorkshire and the North East to London and to provide increased capacity and capability for freight.

Anticipated dates for delivery of infrastructure projects funded by Network Rail are set out in the Network Rail CP4 Delivery Plan, which is updated quarterly, and the annual route plans published in March (both of which are available at **www.networkrail.co.uk**). The summaries below reflect the current proposals for the use of additional rolling stock made available and the infrastructure interventions to support them. However, the number of additional vehicles available for services in the north of England is likely to be significantly less than was expected prior to the start of the control period. As many of the infrastructure interventions in CP4 are designed to deliver the operational plans of the train operators that reflect the use of the additional stock, the list of enhancements is subject to change.

Local services

The most crowded local services will either be lengthened or supplemented by new shuttle services as additional rolling stock becomes available. New peak shuttles are expected to run between Leeds and Horsforth, Doncaster, Bradford Forster Square and Halifax, and between Manchester and Rochdale, and Stalybridge. Platform extensions will be provided at a number of stations and new turnback facilities will be built

at Horsforth and Stalybridge in association with renewal projects. New and increased passenger train servicing and stabling facilities will be needed to accommodate the additional rolling stock.

Capacity for the longer and additional services terminating at Leeds will be provided by creating an additional through platform at Leeds and using an existing through platform as a long turnback facility. This involves connecting two bay platforms (numbers 13 and 14), and a new crossover at the west end of Platforms 15 and 16. This allows Platform 15 to be used to terminate/start two long trains to/from the west of Leeds, while trains that use this platform currently would use the new through platform. Some peak trains may operate through Leeds to a new turnback facility at a resited Micklefield station, also to free up capacity at Leeds.

Improvements to services in the Tees Valley and between East Lancashire and Manchester are being promoted by local authorities. The former is the Tees Valley Metro Project, which involves an even interval frequency of two trains per hour between Darlington and Saltburn and two new stations. The latter provides for increased services between Blackburn and Manchester, requiring track capacity improvements, and a new service from Burnley to Manchester via Rochdale using a reinstated north to west curve at Todmorden.

Long distance services serving London King's Cross

There will be increased service levels between the RUS area and London King's Cross to cater for growth and to reduce journey times on the medium and longer distance flows serving Yorkshire and the North East. These are supported by a programme of infrastructure enhancements on the East Coast Main Line (ECML) and upgrading of the route between Peterborough and Doncaster via Spalding and Lincoln. These schemes will also improve performance and most provide freight capacity benefits.

The programme includes two schemes on the ECML in the RUS area. One is the remodelling of the Shaftholme Jn area to provide a shorter route for Immingham to Aire Valley coal trains, which also removes the conflict between these services and long distance passenger and freight trains using the Doncaster to York route. The second is a fourth running line between Holgate Jn and York station, and associated signalling enhancements, providing improved capacity for trains to and from Leeds and addressing reactionary delay to services caused by congestion at York.

Interurban services

Journey times will be reduced between Leeds and Manchester via Huddersfield, and between Liverpool and Manchester via Earlestown (the Chat Moss route). These will be achieved through a mixture of linespeed improvements and small capacity enhancement schemes designed to improve the timetable.

Freight services

Additional freight services, as forecast in the Freight RUS, will be accommodated, with re-routeing where appropriate to take advantage of new freight

routeing opportunities such as those provided by the recently upgraded Brigg line and the Shaftholme Jn remodelling project.

The capability to carry 9'6" deep sea containers on standard deck height wagons and the transportation of other intermodal units will be provided through loading gauge enhancements on a number of routes, funded by several different mechanisms. The following routes in the RUS area are expected to see loading gauge enhancements:

- Peterborough – Doncaster – Selby via the East Coast Main Line
- Newark – Lincoln – Gainsborough – Doncaster
- Peterborough – Spalding – Lincoln
- Doncaster – Leeds Stourton via Wakefield Europort
- Doncaster – Birmingham via Beighton and the Erewash Valley
- Doncaster – Newcastle and possibly into Scotland
- Swinton – Moorthorpe – South Kirkby Jn
- Darlington – Teesport
- Seaforth (Liverpool) – West Coast Main Line via Huyton.

Performance improvement

Performance improvement is targeted through a reduction in reactionary delays, either in conjunction with other interventions in the CP4 strategy, renewals or where separate value for money and affordable projects are achievable.

Electrification

The first phase of electrification of additional routes in the North West is expected to be completed by the end of CP4. The programme of electrification is currently being developed.

Other projects promoted/funded by local authorities/PTEs

In addition to those in the scope of the Tees Valley Metro project, several new stations are being promoted and/or funded by local authorities or PTEs for opening in CP4. These are at Apperley Bridge, Kirkstall Forge, Haxby and Low Moor. There are also schemes to provide a new bay platform at Wakefield Westgate and to enhance the re-sited Micklefield station to become a parkway station.

Medium-term strategy 2014-24 (CP5 and 6)

Background

The strategy for the medium-term builds on that proposed for CP4. It assumes that any schemes or service changes in the previous section that are not undertaken in CP4 will become part of the medium-term strategy.

The general approach will be further train lengthening to meet predicted continuing growth in demand, though on some corridors additional shuttle services will provide a better use of resources and also improve connectivity.

There is an opportunity to improve connectivity between the cities and the major towns of the north significantly, and also between them and other key destinations such as Manchester Airport

and cities in other parts of Britain. This would also help drive a step change in economic activity for the north of England.

Therefore there will be a continuing need for additional rolling stock, including electric units to take advantage of later phases of the electrification of routes in the North West. In addition, by this time a number of existing rolling stock fleets will be reaching life-expiry or becoming due for a major mid-life overhaul, and the commencement of replacement and refurbishment programmes will create opportunities for improvements in capacity, performance, fuel efficiency and attractiveness to passengers.

Interurban services

The track capacity and linespeed improvements on a number of corridors linking neighbouring cities and towns to Manchester, and in the Manchester area itself, would allow improvements in frequencies and journey times of interurban services between major cities in the north. There would be opportunity to improve links between various northern cities and other key destinations, including Manchester Airport. In particular, with any necessary capacity improvements at Leeds, Sheffield and Liverpool Lime Street, increased frequencies will be possible between Manchester and Leeds, Sheffield and beyond and between Liverpool and Manchester.

Improved journey times will also be sought on other interurban corridors, including between Leeds and Sheffield via Barnsley (and onwards to the East Midlands) and where signalling or other renewals are due to be undertaken, for example on the route out of Hull.

Local services

There will be further train lengthening of local services or the operation of additional peak shuttles, where these provide better value for money, to meet peak growth into Newcastle, Middlesbrough, Leeds, Manchester, Liverpool and Sheffield as more rolling stock becomes available. A programme of platform extensions will be required to allow train lengthening on some lines.

The improvements in track capacity in the Manchester area would allow more commuter and local services to run throughout the day and for their journey times to be improved. Other local services converted to electric traction following the completion of the electrification of additional lines in the North West will also be speeded up.

Long distance high speed services

Further growth on Long Distance High Speed (LDHS) trains to London King's Cross, London St Pancras and non-London LDHS services will be met by a mixture of longer trains and additional services as a result of the introduction of new LDHS rolling stock. Improved long distance journey times would also be expected.

Electrification

The remaining works in connection with electrification of additional routes in the North West are expected to be completed by the middle of CP5. A timetable recast on the Bolton and Atherton corridors would be needed to make best use of rolling stock following electrification of the Blackpool – Preston – Bolton – Manchester route, to meet growth and connectivity requirements.

There would then be possible extension of the electrified network within the RUS area, as identified in the electrification RUS, covering one or more of the following:

- Midland Main Line from Sheffield to Bedford via Derby
- Sheffield to Doncaster and/or South Kirkby Jn
- Leeds – York/Selby
- Manchester – Leeds.

Freight services

Further increases in freight services will be seen on those routes predicted to see a significant increase in train path requirements in the SFN forecasts, particularly between Immingham and the Aire Valley and into the Trafford Park terminals. The former would require improved signalling headways between Immingham and Scunthorpe in association with signalling renewals.

The SFN steering group will identify any further loading gauge enhancement works beyond those implemented in CP4. The electrification of further routes would help provide the increased loading gauges on those lines.

Rolling stock

As well as the introduction of new LDHS rolling stock mentioned above, new regional rolling stock will be required to deal with the growth and improved connectivity across northern England described in this strategy. This would be part of a progressive programme of new build and/or refurbishment to provide the additional vehicles required and to replace obsolete rolling stock. The electrification of further routes within the RUS area would allow more electric units to be part of this programme.

Long-term context (CP7 and beyond)

The 2007 White Paper 'Delivering a Sustainable Railway' aspired to a doubling of both passenger and freight traffic nationally over a 30-year period.

This section examines what a doubling of passenger and freight traffic over a 30-year period could mean for the RUS area. It is assumed that all passenger markets would generally double. However, for freight the SFN forecasts for 2030 have been used to identify those routes where the increase in freight path requirements are most significant. These are generally the core national arteries connecting the ports, the Channel Tunnel and regional distribution centres, as intermodal traffic is the primary growth area.

For high traffic growth on existing routes the strategy in the longer term must look first to make best use of the existing infrastructure in the RUS area and then to the opportunities offered by the wider rail network, for example making use of any remaining capacity on lines outside the RUS area. There could also be options to provide the additional capacity through reopening currently disused lines, or construction of some completely new sections of railway.

On the north-south axis the development of one or more high speed routes would provide much reduced journey times and increased service frequencies to London from key locations in the north. It would also release capacity on the existing north-south routes, which would allow growth in other passenger markets and in freight.

In order to accommodate a doubling of commuter journeys on each rail corridor, the short-to-medium term strategy of either train lengthening or additional services gives the foundation for the longer term. Continued growth could be addressed largely through progressive train lengthening both of existing services and the 'peak-busting' additional services described in this RUS.

Much of the network capacity to allow a doubling of the passenger markets in the north of England would be provided by the Northern Hub schemes. Increasing the capacity in the Leeds, Sheffield and Liverpool Lime Street areas (which are not within the scope of the Northern Hub capacity works) would result in most of the remaining infrastructure being in place to accommodate the doubling of passenger numbers in these markets.

For freight growth, accommodating a significant increase in intermodal traffic is necessary. This requires loading gauge enhancement to W9, W10 and W12, to allow train lengths up to 775 metres (to maximise use of train paths, locomotives and drivers) and to increase freight paths on the key freight arteries through the RUS area, including associated diversionary routes.

Those arteries where increased capacity would be the most challenging are:

- Rotherham – Swinton – Moorthorpe – Hare Park Jn
- Doncaster – Colton Jn.

The first of these arteries will need four-tracking of significant sections and improving some of the junctions on this corridor, but this will also provide other benefits.

In summary, the longer-term high level strategy to deliver a doubling of passenger and freight traffic should aim to make use of a mixture of enhancements to the existing railway network and new high speed routes.

The other requires solutions to future routeing of passenger and freight traffic through the Doncaster station area and attention given to making most effective use of the lines via Hambleton and Askern. The former needs to be examined not only in the context of the freight growth but for the longer-term passenger services. This could lead to a major upgrade of the network in this area when signalling renewals become due.

In summary, the longer-term high level strategy to deliver a doubling of passenger and freight traffic should aim to make use of a mixture of enhancements to the existing railway network and new high speed routes. The balance between these will depend on the routeing of any new lines and therefore which current major passenger flows would transfer to them. The capacity of the existing routes would then be used to cater for the remaining passenger flows and freight growth.

Consultation and next steps

As mentioned previously, this RUS has been developed in conjunction with industry stakeholders through a Stakeholder Management Group comprising representatives from DfT, TOCs, FOCs, PTEs, ATOC, Passenger Focus and the ORR (as observers).

Briefings were also undertaken with organisations outside the rail industry, including local authorities, Government Agencies and ports and airports, and workshops were held with rail user groups and Community Rail Partnerships.

We now welcome contributions to assist us in developing this RUS. Specific consultation questions have not been set but we are particularly interested in feedback on the demand forecasting methodology and the options that address the gaps identified. Details of how to respond can be found in **Chapter 6**.

1. Background

1.1 Introduction to Route Utilisation Strategies (RUSs)

1.1.1

Following the Rail Review in 2004 and the Railways Act 2005, the Office of Rail Regulation (ORR) modified Network Rail's network licence in June 2005 to require the establishment and maintenance of RUSs across the network. Simultaneously, ORR published guidelines on RUSs and both of these documents were then updated and reissued on 1 April 2009. A RUS is defined in Condition 1 of the network licence as, in respect of the network[1] or a part of the network, a strategy which will promote the route utilisation objective.

1.1.2

The route utilisation objective is defined as:

"the effective and efficient use and development of the capacity available on the network, consistent with the funding that is, or is likely to become, available during the period of the route utilisation strategy and with the licence holder's performance of the duty."

Extract from Network Licence Condition 1, April 2009

1.1.3

The ORR Guidelines explain how Network Rail should consider the position of the railway funding authorities, their statements, key outputs and any options they should wish to be tested. Such strategies should address:

- **network capacity and railway service performance**
- **train and station capacity including crowding issues**
- **the trade-offs between different uses of the network (e.g. between different types of passenger and freight services)**
- **rolling stock issues including deployment, train capacity and capability, depot and stabling facilities**
- **how maintenance and renewals work can be carried out while minimising disruption to the network**
- **opportunities from using new technology**
- **opportunities to improve safety."**

Extract from ORR Guidelines on Route Utilisation Strategies April 2009

1 *Defined in Network Rail's Licence Condition 1 as where the licence holder has any estate or interest in or right over a station or light maintenance depot, such station or light maintenance depot.*

1.1.4

The guidelines also set out principles for RUS scope, time period and processes to be followed and assumptions to be made. Network Rail has developed a RUS manual which consists of a consultation guide and a technical guide. These explain the processes used to comply with the Licence Condition and guidelines. These and other documents relating to individual RUSs and the overall RUS programme are available at **www.networkrail.co.uk**

1.1.5

The ORR guidelines require options to be appraised. This is initially undertaken using the Department for Transport's (DfT) appraisal criteria, though bespoke analysis will be used where shown to be necessary. To support this appraisal work, RUSs seek to capture implications for all industry parties and wider societal implications in order to understand which options maximise net industry and societal benefit, rather than that of any individual organisation or affected group.

1.1.6

RUSs occupy a particular place in the planning activity for the rail industry. They utilise available input from processes such as the DfT's Regional Planning Assessments and, for the period to 2014, the 2007 High Level Output Specification (HLOS). The recommendations of a RUS and the evidence of relationships and dependencies revealed in the work to produce them form an input to decisions made by industry funders and suppliers on issues such as franchise specifications and investment plans. In particular, RUSs form an essential building block of Network Rail's Strategic Business Plan, itself a precursor to the 2012 HLOS process which will define the level of expenditure available for rail in the next control period (Control Period 5 2014/19).

1.1.7

Network Rail will take account of the recommendations from RUSs when carrying out its activities. In particular, they will be used to help inform the allocation of capacity on the network through application of the normal Network Code processes.

1.2 RUS principles

RUSs examine the rail network at a specific point in time and identify where it will not be able to accomodate the forecast demand placed upon it. This is primarily in terms of capacity but RUSs also consider performance and connectivity. Where the demand cannot be accommodated (Gaps), RUSs seek to find solutions. The general principle adopted in RUSs has been to consider simpler and lower cost interventions before turning to more complex and expensive solutions. In the first instance, optimising use of existing infrastructure is examined and timetabling solutions are usually sought as preferable to infrastructure works, subject to there being no unacceptable performance impact. The various options are then evaluated using the DfT's appraisal criteria and recommendations made.

1.3 RUS governance

The RUS process is designed to be inclusive. Joint work is encouraged between industry parties, who share ownership of each RUS through its industry Stakeholder Management Group (SMG). Detailed analysis is undertaken in industry Working Groups.

There is also informal consultation outside the rail industry by means of rail user group workshops and wider stakeholder group briefings.

1.4 Second generation RUSs

The Network Licence requires Network Rail both establish and maintain RUSs. Network Rail has published a number of RUSs which, at least in part, cover the north of England:

- Freight RUS, established May 2007
- North West RUS, established July 2007
- East Coast Main Line RUS, established April 2008
- Merseyside RUS, established May 2009
- Yorkshire and Humber RUS, established September 2009
- Lancashire and Cumbria RUS, established October 2009
- Network RUS: Electrification Strategy, established December 2009.

Since the original strategies, a number of significant infrastructure and service changes to the railways in the north of England have either occurred or have been announced as funded. In order to fulfil its obligations to maintain established RUSs, Network Rail is therefore publishing a series of second generation RUSs, of which this Northern RUS is the first.

These strategies will take into account the relevant recommendations from previous RUSs, identifying where major changes have occurred (and are likely to occur during the current control period) and analyse interventions which may be required in order to accommodate passenger and freight demand to 2024. In line with other recently published RUSs, the strategy will also look further ahead and consider some of the interventions that may be required over the next 30 years.

1.5 About this document

This strategy has been developed based on input from stakeholders from within and outwith the rail industry, and comprehensive appraisal and analysis work.

Chapter 2 describes the scope of the RUS and the planning context in which it is written.

Chapter 3 details the passenger demand forecasts and the Strategic Freight Network forecasts which were used in this RUS.

Chapter 4 describes the gap identification process, the strategic gaps considered by the Northern RUS and the options appraised.

Chapter 5 summarises the emerging strategy for the north of England resulting from work done in this RUS and the established RUSs listed above.

Chapter 6 describes how stakeholders can respond to this consultation and the next steps in the RUS process.

2. Scope and planning context

2.1 Introduction

This chapter details the scope of the Northern Route Utilisation Strategy (RUS), its purpose, timeframe, the planning context in which it is set, and the linkages to other studies.

2.2 Northern RUS scope

Apart from the Freight and Network RUSs, the first generation of RUSs all had a strict geographic scope to consider when identifying gaps and options. As part of the second generation, the Northern RUS does not have a strict geographic scope to consider but broadly covers the north of England. This area has already been considered in other RUSs and so has an established set of recommended interventions. This RUS reviews those interventions, and relevant ones in the Freight and Network RUSs, in the light of demand forecasts over a longer time frame and what has happened since the RUSs were published. It only considers issues where there has been a change in circumstance since the original recommendations were made. The RUS also contains a high-level 30-year strategy; something that a number of the earlier RUSs did not have.

Figure 2.1 shows broadly the railway in the north of England.

2.3 Northern RUS timeframe and purpose

2.3.1 Timeframe

The baseline for this RUS is the expected position at the end of Control Period 4 (CP4). Network Rail is funded in five-year control periods and CP4 is the period from April 2009 to March 2014.

The 'Delivering a Sustainable Railway' Government White Paper was published in July 2007. This included a High Level Output Specification (HLOS) for CP4, specifying the safety, capacity and performance outputs that the Government required the rail industry to deliver by 2014. **Table 2.1** details the CP4 HLOS peak capacity requirements for urban centres in the north of England. In January 2008, the Department for Transport (DfT) also published a Rolling Stock Plan that indicated the number of additional vehicles likely to be available for meeting capacity growth across the network.

Table 2.1 – CP4 HLOS peak capacity requirements for urban centres in the north of England

	Morning peak three hours			Morning high-peak hour		
Urban centre	**Forecast demand in 2008/09**	**Extra demand to be met by 2013/14**	**Maximum average load factor at end CP4**	**Forecast demand in 2008/09**	**Extra demand to be met by 2013/14**	**Maximum average load factor at end CP4**
Leeds	23,400	5,100	64 %	11,300	2,700	70 %
Central Manchester	22,100	4,100	45 %	10,700	2,200	49 %
Other urban areas (including Sheffield, Newcastle and Liverpool (excluding Merseyrail network))	27,700	3,600	41 %	12,300	2,000	46 %

Network Rail's CP4 Delivery Plan was published in June 2009 and subsequently updated in March 2010, with further updates generated through a rail industry change control mechanism. It states how Network Rail aims to deliver the outputs specified within the HLOS. The relevant CP4 enhancement schemes that are currently included in the 2014 baseline for this RUS are contained in **Chapter 5**. However, the number of additional vehicles expected to be available for services in the north of England is likely to be less than indicated in the Rolling Stock Plan and will constrain the ability to meet growth in CP4. The list of infrastructure interventions required to support the use of the additional rolling stock in CP4 will be subject to change.

Those interventions that were previously recommended by RUSs for CP4 which are not fully implemented by the end of the control period will become part of the strategy beyond 2014.

Additionally, in 2009 the Government announced the electrification of a number of routes in the north west, known as the Lancashire Triangle, to be completed in phases during CP4 and Control Period 5 (CP5).

This programme of electrification comprises the following routes: Liverpool to Manchester via Earlestown, Huyton to Wigan via St. Helens Central, Manchester to Preston via Bolton and Preston to Blackpool.

2.3.2 Availability of funding

As mentioned in **Chapter 1**, the RUS is required to take account of funding that is or is likely to become available. Evidently, there are currently a number of uncertainties regarding the economy, but it is still appropriate for this RUS to identify interventions that demonstrate value for money over the full period of the RUS to meet identified gaps. In the event that funding is constrained then the RUS will play a valuable role in prioritising the use of available funds.

Figure 2.1 – Railway in the north of England

2.3.3 Purpose of the RUS

This RUS, along with the first generation of RUSs, is designed to inform the next HLOS in 2012 by feeding into Network Rail's Initial Strategic Business Plan (ISBP), which will be published in summer 2011, identifying outputs that Network Rail, in consultation with its industry partners, thinks the Governments for England and Wales, and Scotland may consider buying in CP5, the interventions necessary to achieve them and their costs.

This RUS also goes beyond current train operator franchises, and therefore aims to inform the next round of franchising in the north of England.

2.4 Links to other studies

The Northern RUS cannot be considered in isolation and fits within a wider context of transport planning and other studies and workstreams.

2.4.1 Established first generation RUSs

As mentioned above, the area covered by this RUS has already been considered in a number of RUSs. They are:

- Freight RUS, established May 2007
- North West RUS, established July 2007
- East Coast Main Line RUS, established April 2008
- Merseyside RUS, established May 2009
- Yorkshire and Humber RUS, established September 2009
- Lancashire and Cumbria RUS, established October 2009
- Network RUS: Electrification Strategy, established December 2009
- Network RUS: Scenarios and Long Distance Forecasts established August 2009

The recommendations in these RUSs have been re-examined in the light of subsequent changes, including:

- new passenger demand forecasts covering the period to 2024
- Strategic Freight Network (SFN) freight growth forecasts for 2019 and 2030
- the Government's announcement of electrification of certain routes in the North West
- the tram-train trial being moved from the Sheffield – Huddersfield route to that between Rotherham and Tinsley (and onto the local tram network in Sheffield)
- interventions planned in CP4
- subsequent RUSs affecting some previous recommendations.

More information on these changes and how they have informed the gap identification process can be found in **Chapter 4**. The recommendations made by the first generation RUSs that are not affected by the above remain valid and have not been re-examined by this RUS. They are detailed in **Appendix A**.

2.4.2 Network RUS

The Network RUS is split into four workstreams, two of which (Scenarios and Long Distance Services and the Electrification Strategy) are already established.

Network RUS: Scenarios and Long Distance Forecasts

The Network RUS: Scenarios & Long Distance Forecasts document considers passenger and freight long distance demand over 30 years. The RUS provides four scenarios for demand, based on alternative economic and environmental futures, two of which were used in forecasting long distance flows for the Northern RUS, more details of which can be found in **Chapter 3**.

Network RUS: Stations

The Network RUS: Stations document will look at the passenger capacity of stations across the national network. It will provide a prioritised shortlist of stations that require interventions, as agreed by an industry working group, and describe a toolkit of solutions that can be adopted to solve a variety of capacity constraints at stations. **Appendix B** discusses passenger capacity at stations across the Northern RUS area.

Network RUS: Rolling Stock and Depots

The Network RUS: Rolling Stock and Depots workstream will produce two documents. The Rolling Stock document will take a whole-industry approach to planning the interaction between new or refurbished rolling stock and the infrastructure which it runs over. It will consider the appropriate rolling stock for each key market sector and where appropriate it will consider how the infrastructure would require investment to enable appropriate rolling stock to operate.

The Depots document will provide guidelines on future depot requirements. It will concentrate on how the choice of depot location can influence capacity utilisation.

Network RUS: Electrification Strategy

The Network RUS: Electrification Strategy looked at potential electrification schemes across the network, focusing on the benefits associated with reducing the ongoing cost to the country of the railway and the environmental benefits associated with electrification. It then identified a core strategy and a series of further schemes based on these criteria. The outputs of the Electrification Strategy were included in the review undertaken to identify the gaps for this RUS.

2.4.3 East Coast Main Line 2016 Capacity Review

The East Coast Main Line RUS was established in April 2008. Network Rail are currently leading the industry in work on an addendum to the RUS which examines the likely capacity requirements of the route in 2016, which will then inform the strategy for the East Coast Main Line for CP5 onwards. A report was published for consultation in August 2010 and the final document is expected by the end of the year. It is expected that the final Northern RUS will incorporate the East Coast Main Line 2016 Capacity Review work's findings into the strategy for the north of England.

2.4.4 West Coast Main Line RUS

The West Coast Main Line RUS is currently in development and covers the core West Coast Main Line route from London Euston to Carstairs, Manchester and Liverpool and affects the north of England. The West Coast Main Line RUS will consider connectivity and capacity on the route and is due for publication as a Draft for Consultation in winter 2010. Any relevant recommendations made by the West Coast Main Line RUS Draft for Consultation will be taken into account in the final Northern RUS.

2.4.5 The Manchester Hub Study

In October 2007 the Minister of State for Transport, responding to work by the Northern Way, asked Network Rail to undertake a study to develop proposals to enhance the capacity and functionality of the rail network in and around Manchester, referred to as the 'Manchester Hub'. The Manchester Hub is seen as a major constraint to developing rail services across the north of England.

The study was undertaken in two phases. Phase one, led by the Northern Way, identified the economic case for enhancement to the Manchester Hub and the improvements to rail services that would drive economic growth for the north of England, described as conditional outputs.

Phase two, led by Network Rail, identified value for money interventions to address the gaps between the capability of the network in 2014 and the capability required to deliver the conditional outputs.

The recommended interventions provide many of the outputs the Northern Way identified, including increased inter- and intra-regional connectivity, improved freight capacity and capability, journey times and performance. This work is now being taken forward as The Northern Hub and more information on both the study and The Northern Hub can be found at **www.networkrail.co.uk**

2.4.6 Merseyside Long-Term Planning Study

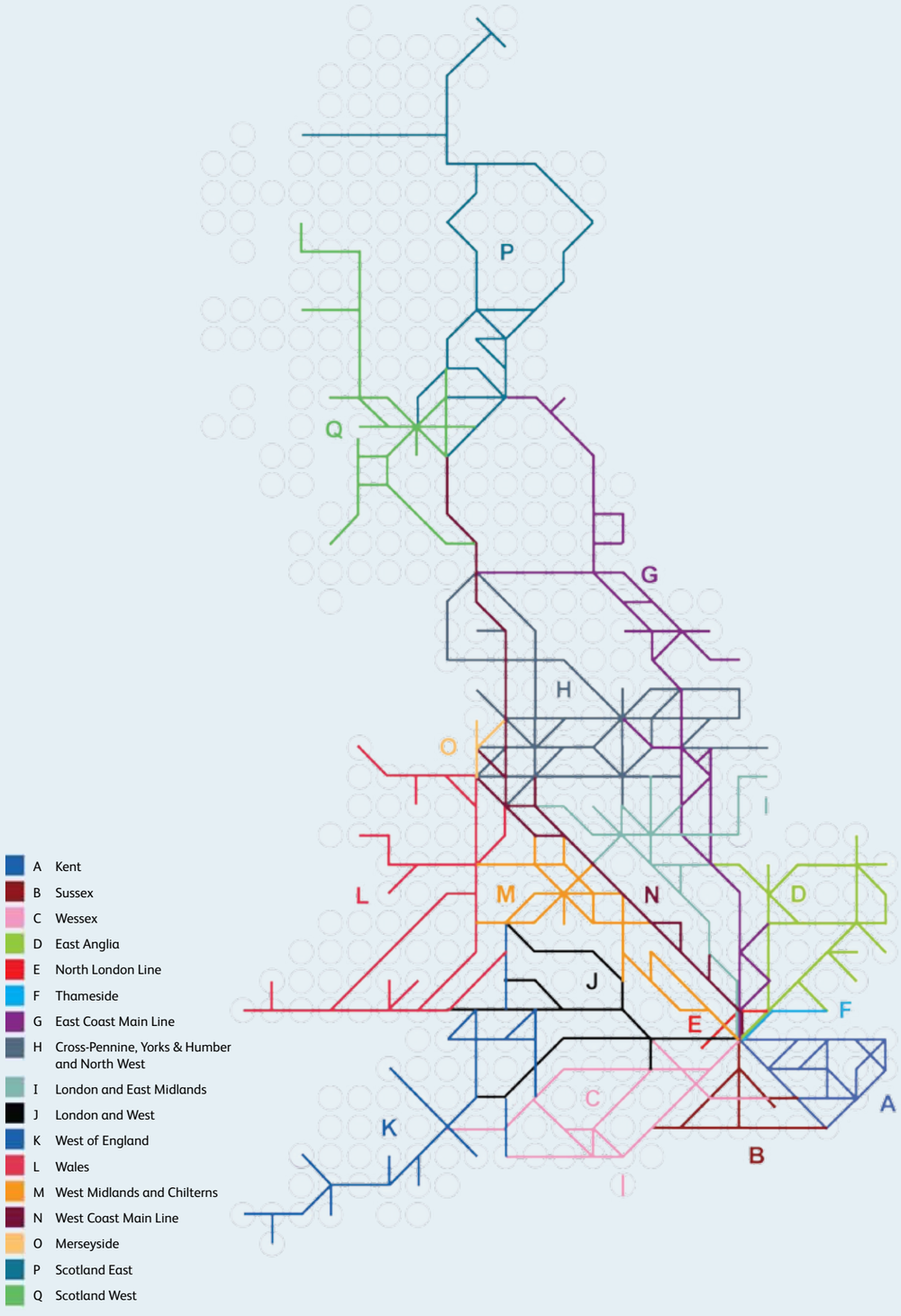
The Merseyside RUS, which was established in May 2009, identified a number of potential future problems of a magnitude that can only be addressed through radical changes to the rail infrastructure and/or pattern of services on the DC[1] electrified network in Merseyside. The unique way in which rail services in Merseyside are franchised has allowed the industry to work in partnership to seek solutions that make a major contribution to the economy of the area, through a Long-Term Planning Study jointly led by Merseytravel, Merseyrail and Network Rail. This study commenced in August 2009, and is due to be completed this Autumn. In light of this study, the Northern RUS has not reviewed the parts of the Merseyside RUS that cover the DC electrified network.

2.4.7 Network Rail route plans

Network Rail publishes route plans annually. The route plans provide a description of the current capability and use of each of the 17 strategic routes, detailing information such as linespeeds, loading gauge, scheduled renewals, route availability and current performance. The plans also describe Network Rail's vision for the future of the route, and the strategy for achieving that vision. This largely reflects the output of the RUSs and funding made available for interventions through whatever mechanisms, and are developed with train operators and other stakeholders. **Figure 2.2** shows the 17 strategic routes and the route plans are available at **www.networkrail.co.uk**

1 The DC network is that in Merseyside which is electrified at 750V DC over which services are currently operated by Merseyrail.

Figure 2.2 Map – Network Rail's 17 strategic routes



2.4.8 Strategic Freight Network (SFN)

The SFN is a proposed network of core trunk and diversionary freight routes, as agreed by an industry steering group, with sufficient capacity and appropriate loading gauge to carry the expected growth of major flows of freight. Subject to acceptable business cases, the core network would ultimately be expected to:

- have sufficient capacity for growth with possibly a few high capacity lines
- have limited conflicts between passenger and freight traffic by using avoiding lines and grade separation
- provide for longer trains
- provide for appropriate axle loads
- have appropriate loading gauge for the traffic that needs to use it
- include defined diversionary routes where possible for each core route with the objective of ensuring availability whenever operators wish to use the network.

Network Rail leads the SFN work and as part of its remit developed sets of forecasts for freight traffic in 2019 and 2030 which were used when identifying the gaps in this RUS.

2.4.9 New Lines Programme

In summer 2008 Network Rail commenced its New Lines Programme, examining the case for the development of new high speed lines in the UK. The first phase of the New Lines Programme, which was completed in August 2009, established the business case for a new high speed line connecting the main conurbations between London and Glasgow/ Edinburgh currently served by the West Coast Main Line. The second phase of the study examined the case for a New Line to Leeds and the East Midlands and found that there was a case for such a line to be taken forward.

The previous Government's proposed strategy for High Speed Rail was established in a Command Paper presented to Parliament and published in March 2010. The Command Paper sets out the case for a new core British high speed rail network. The core strategy comprises a 335-mile core Y-shaped high speed rail network between London and Birmingham/Manchester/Leeds capable of carrying trains at speeds of up to 250mph. The Command Paper states that a London to West Midlands route would be the first stage of the new high speed rail network.

The current Government has publicly stated that it is in favour of a new high speed line. However, it is revisiting some aspects of the scheme, such as the case for a link to High Speed One, and whether or not Heathrow should be served directly.

2.4.10 Local Transport Plans

Passenger Transport Executives (PTEs), Integrated Transport Authorities (ITAs) and local authorities with a responsibility for public transport produce Local Transport Plans (LTPs) which cover all modes of transport. These set out interventions that they fund themselves, how the transport needs of their areas are supported by schemes funded by other parties and their vision for the future. These are normally formulated in consultation with rail industry members and rail schemes funded through LTPs form part of the rail industry planning framework. The next set of LTPs are currently being prepared for April 2011.

2.4.11 Community Rail Partnerships

There are several Community Rail Partnerships (CRPs) in the north of England covering various lines and services throughout the RUS area. CRPs are a link between the railway and local communities. They propose positive development, bringing together a wide range of interests along the rail corridor. Some partnerships have enabled significant increases in the use of rail through innovative marketing, improved services and better station facilities. The work of CRPs includes improving bus links to stations, developing walking and cycling routes, restoring station buildings, art and education projects and organising special events which promote the railway and its relevance to the community.

3. Forecast changes in demand

3.1 Passenger demand forecasts

3.1.1 Introduction

This chapter outlines the methodology and results of the Northern Route Utilisation Strategy (RUS) passenger demand forecasting process. The forecasts run to 2029, using 2014 as a reference case, and have informed the gap identification process and subsequent appraisal of options to address these gaps.

3.1.2 Context of methodology

Recent industry studies, including RUSs, have demonstrated that industry standard models tend to underpredict observed passenger growth in some of the main regional centres covered by the RUS area. This is particularly true of season tickets, affecting the validity of peak demand forecasts into the five major High Level Output Specification (HLOS)[1] cities (Manchester, Sheffield, Leeds, Liverpool and Newcastle). The challenge is to understand the drivers of rail demand into these cities and project these drivers into the future.

The UK was in a recession from the fourth quarter of 2008/09 until the third quarter of 2009/10 and the effect on future rail demand is still unclear. However, the most recent data suggests that in many rail sectors demand continued to increase during the recession and demonstrates high growth in the post-recession recovery period.

A forecast has been produced for every flow on the network that contributes to demand within the RUS area. Two methods have been used: one for long distance flows and one for short distance flows. The impact of committed service improvements on demand has been estimated and included in the forecasts to the end of Control Period 4 (CP4).

High and low growth scenarios have been produced. The high growth scenario – which for short distance flows represents an improvement from the traditional Passenger Demand Forecasting Handbook (PDFH) methodology – has been used to identify gaps and formed the central case for growth at the option appraisal stage. The low growth forecast has been used to show a comparison between the method taken forward and the traditional PDFH method.

3.1.3 Short distance methodology

Consultants were commissioned to develop a set of growth forecasts for short distance flows for the Northern RUS. This ensured consistency with the revised demand forecasts for phase 2 of the Northern HLOS scheme, which seeks to understand the operator vehicle requirements in the North, which were produced on behalf of the Department for Transport (DfT).

This methodology was used for flows of less than 50 miles. Two sets of forecasts have been produced. A low forecast, which has been developed using standard PDFH forecasting drivers and a high forecast, which includes outputs from the DfT Northern HLOS growth study, specifically including additional demand drivers derived from regression analysis and back-casting to explain the gap between observed and forecast growth in the north of England evident since the early 2000s.

Drivers of demand

The high and low growth scenarios use the same set of demand drivers listed in **Table 3.1**.

Table 3.1 – Drivers of demand

PDFH exogenous demand drivers	Source
fares	standard DfT assumptions
Gross Value Added (GVA) per capita	Oxford Economics Forecast Update for Passenger Demand Forecasting Council (PDFC) Members, December 2009
employment	Oxford Economics Forecast Update for Passenger Demand Forecasting Council (PDFC) Members, December 2009
population	TEMPRO[2]
car ownership	TEMPRO
fuel cost	standard DfT assumptions
car journey time	standard DfT assumptions
air cost	standard DfT assumptions
air headway	standard DfT assumptions
bus cost	standard DfT assumptions
bus journey time	standard DfT assumptions
bus headway	standard DfT assumptions
LUL cost	standard DfT assumptions
air cost	standard DfT assumptions

Recent studies of rail growth in the north of England have identified city-wide car parking cost and the proportion of employment in office-based sectors to explain peak growth to (and between) the urban centres. This is significant for season ticket journeys where the difference between PDFH forecasts and recent observed growth is most pronounced.

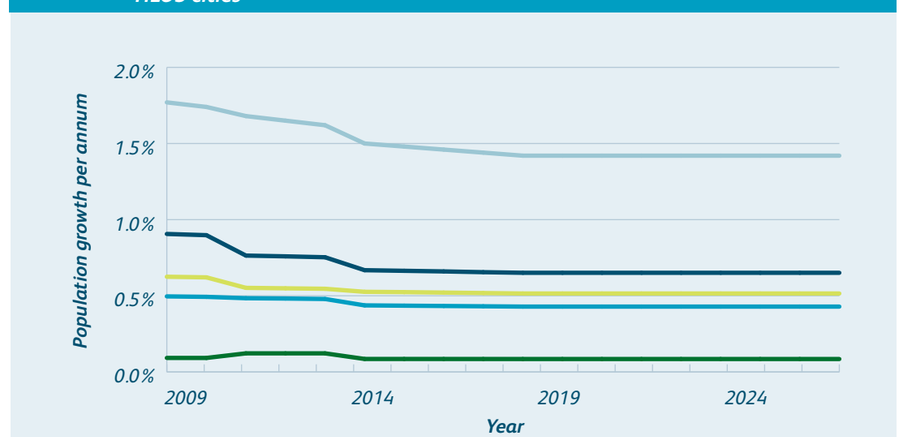
Population

Figure 3.1 represents the forecast population growth rate from 2009 in the five major HLOS cities.

GVA per capita

GVA per capita is a measure of economic growth and is related to demand for business and leisure trips. **Figure 3.2** illustrates the forecast rate of growth in GVA per capita from 2009. GVA per capita is expected to decline in 2009, followed by a period of high growth representing recovery from 2010 to 2018 with steady growth from 2018 onwards.

Figure 3.1 – Forecast population growth rate per annum in the five major Northern HLOS cities



1 *The Department for Transport's High Level Output Specification, which specifies the rail industry outputs that need to be delivered within a control period.*

2 *TEMPRO is the DfT's demographic forecasting data.*

Employment

Employment is related to demand for commuting trips. **Figure 3.3** illustrates the forecast rate of annual growth in employment from 2009 in the five major HLOS cities. Employment is expected to decline from 2009 to 2010/11 with a period of high growth representing recovery from 2012 to 2018, with steady growth from 2018 onwards.

Structural change

Table 3.2 demonstrates that there has been a shift towards office-based sectors, with the exception of Newcastle (derived from Annual Business Inquiry data). **Table 3.3** shows the assumed forecast growth in structural change. For the high forecasts the recently observed rates of structural change are assumed to continue during CP4 in all urban areas, and then reduce to PDFH (ie. no further structural change) over Control Period 5 (CP5) and Control Period 6 (CP6) based upon the above achieved rates of 2009 structural change and an upper limit that represents a saturation point.

Car parking

Car parking data has been obtained for Leeds, Manchester, Liverpool and Sheffield which shows that there have been large sustained real increases in car parking costs in recent years, with smoothed real growth rates of 5-6 per cent per annum observed in Manchester and Leeds.

For the season ticket market, regression analysis suggests that real changes in car parking costs have a statistically significant relationship with rail passenger growth, with an elasticity value just over one. It is likely that this relationship is masking structural change in the city centres and is acting as a proxy for wider changes, such as restrictions on long-stay parking supply and increased density of office-based employment.

Table 3.4 shows the forecast annual real increase in car parking costs in the five major HLOS cities of the north. For the high forecasts it has been predicted that car parking costs rise at an average RPI+3% for CP4 in all urban areas, then decrease to PDFH (ie. no real increase in costs) over CP5 & CP6 based upon rates of structural change to 2009. As **Table 3.4** shows, the decrease would begin earliest with Leeds, followed by Manchester, Sheffield, Liverpool and Newcastle, reflecting rates of structural change already achieved.

Figure 3.2 – Forecast rate of GVA per capita growth per annum in the five major Northern HLOS cities

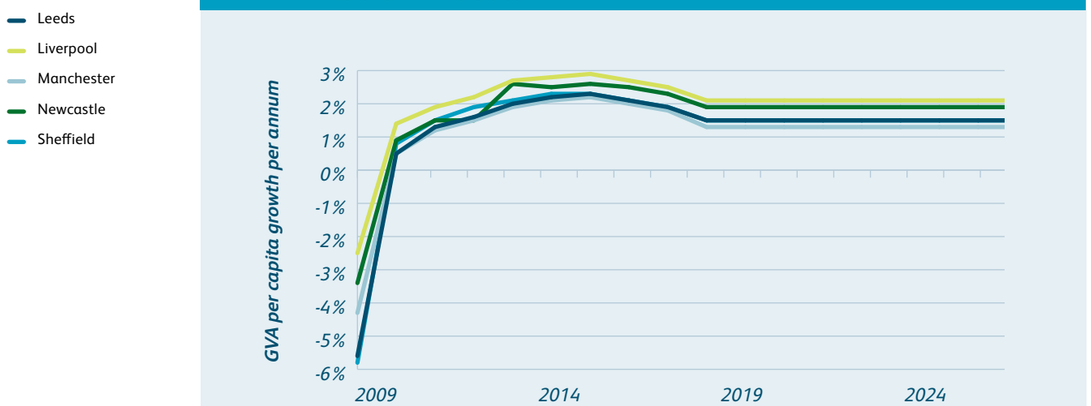


Figure 3.3 – Forecast rate of growth in employment per annum in the five major Northern HLOS cities

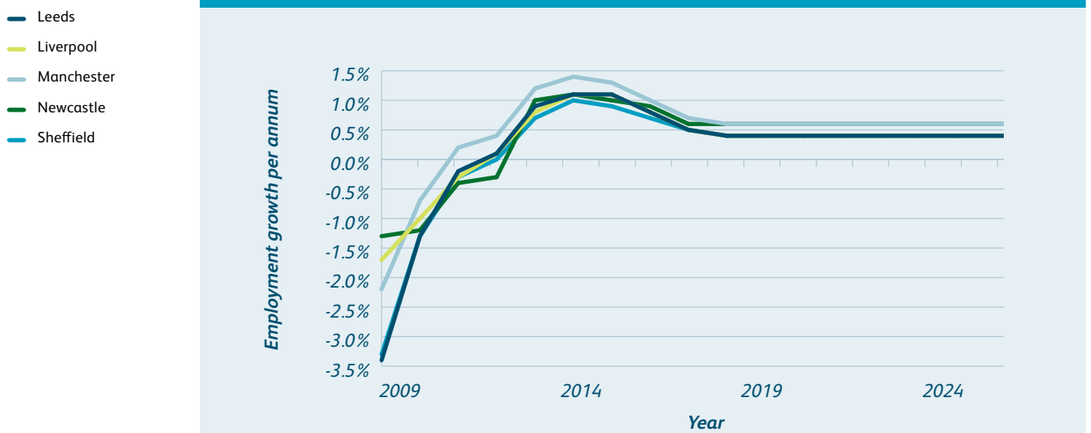


Table 3.2 – Structural change (percentage of city centre workers employed in office-based employment)

City	2002	2003	2004	2005	2006	2007	2008	2009
Leeds	64.57%	66.40%	68.23%	68.47%	72.97%	75.67%	75.55%	77.37%
Liverpool	60.46%	61.25%	62.03%	63.35%	67.50%	64.37%	65.17%	65.96%
Manchester	56.06%	58.47%	60.89%	62.75%	63.80%	70.09%	70.55%	72.96%
Newcastle	62.71%	61.78%	60.86%	56.95%	58.82%	58.46%	57.15%	56.22%
Sheffield	65.05%	65.89%	66.73%	67.40%	68.18%	68.87%	70.09%	70.92%

Table 3.3 – Forecast annual percentage increase in structural change

City	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Leeds	0.7%	0.6%	0.5%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Liverpool	0.8%	0.7%	0.6%	0.5%	0.5%	0.4%	0.3%	0.2%	0.1%	0.0%	0.0%
Manchester	1.3%	1.2%	1.0%	0.8%	0.6%	0.4%	0.2%	0.0%	0.0%	0.0%	0.0%
Newcastle	0.5%	0.4%	0.4%	0.3%	0.3%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%
Sheffield	1.0%	0.9%	0.8%	0.6%	0.5%	0.4%	0.3%	0.2%	0.1%	0.0%	0.0%

Table 3.4 – Forecast real car parking cost increases

City	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Leeds	3.0%	2.5%	2.0%	1.5%	1.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Liverpool	3.0%	2.7%	2.4%	2.1%	1.7%	1.4%	1.1%	0.8%	0.5%	0.2%	0.0%
Manchester	3.0%	2.6%	2.2%	1.8%	1.5%	1.1%	0.7%	0.3%	0.0%	0.0%	0.0%
Newcastle	3.0%	2.7%	2.4%	2.1%	1.7%	1.4%	1.1%	0.8%	0.5%	0.2%	0.0%
Sheffield	3.0%	2.7%	2.4%	2.1%	1.7%	1.4%	1.1%	0.8%	0.5%	0.2%	0.0%

3.1.4 Long distance methodology

The Network RUS: Scenarios and Long Distance Forecasts document was used to forecast demand on flows with a straight line distance of over 50 miles. Chapters 7 and 8 of the document describe the demand drivers and the methodology in detail. **Figure 3.4** outlines the demand drivers of the two chosen scenarios. One (top left) reflects an optimistic high growth scenario that assumes rail's competitive position improves and its market share increases. The other (bottom right) represents a pessimistic scenario where rail's competitive position stays roughly the same as now and growth is driven by relatively modest changes in the drivers of the size of the long distance travel market.

Market share and market size were estimated separately and the key drivers of passenger demand were categorised according to whether they impact upon market size, market share or both.

To estimate the future size of the long distance market the population of Great Britain was segmented by geographical area, household structure and income band. Then analysis of the National Travel Survey (NTS) was undertaken to relate drivers of market size to the propensity to undertake long distance trips by market segment.

To estimate the share of the long distance market traveling by rail, the generalised cost of each mode was derived from demand drivers that affect market share. The results were used to allocate changes in market share according to changes in the relative generalised cost of travelling by each mode.

3.1.5 Service improvements in CP4

MOIRA (the industry standard demand modelling tool) was used to estimate the effect of committed service improvements in CP4 on demand including:

- The East Coast Main Line 2011 timetable
- Leeds to Liverpool line speed improvements
- Northern Rail operational plan[3]
- Network Rail's committed performance trajectory for CP4.

The impact of committed service improvements at an aggregate level is relatively small.

3.1.6 Summary of results

The forecasts by flow can be aggregated in many different ways. Where appropriate, flows have been aggregated to produce forecasts at a route and service level to identify gaps. Similar aggregations of flows have been used to produce forecasts at the option appraisal stages of the RUS. The following tables and graphs give a summary of the forecasts.

Table 3.5 shows forecast growth in peak demand into the five HLOS cities on all services.

Forecasts on local services

Figure 3.5 and **Table 3.6** show expected growth in demand into the five HLOS cities on local services (services currently run by Northern Rail have been used as a proxy for local services). The blue spectrum lines show growth defined by the low scenario, the red/yellow lines show growth defined by the high scenario.

The effect of the recession is taken as a four to five per cent decrease in GVA per capita in 2009/10, very low growth in 2010/11 and slightly higher than average growth in 2011-2014 to reflect recovery, with corresponding figures for employment over this period. Therefore, the steepness of both curves is less in CP4 than in CP5. Growth in CP5 is highest as estimated economic growth is strong and the structural shift drivers that affect the high growth scenario will have only just begun to reduce. This reduction ends by around 2024, when annual growth decreases to that of the low scenario. The uplift of demand from a PDFH base is highest in the season ticket market as a result of structural shift. Therefore, growth will be high in markets where the proportion of season ticket demand is high compared to demand for all tickets. Differences in passenger growth are also explained by economic growth, employment and population growth in the catchment areas of the five cities.

Figure 3.4 – Drivers of long distance demand by scenario

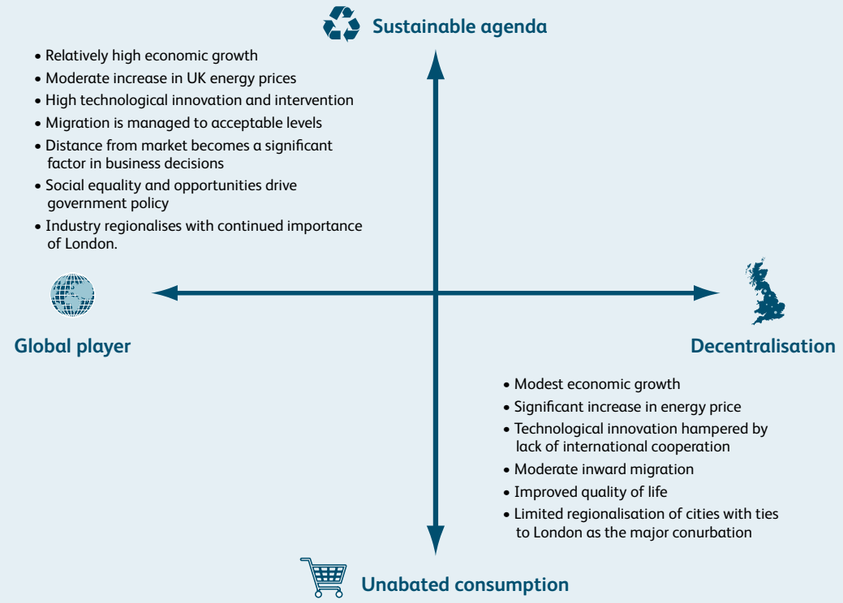


Table 3.5 – Forecast increase in peak passenger demand into the five Northern HLOS cities on all services

	Growth – 2014	Growth – 2019	Growth – 2024	Growth – 2029
Leeds – low	7 %	16 %	25 %	36 %
Liverpool – low	5 %	17 %	28 %	42 %
Manchester – low	7 %	17 %	25 %	37 %
Newcastle – low	12 %	19 %	26 %	34 %
Sheffield – low	5 %	14 %	23 %	33 %
Leeds – high	20 %	42 %	53 %	68 %
Liverpool – high	13 %	32 %	46 %	63 %
Manchester – high	21 %	44 %	57 %	72 %
Newcastle – high	21 %	37 %	49 %	62 %
Sheffield – high	15 %	35 %	48 %	62 %

3 *The Northern Rail operational plan refers to peak service frequency improvements to provide additional capacity*

Figure 3.5 – Forecast increase in all-day passenger demand into the five HLOS cities on local services

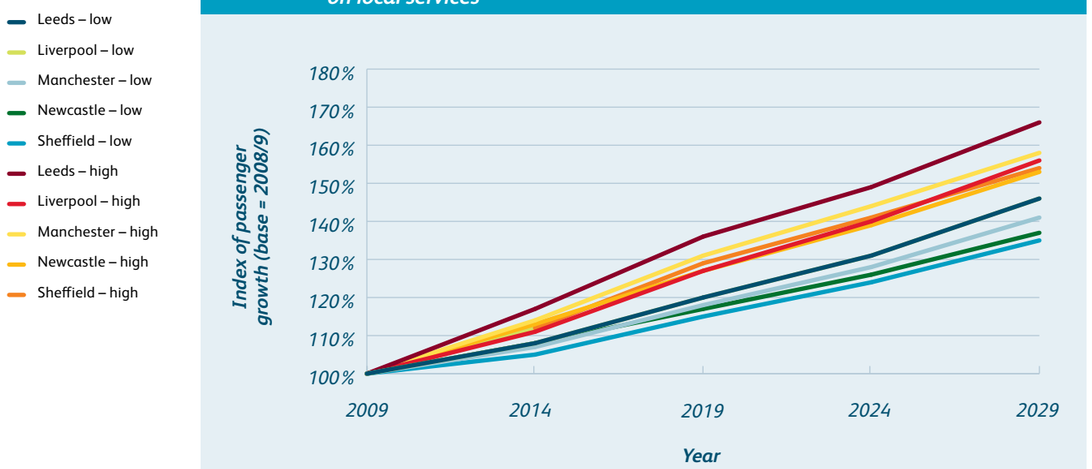


Figure 3.6 – Forecast increase in peak passenger demand into the five HLOS cities on local services

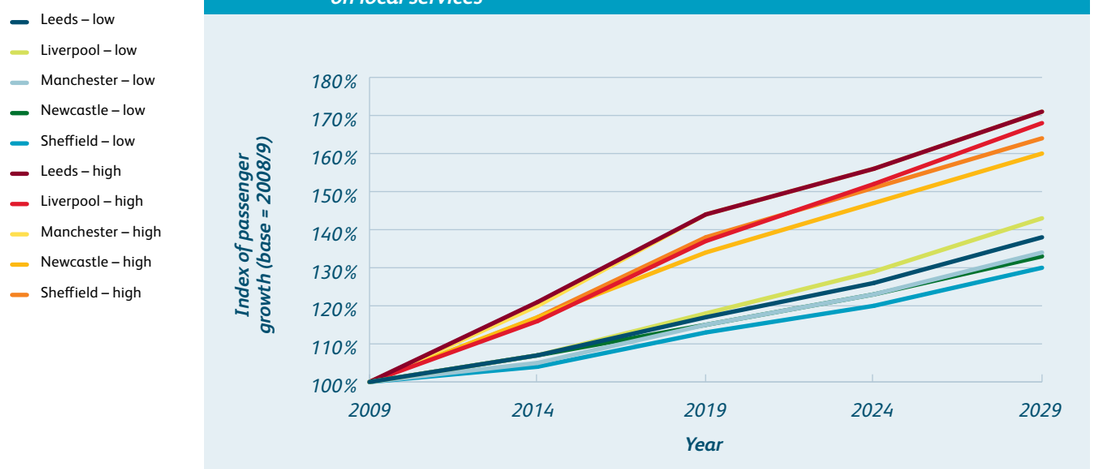


Table 3.6 – Forecast increase in all-day passenger demand into the five HLOS cities on local services

	Growth – 2014	Growth – 2019	Growth – 2024	Growth – 2029
Leeds – low	8 %	20 %	31 %	46 %
Liverpool – low	8 %	20 %	31 %	46 %
Manchester – low	7 %	18 %	28 %	41 %
Newcastle – low	8 %	17 %	26 %	37 %
Sheffield – low	5 %	15 %	24 %	35 %
Leeds – high	17 %	36 %	49 %	66 %
Liverpool – high	11 %	27 %	40 %	56 %
Manchester – high	14 %	31 %	44 %	58 %
Newcastle – high	13 %	27 %	39 %	53 %
Sheffield – high	12 %	29 %	41 %	54 %

Table 3.7 – Forecast increase in peak passenger demand into the five HLOS cities on local services

	Growth – 2014	Growth – 2019	Growth – 2024	Growth – 2029
Leeds – low	7 %	17 %	26 %	38 %
Liverpool – low	7 %	18 %	29 %	43 %
Manchester – low	5 %	15 %	23 %	34 %
Newcastle – low	7 %	15 %	23 %	33 %
Sheffield – low	4 %	13 %	20 %	30 %
Leeds – high	21 %	44 %	56 %	71 %
Liverpool – high	16 %	37 %	52 %	68 %
Manchester – high	20 %	44 %	56 %	71 %
Newcastle – high	17 %	34 %	47 %	60 %
Sheffield – high	17 %	38 %	51 %	64 %

Figure 3.6 and **Table 3.7** show expected peak growth into the five HLOS city stations on local services. The proportion of season tickets is higher in the peak, therefore structural change has a larger effect on growth in the high scenario. The peak high scenario forecasts are comparable to forecasts produced in the Yorkshire and Humber and North West RUSs:

- morning peak growth into Leeds was forecast as 3.7 per cent per annum in the Yorkshire and Humber RUS to 2019. Peak growth into Leeds in this RUS is forecast to grow by 44 per cent to 2019, which equates to a Compound Annual Growth Rate (CAGR) of 3.7 per cent to 2019 in the high scenario.
- morning peak growth into Sheffield was forecast as 3.9 per cent per annum in the Yorkshire and Humber RUS to 2019. Peak growth into Sheffield in this RUS is forecast to grow by 38 per cent by 2019, which equates to a CAGR of 3.3 per cent to 2019 in the high scenario. The difference can be explained by the affect of the recession.
- morning peak growth into Manchester was forecast as 3.4% per annum in the North West RUS to 2019. Peak growth into Manchester in this RUS is forecast to grow by 44% to 2019, which equates to a CAGR of 3.7% to 2019 in the high scenario.
- there are no easily comparable forecasts for Liverpool and Newcastle from previous RUSs.

Interurban forecasts

Figure 3.7 and **Table 3.8** show forecast growth in all-day demand on a selection of interurban corridors. The corridors are defined as follows:

A	Reading/Penzance to Edinburgh/Glasgow/Newcastle services and also Manchester to Birmingham and the South services currently run by CrossCountry
B	Services currently run by East Coast between London King's Cross, Doncaster, York, Newcastle, Edinburgh and Glasgow
C	Newcastle, Scarborough, York and Hull to Manchester Piccadilly and Liverpool Lime Street services currently run by TransPennine Express
D	Cleethorpes to Manchester Airport and Norwich to Liverpool services currently run by TransPennine Express and East Midlands Trains respectively
E	Manchester Airport to Blackpool North, Barrow, Windermere and Preston services, currently run by TransPennine Express
F	Manchester Piccadilly, Chester to Llandudno services currently run by Arriva Trains Wales
G	Manchester Airport to Glasgow and Edinburgh services currently run by TransPennine Express

The forecasts are generally aggregations of flows estimated using the long distance methodology. However, in some instances where the straight line distance between the origin and destination pair is less than 50 miles, the short distance methodology has been used; for example Leeds to Manchester, Sheffield to Manchester, Liverpool to Manchester and Sheffield to Leeds.

The difference between the high and low scenarios is related to the change in market share assumed in the top left scenario. Therefore, a large difference between the high and low scenarios implies a relatively large mode shift to rail in the high scenario.

Figure 3.7 includes historic growth data for the period 1999/2000 to 2007/08 for comparison.

Figure 3.7 – Forecast increase in all-day passenger demand on a defined set of interurban corridors

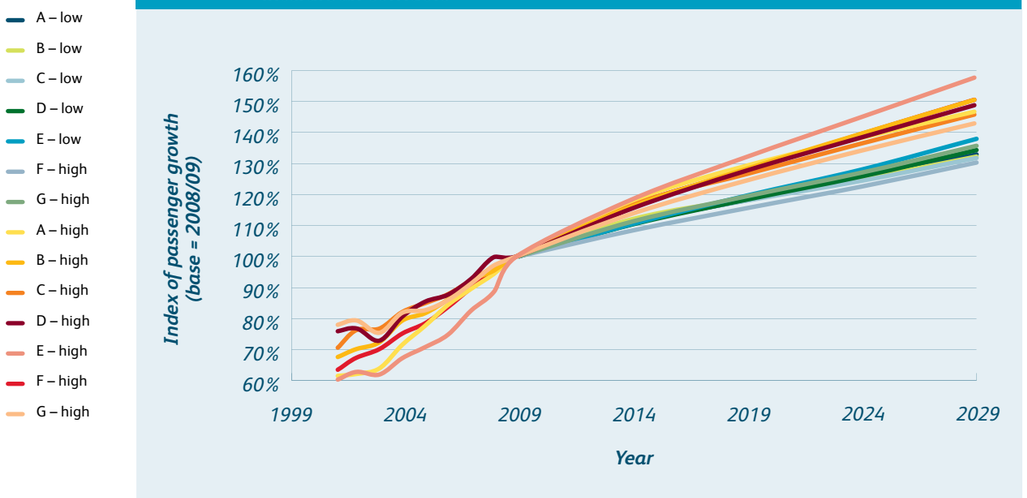
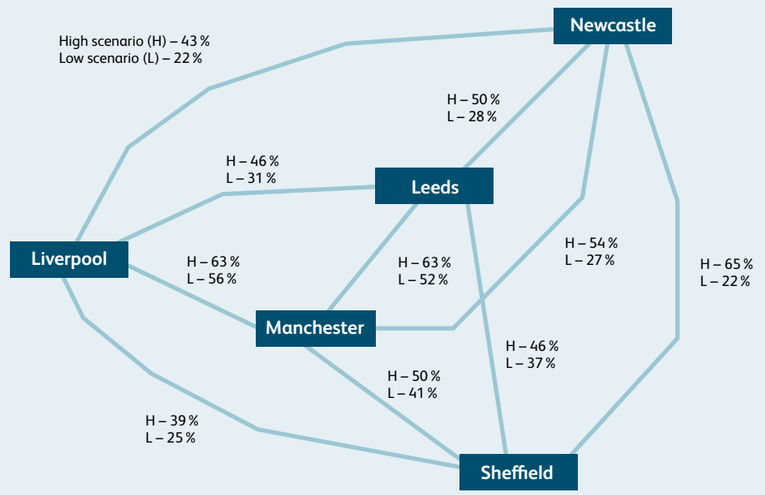


Figure 3.8 shows expected growth to 2029 in the high scenario for flows between the five major HLOS city stations. Leeds to Manchester, Manchester to Liverpool, Manchester to Sheffield and Leeds to Sheffield have been assessed using the short distance flows methodology and the expected growth is related to the size of the season ticket market as well as economic growth, employment, population and other drivers. For the long distance flows, the expected growth is related to the estimated gain in rail market share. The difference between the high and low scenarios tends to be smaller for flows where the short distance methodology has been used; this shows that the forecast passenger growth is relatively high even when using the standard PDFH methodology.

Table 3.8 – Forecast increase in all-day passenger demand on a defined set of interurban corridors

	Growth – 2014	Growth – 2019	Growth – 2024	Growth – 2029
A – low	11 %	18 %	25 %	33 %
B – low	12 %	19 %	25 %	33 %
C – low	11 %	18 %	25 %	32 %
D – low	10 %	19 %	26 %	35 %
E – low	11 %	20 %	28 %	38 %
F – low	8 %	16 %	23 %	31 %
G – low	11 %	20 %	27 %	36 %
A – high	17 %	28 %	40 %	51 %
B – high	17 %	27 %	37 %	46 %
C – high	18 %	30 %	39 %	47 %
D – high	16 %	28 %	40 %	51 %
E – high	16 %	28 %	39 %	49 %
F – high	14 %	25 %	34 %	43 %
G – high	18 %	32 %	45 %	58 %

Figure 3.8 – Forecast increase in all-day passenger demand between the five HLOS cities by 2029



3.2 Forecast freight demand

Freight demand forecasts were developed nationally to 2019 and 2030 for the Strategic Freight Network (SFN). The forecasts were developed, as reported in the Network RUS: Scenarios and Long Distance Forecast, using the Great Britain Freight Model (GBFM) to assess the aggregate level of demand. The GBFM is designed to forecast freight moved within Great Britain, including freight to and from the ports and the Channel Tunnel. It covers different modes such as rail and road and produces a matrix of all forecast freight flows. This provides a 'top down' view based on economic modelling.

In common with the method adopted in the Freight RUS, this perspective was complemented by a 'bottom up' view of the markets provided by a review of the forecasts by the industry. The forecast change in demand by commodity type is shown in **Table 3.9**.

The changes in origin to destination freight demand were mapped across the network.

The majority of the increase in demand is forecast to occur in the non-bulk sector. Deep sea container growth is forecast to continue. The completion of the W10 gauge clearance schemes between Southampton and the West Coast Main Line, and the Haven Ports to the East Coast Main Line (which includes W9) in CP4 will further assist the competitive nature of rail in this market. Domestic non-bulk is forecast to grow most rapidly, but this is from a low base. This will mean a significant increase in traffic to freight handling facilities.

The bulk sector is forecast to grow, albeit at a slower rate than the non-bulk sector. The demand for coal traffic from Hunterston to the power stations in England is forecast to decrease as the amount of coal imported through Immingham increases. Therefore, coal traffic to the Drax, Eggborough and Ferrybridge power stations from the port of Immingham is forecast to grow. Other bulk commodities, such as metal, aggregates, scrap and chemicals are forecast to increase. The future of the UK energy policy and carbon emission levels will affect the demand for coal in the medium term. The forecasts have made assumptions about the use of alternative fuels such as biomass.

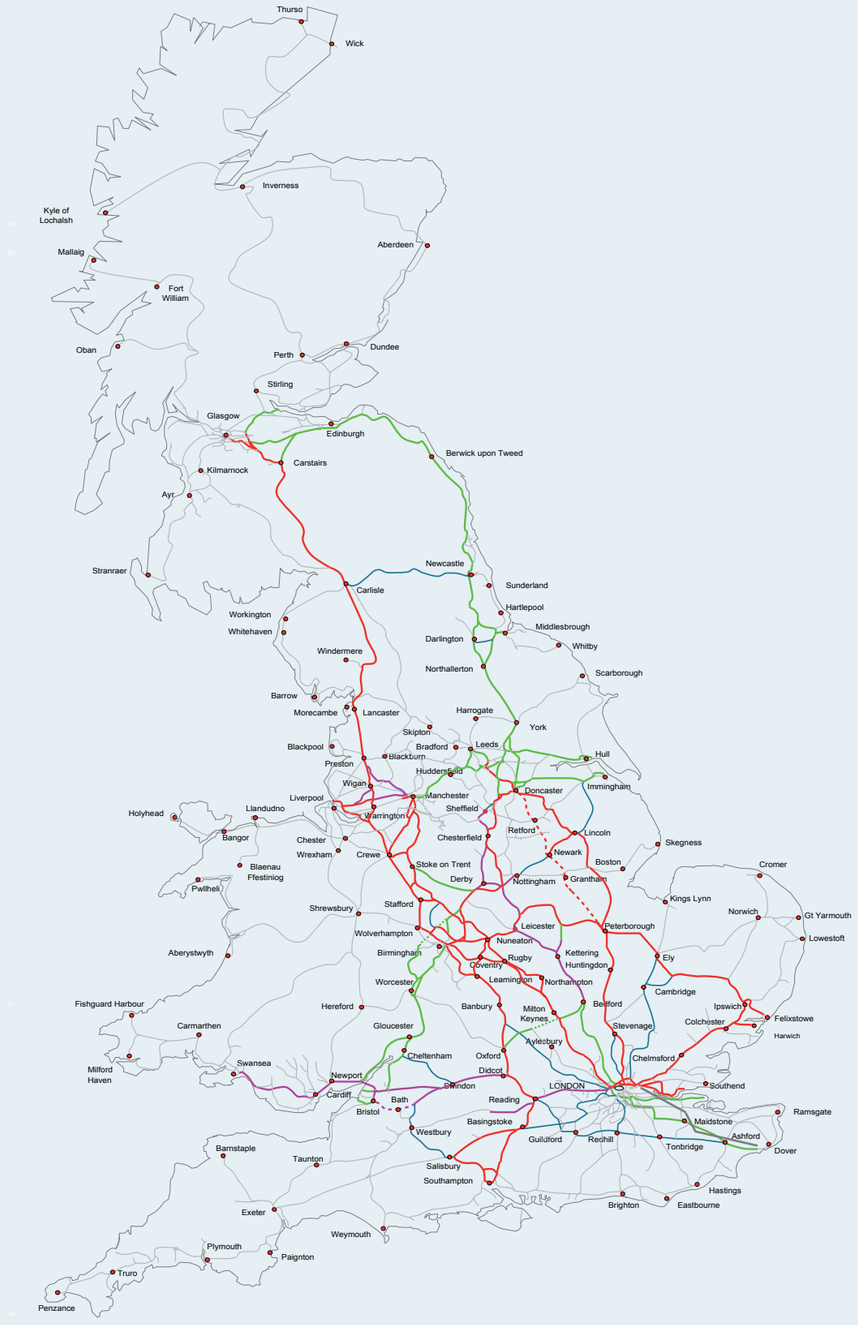
The forecasts were made from a pre-recession base. However, it is reasonable to assume that following a period of relatively static growth, freight will return to, or exceed previously attained levels of traffic.

Figure 3.10 shows the SFN gauge clearance aspirations. **Figure 3.11** shows the forecast daily freight paths in each direction in 2030.

Table 3.9 – Forecast change in freight demand by commodity to 2030

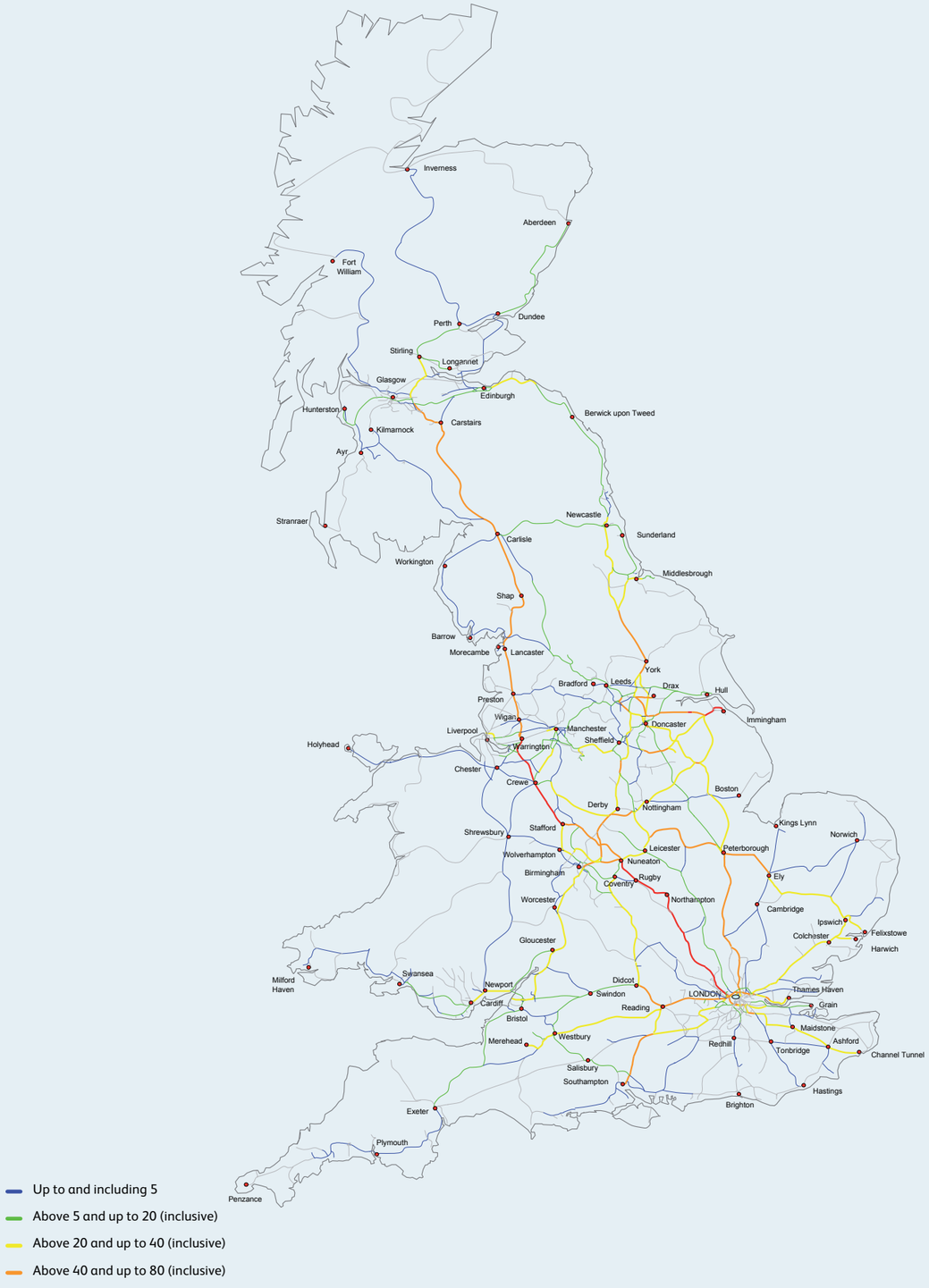
	Million tonnes			Billion tonne km		
	2006	2030	Average annual growth	2006	2030	Average annual growth
Solid fuels	51	41	-1%	8	5	-2%
Construction	21	32	2%	4	5	1%
Metals + ore	18	19	0%	3	3	0%
Ports non-bulk	12	50	6%	4	17	6%
Domestic non-bulk	2	25	11%	1	12	11%
Other	12	12	1%	3	3	1%
Total	116	179	2%	23	45	3%

Figure 3.10 – SFN aspirations



- Gauge cleared to at least W10: Planned end CP4
- SFN routes which are also core routes from the Network RUS: Electrification Strategy
- Designated in SFN to become W9/W10/W12
- Other SFN routes

Figure 3.11 – Forecast daily freight paths each direction in 2030



4. Gaps and options

4.1 Introduction

As described in **Chapter 2**, the Northern Route Utilisation Strategy (RUS) is a second generation RUS and therefore the geography it covers has already been the subject of previous RUSs and has an established set of recommended interventions.

The Northern RUS strategic gaps have been identified by reviewing the first generation of RUSs that cover the north of England. Specifically, these are the East Coast Main Line (ECML) RUS (between Peterborough and the Scottish Border), Yorkshire and Humber RUS, Lancashire and Cumbria RUS, Network RUS: Electrification Strategy, Freight RUS, North West RUS, and Merseyside RUS where appropriate[1].

These have been reviewed in the light of funded interventions for Control Period 4 (CP4) and Control Period 5 (CP5), including the Secretary of State for Transport's announcement in 2009 of the electrification of a number of routes in the North West, along with the passenger growth forecasts to 2024 and the agreed Strategic Freight Network (SFN) forecasts for 2019 and 2030. Account has also been taken of any RUS recommendations that change those published in earlier RUSs.

Each first generation gap can be broadly categorised as follows:

1. gap that will have been addressed by the end of CP4 (the baseline for this RUS) and so is 'closed'
2. gap which will still be a gap at the end of CP4 but for which the previous RUS recommendation is still appropriate
3. gap which will still be a gap at the end of CP4 but for which the intervention needs reviewing due to more recent changes
4. gap that has changed sufficiently that the previous intervention may not be entirely appropriate.

Categories 3 and 4 are those that have shaped most of the Northern RUS gaps and the vast majority of 'first generation' gaps fall into category 2. **Appendix A** details each of the recommendations from the first generation of RUSs and how they have been categorised.

Medium-term capacity requirements for the ECML from Peterborough to the Scottish Border have not been examined by this RUS as they are being considered by the East Coast Main Line 2016 Capacity Review (see paragraph 2.4.3).

1 *The Northern RUS only reviewed the non-DC lines recommendations in the Merseyside RUS, as those for the DC lines are being taken forward via the Merseyside Long Term Planning Study (see 2.4.6) The DC lines are those in Merseyside electrified at 750V DC over which services currently operated by Merseyrail run.*

However, it is anticipated that the outputs, where appropriate, will be incorporated into the final version of this RUS.

This process led to the following gaps being identified for examination by the Northern RUS:

Gap 1 – Peak crowding on routes affected by the electrification of additional routes in the North West.

Gap 2 – Accommodating peak services into the Manchester Piccadilly station area.

Gap 3 – Peak and off-peak crowding on the Leeds – Manchester route taking into account journey time improvements.

Gap 4 – Peak and off-peak crowding between Sheffield and Manchester.

Gap 5 – Peak crowding on the Retford and Penistone lines, and additional calls at Elsecar.

Gap 6 – Insufficient freight capacity on the Immingham – Scunthorpe – Knottingley corridor.

Gap 7 – Peak crowding on the Ilkley, Skipton and Wakefield Westgate corridors into Leeds.

Gap 8 – Accommodating peak services into Leeds station.

Gap 9 – Strategic connectivity across the north of England.

This chapter details each of these gaps and the options and recommendations developed to address them.

Peak services are those arriving at the following stations between 07:00 and 09:59 Monday to Friday and departing between 16:00 and 18:59:

- Leeds
- Liverpool Lime Street (high level platforms)
- Manchester Oxford Road (eastbound in morning peak and westbound evening peak)
- Manchester Piccadilly (westbound in morning peak and eastbound in evening peak)
- Manchester Victoria
- Newcastle
- Sheffield.

The high peak hour is 08:00 to 08:59 in the morning peak and 17:00 to 17:59 in the evening peak.

4.2 Crowding analysis and option appraisal

Passenger demand data has been collated from on-train counts provided by several train operators. The crowding analysis has been undertaken using the mean of these counts and, where possible, the 75th percentile of counts has been calculated to demonstrate the variability of demand on the same service on different days. The 75th percentile is the point at which 75 per cent of observations are below that figure.

The gap between capacity and demand has been assessed assuming that passenger loads above seated capacity is unacceptable for passenger journeys, of more than approximately 20 minutes. This is consistent with Department for Transport (DfT) policy.

When appraising options, the costs and benefits to the industry and society are taken into account:

- capital costs are those associated with infrastructure
- operating costs are those associated with employment of drivers and guards to run additional services, the leasing costs of extra rolling stock, and the mileage-related costs associated with rolling stock maintenance, track access and fuel/electric current for traction
- rail user benefits quantify the change in utility to passengers as a result of an improved or worsened service
- crowding benefits are the rail user benefits associated with reduced load factors
- revenue is accrued through attracting more passengers to rail services
- non-user benefits are accrued by the abstraction of vehicles from the roads reducing congestion, environmental impacts and road maintenance costs
- other government impacts are the expected loss in tax duty related to reduced car miles
- options that require operational expenditure only are generally assessed over a 30-year appraisal period and a Benefit Cost Ratio (BCR) of more than 1.5 is required for recommendation
- options that require infrastructure expenditure are assessed over an appraisal period pertinent to the asset life of the infrastructure (usually 60 years) and a BCR of more than two is required for recommendation.

4.3 Analysis of gaps and option appraisal

Gap 1: Peak crowding on routes affected by electrification of additional routes in the North West

In 2009, the Secretary of State for Transport announced the electrification of the routes in the North West, commonly known as the Lancashire Triangle, to be completed in phases in CP4 and CP5. This comprises the routes from Liverpool to Manchester Victoria via Earlestown (the Chat Moss Route), Huyton to Wigan via St.Helens Central, Manchester to Preston via Bolton, and Preston to Blackpool. **Figure 4.1** shows the routes to be electrified.

The electrification of these routes will result in a new allocation of Electric Multiple Unit (EMU) rolling stock to the area which is able to accelerate faster and have different capacity characteristics to diesel counterparts. For the purposes of analysing this gap it has been assumed that these are four-car EMUs, as this is the predominant formation of AC electric units. This presents an opportunity to consider demand and capacity on services that run on the Bolton, Atherton, Chat Moss and Cheshire Lines Committee (CLC) routes into Manchester and Liverpool. This analysis considers the optimal service proposition following the completion of the electrification schemes. The analysis has focussed on the morning high-peak hour, which is defined as trains arriving at Manchester Victoria, Manchester Oxford Road or Liverpool Lime Street between 08:00 and 08:59.

Demand and capacity on the CLC and Chat Moss routes into Liverpool and Manchester

Figure 4.2 shows the Chat Moss and CLC routes between Liverpool and Manchester. The Chat Moss refers to the line of route from Liverpool Lime Street through Wavertree Technology Park, Whiston, Earlestown and Eccles, and allows access to Manchester Victoria, Manchester Piccadilly and Manchester Oxford Road. Services on this route include trains between Liverpool Lime Street and Manchester and beyond, trains from Chester and North Wales to Manchester Piccadilly, and services from Preston, Wigan North Western and St Helens Central into Liverpool Lime Street.

The CLC refers to the route from Liverpool Lime Street through Mossley Hill, Warrington Central, Trafford Park and into Manchester Oxford Road and Manchester Piccadilly and is not included in the electrification announcement and so services on this corridor will continue to be comprised of Diesel Multiple Unit (DMU) rolling stock.

The services on these routes into Manchester have been split into six categories for consideration:

- services currently run by Arriva Trains Wales (ATW) into Manchester Piccadilly on the Chat Moss route including the following morning high-peak hour services:
  - Llandudno to Manchester Piccadilly (three-car DMU)
  - Chester to Manchester Piccadilly (three-car DMU)
- services currently run by Northern Rail through Manchester Piccadilly on the Chat Moss route including the following morning high-peak hour service:
  - Liverpool to Manchester Airport (currently a two-car DMU but assumed to become a four-car EMU following electrification)
- services currently run by Northern Rail via Manchester Victoria from the Chat Moss route including the following morning high-peak hour services:
  - Liverpool to Manchester Victoria (currently a two-car DMU but assumed to become a four-car EMU following electrification)
  - Liverpool to Huddersfield (currently a two-car DMU but assumed to become a four-car EMU and terminate at Manchester Victoria following electrification)
- services currently run by Northern Rail into Manchester Oxford Road on the CLC route including the following morning high-peak hour services:
  - Liverpool to Manchester Oxford Road (four-car DMU)
  - Warrington to Manchester Oxford Road (two-car DMU)
- services currently run by TransPennine Express (TPE) through Manchester Piccadilly from the CLC route, including the following morning high-peak hour service:
  - Liverpool to Scarborough (six-car DMU)
- services currently run by East Midlands Trains through Manchester Piccadilly from the CLC route, including the following morning high-peak hour service:
  - Liverpool to Norwich (four-car DMU).

Figure 4.1 – current and planned 25kv AC electrification in the North West

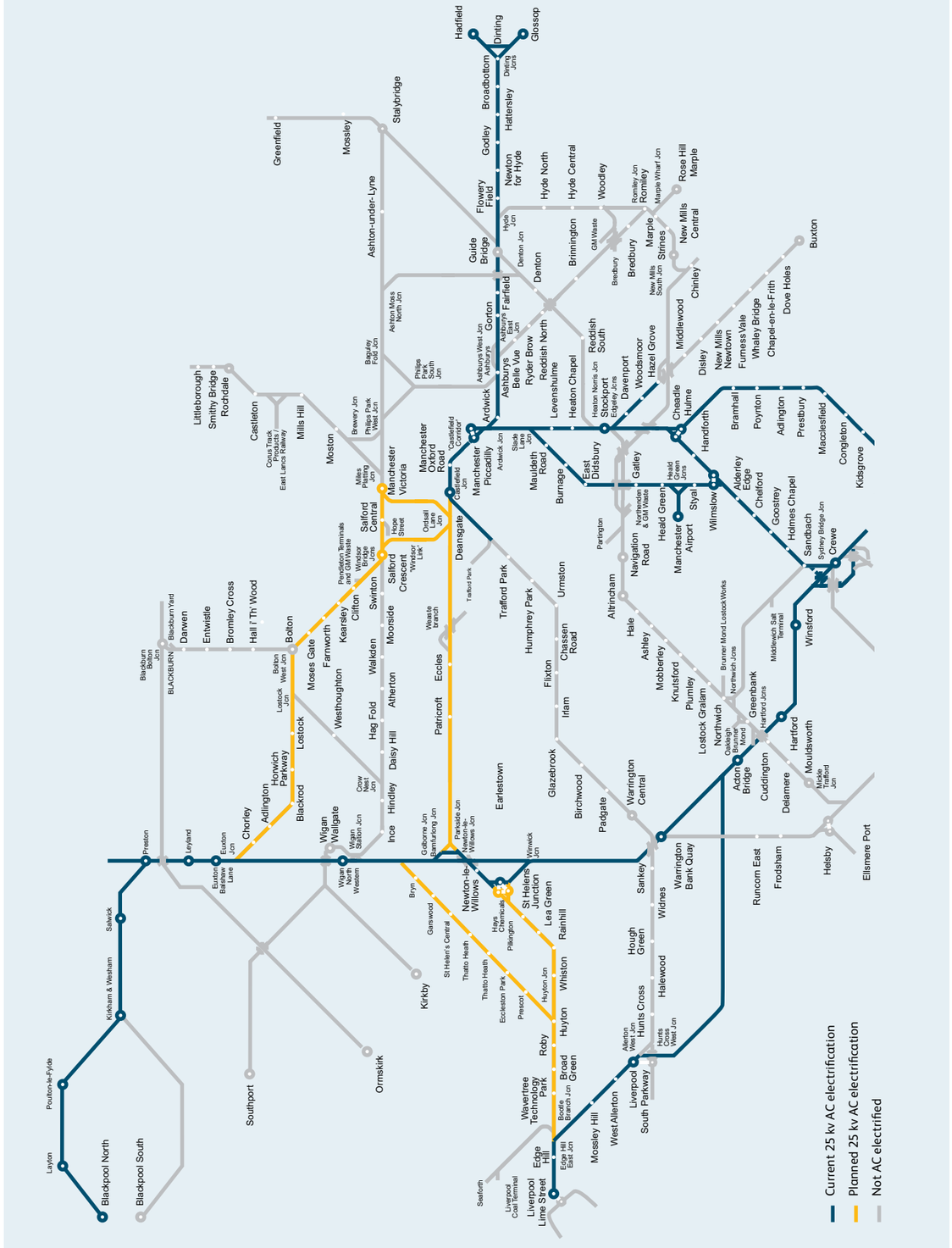


Figure 4.2 – routes used by CLC and Chat Moss passenger services

Figure 4.3 – demand and capacity on the Chat Moss and CLC routes into Manchester in the morning high-peak hour

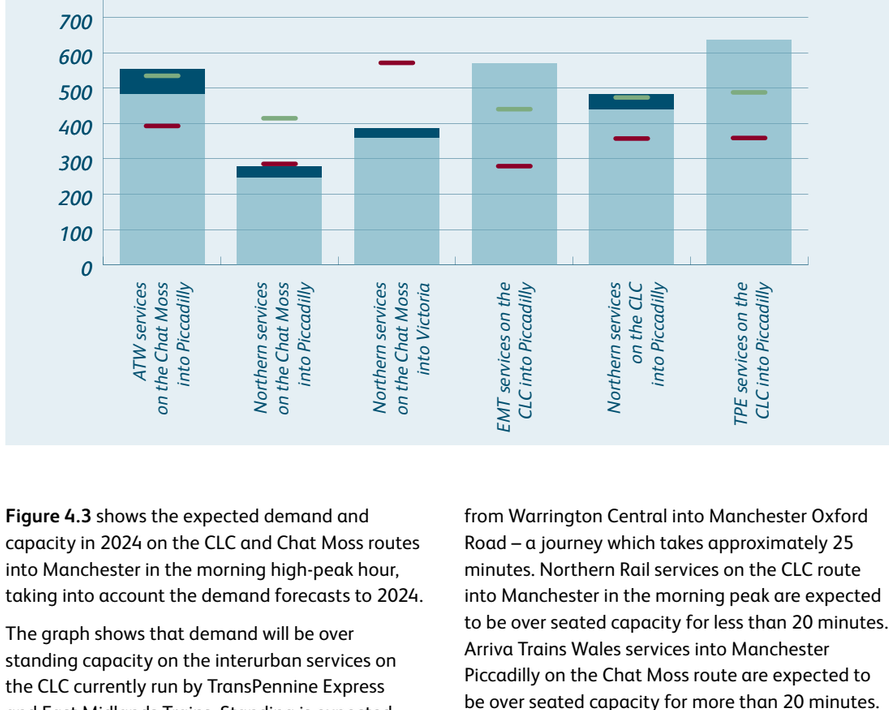


Figure 4.3 shows the expected demand and capacity in 2024 on the CLC and Chat Moss routes into Manchester in the morning high-peak hour, taking into account the demand forecasts to 2024.

The graph shows that demand will be over standing capacity on the interurban services on the CLC currently run by TransPennine Express and East Midlands Trains. Standing is expected from Warrington Central into Manchester Oxford Road – a journey which takes approximately 25 minutes. Northern Rail services on the CLC route into Manchester in the morning peak are expected to be over seated capacity for less than 20 minutes. Arriva Trains Wales services into Manchester Piccadilly on the Chat Moss route are expected to be over seated capacity for more than 20 minutes.

A similar assessment of the demand in the morning peak on the CLC and Chat Moss routes into Liverpool demonstrates that there will be sufficient capacity into Liverpool on both routes following electrification of the Chat Moss line.

Options considered to meet demand on the CLC route

The following options have been considered to meet demand into Manchester on the CLC route:

1.1. an additional shuttle from Liverpool Lime Street into Manchester Victoria in the morning high-peak on the Chat Moss route to abstract passengers from Liverpool who would have travelled on the CLC route

1.2. run two three-car DMU shuttles from Warrington Central into Manchester Oxford Road in the morning high-peak hour to abstract passengers directly from Warrington

1.3. run two three-car DMU shuttles from Warrington Central into Manchester Oxford Road in the morning high-peak hour to abstract passengers directly from Warrington and remove some intermediate stops from the interurban services to manage demand

1.4. run one four-car DMU shuttle from Warrington Central into Manchester Oxford Road in the morning peak hour to abstract passengers directly from Warrington and remove some intermediate stops from the interurban services to manage demand

1.5. run one four-car DMU shuttle from Liverpool Lime Street into Manchester Oxford Road via Warrington Central in the morning peak hour to abstract passengers from stations along the entire CLC route and remove some intermediate stops from the interurban services to manage demand.

In all cases the appraisals have assumed that a similar return train would operate in the evening high-peak hour (departures between 17:00 and 17:59).

Assessment of option 1.1 – increased/improved Chat Moss services	
Concept	This option is designed to abstract passengers from services that are over capacity on the CLC route onto new services on the Chat Moss route by running shuttles from Liverpool Lime Street to Manchester Victoria.
Operational analysis	Paths can be found for the additional services from Liverpool Lime Street to Manchester Victoria and timed to abstract the maximum number of people from the Liverpool to Scarborough and Liverpool to Norwich services.
Infrastructure required	No infrastructure enhancement would be required.
Passenger impact	The option attempts to abstract enough passengers from Liverpool Lime Street to manage loadings on the CLC, however, demand from Liverpool does not contribute to the crowding problem as much as demand from Warrington Central, Birchwood and Irlam. Therefore, options considered on the Chat Moss route would not be able to abstract an adequate number of passengers to meet the gap.
Freight impact	Affects ability to run any freight trains on the Chat Moss route in the high-peak hour.
Financial and economic analysis	No further analysis undertaken.
Link to other options	None
Conclusion	This option is not recommended as it would not abstract an adequate number of passengers to meet the gap.

Assessment of option 1.2 – two peak hour shuttles from Warrington Central to Manchester Oxford Road		
Concept	Two additional three-car DMU shuttles from Warrington Central into Manchester Oxford Road in the morning high-peak hour (and back to Warrington in the evening high-peak hour) to abstract passengers directly from Warrington.	
Operational analysis	Timetable analysis shows that a service can be run on the existing network in the current timetable from Warrington into the Manchester Oxford Road bay platform in the morning peak hour and from Stockport, via Manchester Piccadilly Platform 14 to Warrington in the evening peak hour. A second service would require re-timetabling of existing services and may not be possible as a result.	
Infrastructure required	No infrastructure enhancement would be required.	
Passenger impact	Provides enough overall capacity to meet the gap but inadequately manages passenger loads, therefore stops need to be taken out of the interurban services to manage crowding.	
Freight impact	Minimal	
Financial and economic analysis	The following table outlines the appraisal results:	
	30-year appraisal	**Option 1.2 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	25.0
	Revenue	-8.6
	Other Government impacts	1.7
	Total costs	**18.1**
	Benefits (present value)	
	Rail users benefits	1.6
	Crowding benefits	14.8
	Non users benefits	3.5
	Total quantified benefits	**19.9**
	NPV	**1.8**
	Quantified BCR	**1.1**
	Note: All figures are presented in 2002 market prices	
Link to other options	None	
Conclusion	This option is not recommended as other options represent higher value-for-money.	

Assessment of option 1.3 – two high-peak hour shuttles from Warrington Central to Manchester Oxford Road with stops removed from existing services		
Concept	Two additional three-car DMU shuttles from Warrington Central into Manchester Oxford Road in the morning high-peak hour (and back to Warrington in the evening high-peak hour) to abstract passengers directly from Warrington and remove some intermediate stops from the interurban services to manage demand.	
Operational analysis	Timetable analysis shows that a service can be run on the existing network in the current timetable from Warrington into the Manchester Oxford Road bay platform in the morning high-peak hour and from Stockport, via Manchester Piccadilly Platform 14 to Warrington in the evening high-peak hour. A second service would require re-timetabling of existing services and may not be possible as a result.	
Infrastructure required	No infrastructure enhancement would be required.	
Passenger impact	Provides adequate capacity and manages loadings well enough to meet the capacity gap. However, the majority of the crowding relief is attributable to the train that would run between the two high-peak hour interurban services.	
Freight impact	Minimal	
Financial and economic analysis	The following table outlines the appraisal results:	
	30-year appraisal	**Option 1.3 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	25.0
	Revenue	-11.0
	Other Government impacts	2.2
	Total costs	**16.2**
	Benefits (present value)	
	Rail users benefits	0.1
	Crowding benefits	21.1
	Non users benefits	4.6
	Total quantified benefits	**25.8**
	NPV	**9.6**
	Quantified BCR	**1.6**
	Note: All figures are presented in 2002 market prices.	
Link to other options	None	
Conclusion	This option is not recommended as other options represent higher value-for-money.	

Assessment of option 1.4 – one high-peak hour shuttle from Warrington Central to Manchester Oxford Road with stops removed from existing services		
Concept	Run one four-car DMU shuttle from Warrington Central into Manchester Oxford Road in the morning high-peak hour (and back to Warrington in the evening high-peak hour) to abstract passengers directly from Warrington and remove some intermediate stops from the interurban services to manage demand.	
Operational analysis	Timetable analysis shows that a service can be run on the existing network in the current timetable from Warrington into the Manchester Oxford Road bay platform in the morning high-peak hour and from Stockport, via Manchester Piccadilly Platform 14 to Warrington in the evening high-peak hour.	
Infrastructure required	No infrastructure enhancement would be required.	
Passenger impact	This option is significantly cheaper than option 1.3 but does not abstract enough passengers from the existing services.	
Freight impact	Minimal	
Financial and economic analysis	The following table outlines the appraisal results:	
	30-year appraisal	**Option 1.4 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	14.1
	Revenue	-6.4
	Other Government impacts	1.3
	Total costs	**9.0**
	Benefits (present value)	
	Rail users benefits	-0.9
	Crowding benefits	13.5
	Non users benefits	2.7
	Total quantified benefits	**15.3**
	NPV	**6.3**
	Quantified BCR	**1.7**
	Note: All figures are presented in 2002 market prices.	
Link to other options	None	
Conclusion	This option is not recommended as other options represent higher value-for-money.	

Assessment of option 1.5 – one high-peak hour shuttle from Liverpool Lime Street to Manchester Oxford Road with stops removed from existing interurban services		
Concept	An additional four-car DMU shuttle from Liverpool Lime Street into Manchester Oxford Road in the morning high-peak hour (and back to Liverpool in the evening high-peak hour) to abstract passengers from along the entire CLC route and remove some intermediate stops from the interurban services to manage demand.	
Operational analysis	Timetable analysis shows that a train can be run on the existing network in the current timetable from Liverpool Lime Street into the Oxford Road bay platform in the morning high-peak hour and from Stockport, via Manchester Piccadilly Platform 14 to Liverpool Lime Street in the evening high-peak hour.	
Infrastructure required	No infrastructure enhancement would be required.	
Passenger impact	This option incurs the cost of extra mileage over Option 1.4, but provides the opportunity to abstract passengers from stations between Liverpool Lime Street and Warrington.	
Freight impact	Minimal	
Financial and economic analysis	The following table outlines the appraisal results:	
	30-year appraisal	**Option 1.5 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	15.4
	Revenue	-12.0
	Other Government impacts	2.4
	Total costs	5.8
	Benefits (Present Value)	
	Rail users benefits	0.1
	Crowding benefits	21.8
	Non users benefits	5.0
	Total quantified benefits	**26.9**
	NPV	**21.1**
	Quantified BCR	**4.7**
	Note: All figures are presented in 2002 market prices.	
Link to other options	None	
Conclusion	Option 1.5 is recommended as it is the highest value-for-money. The interurban high-peak hour services are currently over capacity, therefore this intervention is recommended to be implemented as soon as possible.	

The recommended solution for meeting peak hour growth on the CLC route into Manchester is to operate an additional semi-fast service from Liverpool Lime Street to Manchester Oxford Road in the morning high-peak hour and from Manchester Piccadilly to Liverpool Lime Street in the evening high-peak hour.

Analysis of options to meet capacity on the Chat Moss route into Manchester

The Llandudno/Chester – Manchester Piccadilly high-peak hour services are expected to be over seated capacity from Warrington Bank Quay by 2024. These services stop at Earlestown and Newton-le-Willows on the Chat Moss route, so better management of loads could be achieved by removing stops from these services and inserting stops in the Liverpool – Manchester Airport service. However, because the Llandudno and Chester services are expected to be over seated capacity from as far out as Warrington and beyond, this would not be sufficient to meet the capacity gap. Therefore, lengthening of the existing services has been considered.

Assessment of option 1.6 – lengthening of the high-peak Chester/Llandudno to Manchester Piccadilly services		
Concept	Lengthening the morning and evening high-peak hour services between Llandudno, Chester and Manchester from three-car to four-car DMUs.	
Operational analysis	Platforms are able to accommodate four-car DMU stock.	
Infrastructure required	No infrastructure enhancement would be required.	
Passenger impact	Increased capacity and reduced crowding.	
Freight impact	None	
Financial and economic analysis	The following table outlines the appraisal results:	
	30-year appraisal	**Option 1.6 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	4.0
	Revenue	-4.0
	Other Government impacts	0.8
	Total costs	**0.8**
	Benefits (present value)	
	Rail users benefits	0.0
	Crowding benefits	9.5
	Non users benefits	1.7
	Total quantified benefits	**11.2**
	NPV	**10.4**
	Quantified BCR	**>5**
	Note: All figures are presented in 2002 market prices The increase in revenue is estimated to be sufficient to cover the operating costs. The total costs of this option are small when compared with the crowding benefit to passengers and non-user benefits. There is a risk of having to run the lengthened service in the off-peak to avoid coupling/uncoupling and therefore incur the increased mileage related costs; however, the business case is robust against this possibility.	
Link to other options	None	
Conclusion	This option has a high value-for-money case and is recommended and will be required in CP5.	

Demand and capacity on the Atherton route into Manchester

The Atherton route (see **Figure 4.4**) runs from Wigan via Atherton and Salford Crescent into Manchester and is not included in the announced North West electrification scheme, so the services on this route will remain as DMU stock.

Services on the Atherton route into Manchester are currently run by Northern Rail, with the following high-peak hour services:

1. Southport to Manchester Victoria (four-car DMU)
2. Kirby to Rochdale via Manchester Victoria (four-car DMU)
3. Two Wigan Wallgate to Manchester Victoria services (two-car DMU).

Figure 4.5 shows the expected demand and capacity in 2024 on the Atherton route in the morning high-peak hour. Services are expected to be at or over standing capacity between Atherton and Salford Central which is around 20 minutes.

Altering calling patterns is not sufficient in the long term as forecast crowding shows a requirement for two to three extra vehicles on the route across all trains, by 2024. Therefore, lengthening of the Wigan to Manchester Victoria services to four-car DMUs is sufficient to meet the capacity gap.

Assessment of option 1.7 – lengthening of the Wigan Wallgate to Manchester Victoria via Atherton services

Concept	Lengthen the 08:00 and 08:13 Wigan Wallgate to Manchester Victoria services to four-car DMUs. The 08:00 service is expected to be lengthened to a three-car DMU in the near future, and the 08:13 is currently a two-car DMU.	
Operational analysis	Platforms on the Atherton route are long enough to cope with four-car trains.	
Infrastructure required	No infrastructure enhancement would be required	
Passenger impact	Increased capacity and reduced crowding.	
Freight impact	None	
Financial and economic analysis	The following table outlines the appraisal results:	
	30-year appraisal	**Option 1.7 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	5.2
	Revenue	-1.3
	Other Government impacts	0.3
	Total costs	**4.2**
	Benefits (present value)	
	Rail users benefits	0.0
	Crowding benefits	7.4
	Non users benefits	0.5
	Total quantified benefits	**7.9**
	NPV	**3.7**
	Quantified BCR	**1.9**
	Note: All figures are presented in 2002 market prices.	
Link to other options	None	
Conclusion	Lengthening is the recommended option to meet the demand and capacity gap on the Atherton route into Manchester Victoria in the morning and evening peaks, and would be required in CP5.	

Figure 4.4 – routes used by Bolton and Atherton passenger services

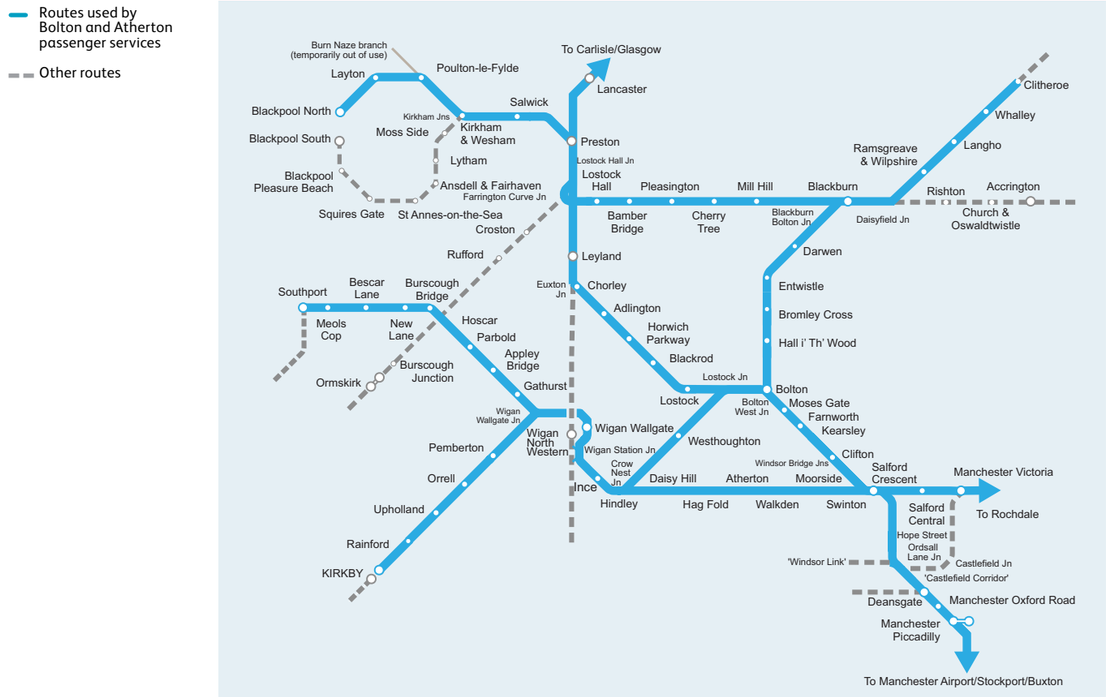
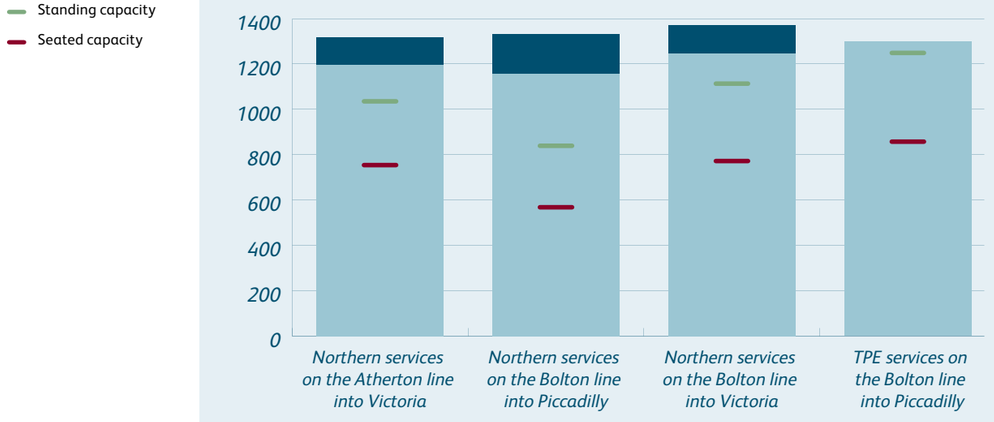


Figure 4.5 – morning high-peak hour demand and capacity in 2024 by line of route and service group on the Atherton and Bolton routes



Demand and capacity on the Bolton route into Manchester

The Bolton route (see **Figure 4.4**) is the most complex of those analysed under Gap 1. It has a mix of interurban and local services and will have a mix of electric and diesel services once the route is electrified. Some services on this route serve Manchester Victoria while others operate to Manchester Oxford Road and Manchester Piccadilly.

Figure 4.5 shows the expected demand and capacity in 2024 on the Bolton route. Services are expected to be at or over standing capacity by 2024.

Table 4.1 is an outline of services currently running on the Bolton corridor and the future rolling stock type assumed for this analysis.

Electrification allows services from Blackpool North and Scotland via Bolton to run as electric services. One of the Blackpool North services currently joins at Preston with a service from Barrow-in-Furness.

Table 4.1 – services on the Bolton corridor by service group in the morning high-peak hour

Local services on the Bolton line to Manchester Piccadilly			
Origin station	**Destination station**	**Current**	**After- electrification**
Southport	Manchester Airport	four-car DMU	DMU
Blackpool North	Hazel Grove	four/five-car DMU	EMU
Local services on the Bolton line to Manchester Victoria			
Origin station	**Destination station**	**Current**	**After- electrification**
Wigan Wallgate	Manchester Victoria	two-car DMU	DMU
Clitheroe	Manchester Victoria	two-car DMU	DMU
Clitheroe	Manchester Victoria	three-car DMU	DMU
Blackpool North	Manchester Victoria	four/five-car DMU	EMU
Inter urban services on the Bolton line to Manchester Piccadilly			
Origin station	**Destination station**	**Current**	**After- electrification**
Blackpool North/ Barrow-in-Furness	Manchester Airport	six-car DMU that joins at Preston	Blackpool train will be EMU and so unable to join with a service from Barrow-in-Furness.
Blackpool North/ Edinburgh	Manchester Airport	six-car DMU that joins at Preston	EMU

However, the route from Barrow-in-Furness to Carnforth is not due to be electrified and so the joining of these services will no longer be possible as DMUs cannot couple to EMUs.

As previously mentioned, the analysis assumes that the EMU rolling stock to be used on these routes is in four-car formation. The services from Blackpool and Edinburgh that join at Preston would convert to four-car EMU operation, which would result in an eight-car EMU service from Preston to Manchester. This would require some platform lengthening if it was to continue to call at Chorley. It would also be unable to call at Salford Crescent, a well-used station on the route, without the use of Selective Door Opening (SDO) or very expensive infrastructure works to provide sufficient platform lengths.

The provision of four-car EMU stock could raise issues on the local services on the Bolton corridor: the analysis shows that in some cases, four-car services would not provide enough capacity and eight cars would likely be an overprovision and trigger a large programme of platform lengthening. Analysis indicates that six-car trains may be ideal, which would require the reconfiguration of the assumed EMU stock; the DfT is currently investigating this. As described previously, the Chat Moss services are better suited to four-car EMU stock, indicating that the best provision for the North West would be a mix of three-car and four-car EMU stock.

Local services that continue to operate as DMUs will need to be lengthened and the formations will depend on the capacity available on the EMU services running via Bolton. Depending on the solution for the lengthening of DMU-operated services, some platform extensions on the Southport and/or Blackburn routes may be required.

On completion of electrification, the service pattern will also have to provide a desirable spread of services to the north and south side of Manchester. Greater Manchester Passenger Transport Executive (GMPTE) will be undertaking a study into the ultimate destination of passengers travelling from stations between Preston and Manchester on the Bolton corridor to help inform what the optimal spread should be. The results of this study will be reported in the final RUS, though consultees are welcome to comment on this in their responses.

Analysis was undertaken to ascertain what capacity will be required on each of the routes/service groups by 2024 using generic vehicle characteristics agreed by the RUS industry working group. The results for the Bolton corridor are shown in **Table 4.2**.

Two options have been tested that provide the required capacity on the Bolton corridor and both have a 'value for money' business case, demonstrating that there will be a number of ways to structure the Bolton line services, including operating services via the West Coast Main Line and the Chat Moss route as an alternative routing option.

The service development process will have to consider the points outlined above, any need for platform extensions on the Southport and Blackpool lines and provide the optimal service which provides enough capacity, is 'value for money' and provides as many linkages that passengers require as possible. The phasing of the interventions will depend on the availability of additional DMUs and what electric rolling stock becomes available upon completion of the electrification programme.

Table 4.2 – vehicle requirement by service group in the morning high peak hour in 2024

Service group	Number of services in the morning peak hour	Vehicles required to provide capacity – 2024
Local services on the Bolton line to Manchester Piccadilly	2	13
Local services on the Bolton line to Manchester Victoria	4	14
Interurban services on the Bolton line to Manchester Piccadilly	2	13

Gap 2: Accommodating peak growth into Manchester Piccadilly

In the period to 2024, there will be an increase in the number and length of services into Manchester Piccadilly. Therefore, it is necessary to identify whether Manchester Piccadilly is capable of accommodating these additional and longer services in terms of track capacity both in the terminal platforms and the approaches to the station, and identify solutions when issues arise.

Platform capacity at Manchester Piccadilly

Trains at Manchester Piccadilly station platforms share to allow more than one train to occupy a platform at the same time but there are some restrictions depending on the length of trains involved.

To understand whether there will be sufficient platform capacity at Manchester Piccadilly in the high-peak hour, a number of scenarios were tested which included any known service or formation alterations and any increases in train length and frequency to meet demand to 2024:

- lengthening of the following:
  - local services as identified in the North West RUS and this RUS
  - nine-car Class 390 services to 11-car
  - further north cross-Pennine train lengthening from three-car to six-car
- increased frequency of services
  - fifth north cross-Pennine service between Manchester and Leeds (see Gap 3).

The current platform occupation report for Manchester Piccadilly between 07:30 and 09:30 in the weekday morning peak has been used to understand whether the aforementioned scenarios cause invalid platform occupations. The following shows any issues raised and the associated recommendation:

Issue	Recommendation
11-car Class 390 trains are too long for Platform 4, which the 08:15 departure from Manchester Piccadilly to Euston uses and which is formed from an Empty Coaching Stock (ECS) move from Longsight depot.	It is recommended that this train is formed from an additional service from Crewe which allows the 08:15 to use one of Platforms 5, 6 or 7 which can accommodate an 11-car Class 390. This also avoids a number of platforming issues that are experienced currently.
A fifth cross-Pennine train cannot be accommodated in Platforms 1-3 in the current timetable.	The introduction of this service requires some re-timetabling of local services over Ardwick Junction. However, re-timetabling of these services is likely to be required anyway to take advantage of planned linespeed improvements on this route and initial analysis indicated that it is possible.

Track capacity at Manchester Piccadilly

The track layout at Manchester Piccadilly is a constraint to running additional services. Currently, three of the four cross-Pennine services per hour running between Leeds (and beyond) to Manchester (and beyond) in each direction cross the approaches to Manchester Piccadilly. Any additional services crossing the throat would create a capacity problem. However, the Northern RUS has not identified the requirement for any additional services to cross the throat of Manchester Piccadilly as the fifth cross-Pennine train goes in and out of Platforms 1-4.

Therefore, further interventions to those listed above are not necessary at Manchester Piccadilly just to accommodate the lengthened or more frequent services required to meet passenger demand.

Track capacity at Manchester Airport

A third platform at Manchester Airport was built in December 2008 to increase platform capacity and reduce the frequency of platform sharing. Similar to the analysis undertaken at Manchester Piccadilly, an assessment was undertaken of the expected length of services that use Manchester Airport between 07:30 and 09:30 and it should be noted that these services operate for both connectivity and operational reasons but the length of them is determined by the need to meet passenger demand into Manchester Piccadilly. The following lengthening scenarios have been taken into account:

- services up to eight-car (depending on the chosen mix of train formations on this route as described in Gap 1) from the Bolton corridor to Manchester Airport
- six-car north cross-Pennine services
- lengthening of local services in line with the North West RUS and as identified by this RUS.

All three existing platforms are approximately 200 metres long, sufficient to allow an eight-car train to be in a platform. However, a second train cannot platform-share if a train of more than four-cars long is already occupying it.

The impact on platform capacity has been analysed and demonstrates that the following services cannot share a platform:

- six-car north cross-Pennine services; in some instances these services cannot be re-platformed
- six/eight-car Bolton line services; in some instances these cannot be re-platformed.

Therefore, a fourth platform is required at Manchester Airport to provide adequate track capacity for lengthened trains to deal with peak hour growth into Manchester Piccadilly.

Assessment of option 2.1 – fourth platform at Manchester Airport	
Concept	Lengthening of services on the Bolton and north cross-Pennine corridors will require additional capacity at Manchester Airport.
Operational analysis	The capital expenditure associated with a fourth platform at the airport has been assessed against the operational costs and benefits of lengthening services on the north cross-Pennine corridor and lengthening the existing Southport to Manchester Airport service so that it is longer than the current four-car formation. A six-car service has been assumed to simplify the appraisal. The additional benefit of possible lengthening of other existing services on the Bolton corridor to more than four-car services has not been assessed.
Infrastructure required	The Northern Hub has identified that the cost of a fourth platform is around £16 million in 2009 prices. Depending on the operational solution, lengthening of some existing platforms between Southport and Bolton may also be required. The cost of this has been estimated at £1.5 million in 2009 prices for six-car operation in the appraisal.
Passenger impact	To accommodate longer services to increase capacity and reduce crowding
Freight impact	None
Financial and economic analysis	The following table outlines the appraisal results:

60-year appraisal	**Option 2.1 PV £m**
Costs (present value)	
Investment cost	18.8
Operating cost	6.0
Revenue	-11.9
Other Government impacts	2.4
Total costs	**15.2**
Benefits (present value)	
Rail users benefits	0.0
Crowding benefits	30.4
Non users benefits	5.2
Total quantified benefits	**35.7**
NPV	**20.4**
Quantified BCR	**2.3**
Note: All figures are presented in 2002 market prices	

Link to other options	Option 3.3: Lengthen peak services into Manchester in the morning peak and out of Manchester in the evening peak. Gap 1 Bolton corridor.
Conclusion	This option is recommended in the strategy and would have to be completed prior to lengthening either the Bolton line services or the north cross-Pennine trains that 'platform share' with other services.

Gap 3: Peak and off-peak crowding on the Leeds – Manchester route taking into account journey time improvements

The interurban services between Manchester and Leeds on the north cross-Pennine route (**Figure 4.6**) are heavily used and were originally considered in the Yorkshire and Humber RUS. To deal with all-day crowding on this route, the Yorkshire and Humber RUS recommended an all-day fifth cross-Pennine service between Manchester and Leeds (and beyond) and lengthening of some existing services into Leeds in the high-peaks. The recommendations for the local services on the route in previous RUSs are still appropriate for growth to 2024.

Analysis of demand and capacity on the interurban services considered the following:

- forecast demand to 2024 on existing services
- the impact on demand and capacity of a fifth cross-Pennine service and lengthening of services into Leeds in the high-peaks as recommended in the Yorkshire and Humber RUS
- the estimated impact on demand of journey time improvements.

Analysis of crowding on the interurban services in 2024 demonstrated that the Yorkshire and Humber RUS recommendation of a fifth cross-Pennine service plus some lengthening of services into Leeds in the high-peak are still required to help address all-day crowding. Therefore, a 25 per cent uplift was applied to the capacity of the services to allow for the affect of the extra train plus lengthening into Leeds in the high-peak.

The Leeds to Manchester route will experience some journey time reductions by 2024 as a result of linespeed improvements. It is not possible to take full advantage of these in the peak as services have to call at multiple stations, but a 10 per cent uplift has been applied to the demand data to allow for an increase in patronage resulting from the reduced journey time.

The following graphs demonstrate what crowding remains on interurban services after the fifth cross-Pennine train and lengthening of some services into Leeds in the high-peaks have been introduced.

Demand and capacity in the Leeds to Manchester direction

Figure 4.7 shows the number of passengers on all trains departing Leeds in the Leeds to Manchester direction and the expected seated and total capacity on those services in 2024. As standing is only expected between Leeds and Dewsbury, which is a journey time of less than 20 minutes, this demonstrates that there will be sufficient capacity in the morning peak and off-peak, but insufficient capacity in the evening peak.

Figure 4.6 – routes used by Manchester – Leeds interurban services

Figure 4.7 – forecast demand and capacity in 2024, on train departure at Leeds in the Leeds to Manchester direction

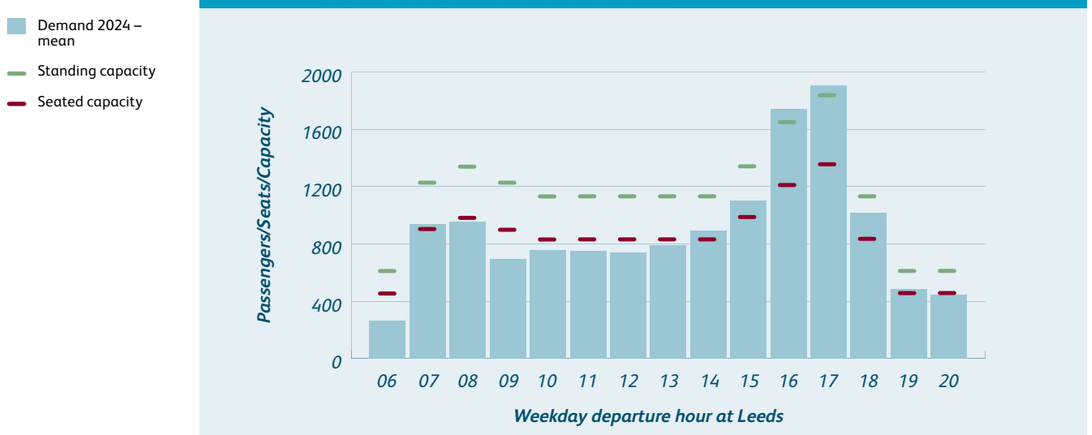


Figure 4.8 – forecast demand and capacity in 2024, on train arrival at Manchester in the Leeds to Manchester direction

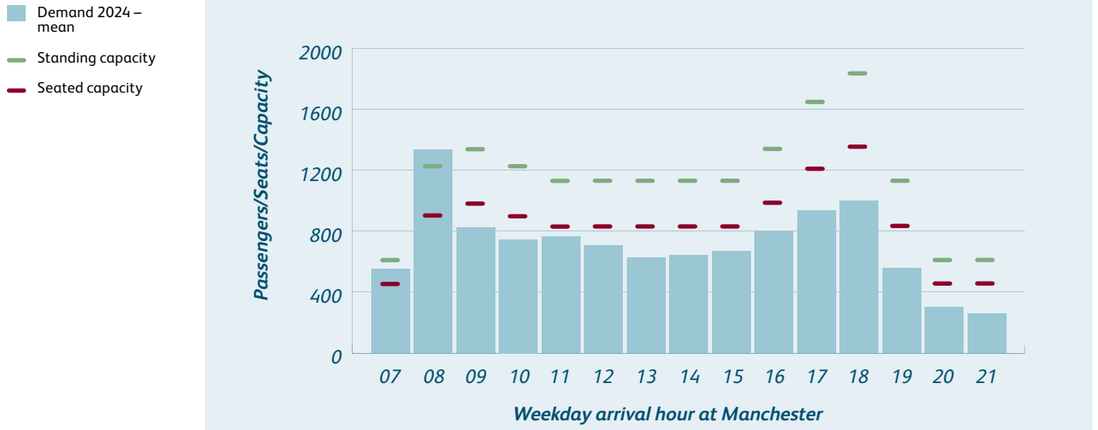


Figure 4.8 shows the number of passengers on all trains arriving at Manchester from Leeds and the expected seated and total capacity on those services in 2024. This demonstrates that there will be sufficient capacity in the evening peak and off-peak, but insufficient capacity in the morning peak.

Demand and capacity in the Manchester to Leeds direction

Figure 4.9 shows the number of passengers on all trains departing Manchester in the Manchester to Leeds direction and the expected seated and total capacity on those services in 2024. This shows that there will be sufficient capacity in the morning peak and off-peak, but insufficient capacity is delivered in the evening peak.

Figure 4.10 shows the number of passengers on all trains upon arrival at Leeds in the Manchester to Leeds direction and the expected seated and total capacity on those services in 2024. This demonstrates that there will be sufficient capacity in the off-peak, but insufficient capacity in the morning and evening peak.

Therefore, even the Yorkshire and Humber RUS recommendations of lengthening of services into Leeds in the morning high-peak and out of Leeds in the evening high-peak, plus the extra train, still does not provide sufficient capacity to meet the peak hours crowding gap at Leeds.

Therefore, to meet the crowding gap at Leeds the following options have been considered:

3.1. a shuttle service between Huddersfield and Leeds in the morning high-peak hour and the busier shoulder peak (in addition to the fifth cross-Pennine train) and a similar pattern of services from Leeds to Huddersfield in the evening peak

3.2. a sixth service between Manchester Piccadilly and Leeds in the morning and evening peaks.

Figure 4.9 – forecast demand and capacity in 2024, on train departure at Manchester in the Manchester to Leeds direction

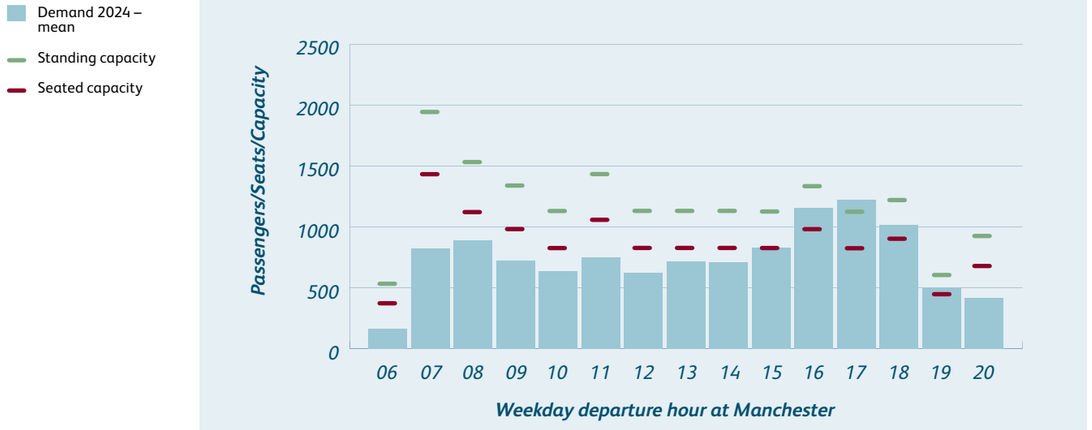
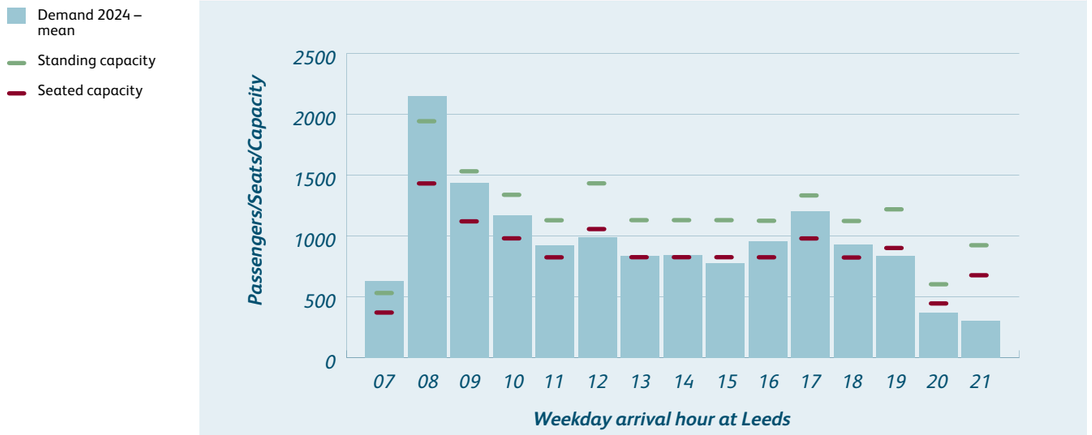


Figure 4.10 – forecast demand and capacity in 2024, on train arrival at Leeds in the Manchester to Leeds direction



Assessment of option 3.1 – Huddersfield to Leeds peak hours shuttle	
Concept	An additional shuttle from Huddersfield to Leeds in the morning high-peak hour and one morning shoulder-peak hour and out of Leeds to Huddersfield in one evening high-peak hour and one evening shoulder peak hour.
Operational analysis	A path can be found for a Huddersfield to Leeds shuttle in the morning and evening peak in the current timetable in addition to a fifth cross-Pennine train. Two stops would have to be removed from the existing Huddersfield to Leeds stopping service and added into the shuttle service to avoid infrastructure changes.
Infrastructure required	This option would use the additional platform at Huddersfield Station which was included in the business case for the lengthening of the local services in the Yorkshire and Humber RUS.
Passenger impact	Increased capacity and reduced crowding.
Freight impact	None as there are no freight paths currently in the 'peak' direction.
Financial and economic analysis	The following table outlines the appraisal results assuming that this service can be run with one additional set of rolling stock.

30 year-appraisal	**Option 3.1 PV £m**
Costs (present value)	
Investment cost	0.0
Operating cost	13.0
Revenue	-12.9
Other Government impacts	2.6
Total costs	**2.7**
Benefits (present value)	
Rail users benefits	1.4
Crowding benefits	17.4
Non users benefits	3.6
WEBs	0.0
Total quantified benefits	**22.5**
NPV	**19.8**
Quantified BCR	**8.4**
Note: All figures are presented in 2002 market prices.	

Assessment of option 3.1 – Huddersfield to Leeds peak hours shuttle cont.	
Financial and economic analysis	The following table outlines the appraisal results assuming that the service requires two additional sets of rolling stock.

30-year appraisal	**Option 3.1 PV £m**
Costs (present value)	
Investment cost	0.0
Operating cost	24.2
Revenue	-13.0
Other Government impacts	2.6
Total costs	**13.8**
Benefits (present value)	
Rail users benefits	1.7
Crowding benefits	17.4
Non users benefits	3.6
WEBs	0.0
Total quantified benefits	**22.7**
NPV	**8.9**
Quantified BCR	**1.6**
Note: All figures are presented in 2002 market prices.	

Link to other options	Option 3.2
Conclusion	This option is recommended to meet capacity on the north cross-Pennine route in addition to the lengthening and fifth train per hour recommended in the Yorkshire and Humber RUS. If actual demand grows in line with forecast demand then implementation of option 3.1 would be necessary in CP6.

Assessment of option 3.2 – sixth Manchester to Leeds semi-fast service in the morning and evening peaks	
Concept	Run a shuttle between Manchester and Leeds in the morning and evening peak hours.
Operational analysis	A path does not exist between Manchester and Huddersfield in the current timetable with the existing infrastructure.
Infrastructure required	To provide the extra path, infrastructure would be required to allow overtaking of stopping services, or rolling stock could be produced that can accelerate fast enough to reduce the time differential between fast and stopping passenger services. The Northern Hub Study has identified that four-tracking the route between Marsden and Diggle to allow fast trains to pass slow trains would cost around £61 million in 2009 prices. Infrastructure would also likely be required at Manchester Piccadilly to path and platform the train.
Passenger impact	Increased capacity, reduced crowding and improved connectivity between Manchester and Leeds. However, the service is not required to go west of Huddersfield to solve the capacity constraint.
Freight impact	Depends on solution to accommodate the sixth train but there is a need for an hourly off-peak freight path on the route.
Financial and economic analysis	The infrastructure cost is significant and there are cheaper ways to provide sufficient capacity into Leeds in the morning peak.
Link to other options	Option 3.1
Conclusion	This option is not recommended to meet capacity.

Though the fifth cross-Pennine train provides extra capacity into Manchester in the peaks, the train lengthening recommended in the Yorkshire and Humber RUS does not provide the required capacity as it is aimed at increasing capacity into Leeds in the high-peak. As a result, in 2024, crowding remains into Manchester in the morning peak and out of Manchester in the evening peak. Therefore, the best option would be to lengthen the busiest services into and out of Manchester.

Assessment of option 3.3 – lengthen peak services into Manchester in the morning peak and out of Manchester in the evening peak		
Concept	An extra six vehicles on services into Manchester in the morning high-peak hour and one in the first morning shoulder peak hour, and similarly deployed in the evening peak to meet demand in the evening high-peak hour and shoulder peak hours.	
Operational analysis	Lengthen the four existing three-car DMU services into Manchester in the morning high-peak hour to a mixture of six and four-car trains, and lengthen one existing three-car DMU service into Manchester in the 07:00–08:00 shoulder peak hour to a four-car DMU. This rolling stock is then assumed to be deployed onto the busiest services in the evening peak to deal with capacity issues. The operational costs of this scheme are the leasing costs of six extra vehicles and the mileage costs of running in one direction in the morning peak and one direction in the evening peak.	
Infrastructure required	This option would require an additional platform at Manchester Airport. The infrastructure costs are excluded from this business case because the fourth platform has been assessed separately (see Gap 2).	
Passenger impact	Increased capacity and reduced crowding.	
Freight impact	None	
Financial and economic analysis	The opportunity to maximise the benefit of this scheme by running lengthened services in the off-peak has not been assessed. The following appraisal quantifies the operational costs and benefits of running the services in the peak only:	
	30-year appraisal	**Option 3.3 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	16.7
	Revenue	-12.3
	Other Government impacts	2.5
	Total costs	**6.9**
	Benefits (present value)	
	Rail users benefits	0.0
	Crowding benefits	26.6
	Non users benefits	5.1
	Total quantified benefits	**31.7**
	NPV	**24.8**
	Quantified BCR	**4.6**
	Note: All figures are presented in 2002 market prices.	
Link to other options	Requires an additional platform at Manchester Airport to avoid platform-sharing with six-car services, which links to the lengthening of services on the Bolton route.	
Conclusion	This option is recommended to meet capacity on the north cross-Pennine route in addition to the lengthening and fifth shuttle recommended in the Yorkshire and Humber RUS. If actual demand grows broadly in line with forecast demand then phased implementation of this option would be required in CP5 and CP6.	

The recommended approach for meeting growth on interurban services between Leeds and Manchester is the operation of a fifth cross-Pennine train all day, train lengthening in the peaks at Manchester and Leeds and two peak semi-fast services each way between Huddersfield and Leeds.

Gap 4: Peak and off-peak crowding between Sheffield and Manchester

Crowding on the Sheffield to Manchester route (**Figure 4.11**) was originally considered in the Yorkshire and Humber RUS, which resulted in a recommendation for an additional all-day Manchester Piccadilly – Sheffield service which would have been an extension of an existing Manchester Piccadilly – New Mills Central service with suitable amendments to calling patterns on Romiley line services. This option also improved connectivity between the two cities.

Subsequently, the East Midlands RUS recommended lengthening the Liverpool Lime Street – Norwich services to four-car so as to deal with crowding between Liverpool and Nottingham, which is expected to be implemented in 2011 following agreement on the provision of additional rolling stock between DfT and East Midlands Trains. Therefore, it is necessary to reconsider the strategy for this corridor in light of these changes.

Analysis of demand and capacity between Sheffield and Manchester considered the following:

- forecast demand to 2024
- a planned increase in capacity as a result of lengthening the existing Liverpool to Norwich services

The following services are considered in the analysis of demand and capacity:

- hourly Cleethorpes to Manchester Airport services that run as three-car DMUs, apart from the least busy hours, where they run as two-car DMUs
- hourly Liverpool to Norwich services that are expected to run as four-car DMUs in 2011.

Figure 4.11 – routes used by Sheffield – Manchester passenger services

Demand and capacity in the Manchester to Sheffield direction

Figure 4.12 shows the number of passengers on all trains departing Stockport[2] in the Manchester to Sheffield direction and the expected seated and total capacity on those services in 2024. This demonstrates that there will be sufficient capacity in the morning peak and off-peak, but insufficient capacity is delivered in the evening peak as standing is expected for more than 20 minutes.

Figure 4.13 shows the number of passengers on all trains arriving at Sheffield in the Manchester to Sheffield direction and the expected seated and total capacity on those services in 2024. This demonstrates that there will be sufficient capacity in the morning peak and off-peak, but some standing is expected in the evening peak. Standing is expected for more than 20 minutes but is on trains that have capacity problems on departure from Stockport.

Figure 4.12 – forcast demand and capacity in 2024, on train departure at Stockport in the Manchester to Sheffield direction

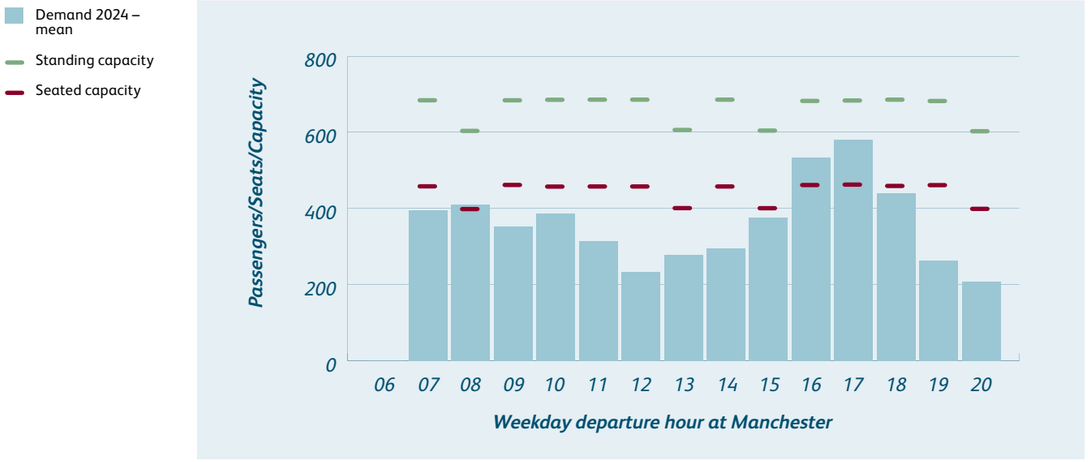
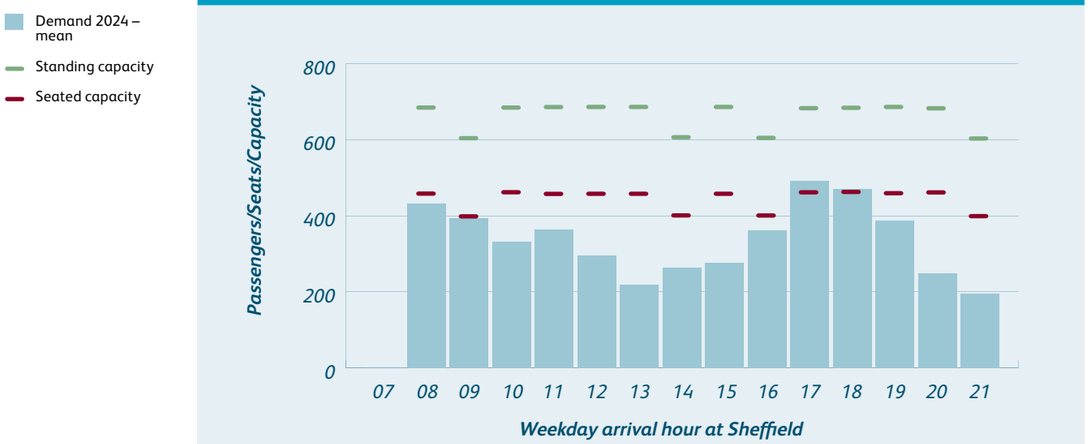


Figure 4.13 – forcast demand and capacity in 2024, on train arrival at Sheffield in the Manchester to Sheffield direction



2 Analysis of demand on trains at Stockport is used to represent crowding for a period of more than 20 minutes, and exclude crowding between Stockport and Manchester Piccadilly, which is less than 10 minutes and therefore complies with DfT guidelines.

Demand and capacity in the Sheffield to Manchester direction

Figure 4.14 shows the number of passengers on all trains departing Sheffield in the Sheffield to Manchester direction and the expected seated and total capacity on those services in 2024. This demonstrates that there will be generally sufficient capacity.

Figure 4.15 shows the number of passengers on all trains arriving at Stockport[2] in the Sheffield to Manchester direction and the expected seated and total capacity on those services in 2024. This demonstrates that there will be generally sufficient capacity in the off-peak and evening peak, but insufficient capacity is delivered in the morning peak. Standing is expected for more than 20 minutes.

Figure 4.14 – forecast demand and capacity in 2024, on train departure at Sheffield in the Sheffield to Manchester direction

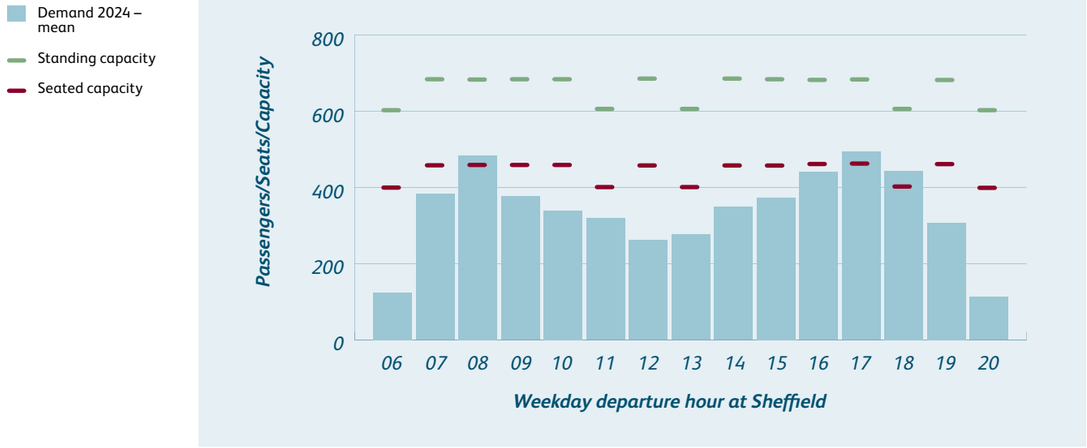
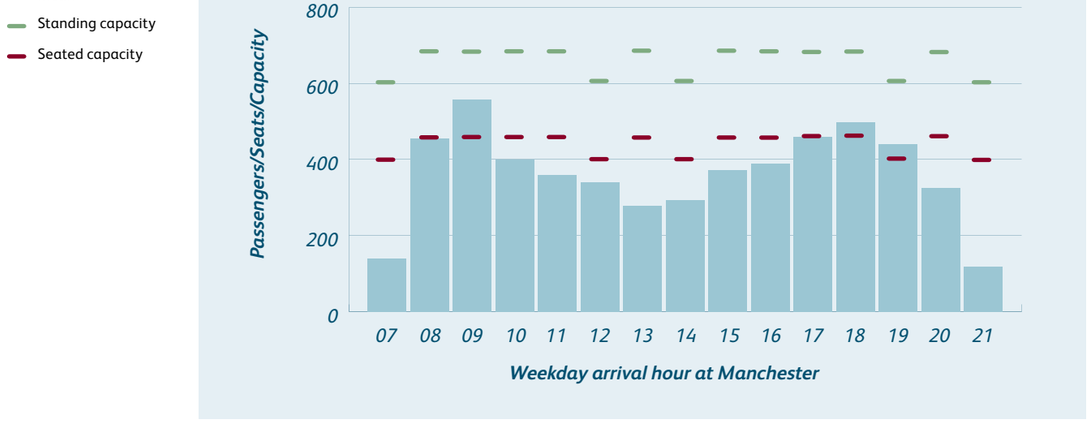


Figure 4.15 – forecast demand and capacity in 2024, on train arrival at Stockport in the Sheffield to Manchester direction



2 Analysis of demand on trains at Stockport is used to represent crowding for a period of more than 20 minutes, and exclude crowding between Stockport and Manchester Piccadilly, which is less than 10 minutes and therefore complies with DfT guidelines.

In summary, there is a gap between demand and capacity on some of these services, mainly into Manchester, that can be dealt with by lengthening existing services or running additional services.

The following four options have been appraised:

4.1. lengthening of the busiest Cleethorpes to Manchester Airport services by one vehicle

4.2. an additional shuttle between Manchester and Sheffield in the morning and evening peaks with the capital cost associated with Dore Jn redoubling

4.3. extending the shuttle to the off-peak with the capital cost associated with Dore Jn redoubling and Grindleford loops with a sensitivity of not including the cost of Grindleford loops

4.4. extending the all-day shuttle to connect with the Hull to Sheffield service to improve connectivity benefits with the capital cost associated with Dore Jn redoubling only.

Assessment of option 4.1 – lengthening Cleethorpes to Manchester Airport services		
Concept	Lengthen the busiest services between Cleethorpes and Manchester Airport	
Operational analysis	Current Manchester Airport to Cleethorpes services are a mixture of two and three-car DMUs; four-car DMUs can be accommodated at all platforms at which these trains call. This appraisal assumes that two unit diagrams (the group of trains that one set of rolling stock operates in a day) would have an additional vehicle all day to avoid coupling and shunting between the peaks. This means the mileage-related costs apply to all trains covered by the two diagrams.	
Infrastructure required	No infrastructure required.	
Passenger impact	Increased capacity and reduced crowding on the busiest Cleethorpes to Manchester Airport (and vice versa) trains.	
Freight impact	None	
Financial and economic analysis	The following table outlines the appraisal results:	
	30-year appraisal	**Option 4.1 PV £m**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	8.9
	Revenue	-8.3
	Other Government impacts	1.7
	Total costs	2.3
	Benefits (present value)	
	Rail users benefits	0.0
	Crowding benefits	16.7
	Non users benefits	3.6
	Total quantified benefits	20.3
	NPV	18.0
	Quantified BCR	>5
	Note: All figures are presented in 2002 market prices The revenue associated with this scheme is expected to almost cover the operating costs. Therefore, there may be a purely financial case for lengthening these services in the future.	
Link to other options		
Conclusion	This option is recommended to meet capacity on the south cross-Pennine route. If actual demand grows in line with forecast demand then implementation of option 4.1 would be necessary in CP6.	

Assessment of option 4.2 – run a peak shuttle between Manchester and Sheffield		
Concept	Extend a Marple/New Mills Central to Manchester Piccadilly service to Sheffield in each of the morning and evening peak hours to provide more capacity on services between Manchester and Sheffield with the added benefits of improved connectivity.	
Operational analysis	Extending an existing train avoids having to timetable an additional train into or out of Manchester Piccadilly in the peak hours. A review of calling patterns on Romiley line services would be needed to get the best balance between Sheffield – Manchester journey times and meeting the needs of local users. The existing Marple/New Mills Central service runs as a two-car DMU, which will have to be lengthened to a three-car DMU to provide enough capacity for existing passengers, and will require two additional units to extend the services. Therefore, this option requires the following: • eight sets of train crew • seven extra DMU vehicles • extra mileage from Marple/New Mills to Sheffield for 12 services a day	
Infrastructure required	This option requires doubling of Dore Jn. The Northern Hub Study estimates the cost of this scheme as £16 million in 2009 prices at GRIP 1 (initial feasibility estimate).	
Passenger impact	Increased capacity, reduced crowding and improved connectivity.	
Freight impact	Further limits opportunity for freight to operate in the Hope Valley during the peaks.	
Financial and economic analysis	The following table outlines the standalone appraisal results:	
	60-year appraisal	**Option 4.2 PV £m**
	Costs (present value)	
	Investment cost	17.2
	Operating cost	54.4
	Revenue	-16.0
	Other Government impacts	3.3
	Total costs	**58.9**
	Benefits (present value)	
	Rail users benefits	18.3
	Crowding benefits	20.1
	Non users benefits	7.1
	Total quantified benefits	**45.5**
	NPV	**-13.4**
	Quantified BCR	**0.8**
	Note: All figures are presented in 2002 market prices	
Link to other options		
Conclusion	The operating costs of this scheme are very expensive compared with the connectivity improvements over and above option 4.1. Therefore, this option is not recommended.	

Assessment of option 4.3 – run a shuttle all day between Manchester and Sheffield	
Concept	Extend one Marple/New Mills Central to Manchester Piccadilly service per hour to Sheffield all day. To provide more capacity on services between Manchester and Sheffield with the added benefits of improved connectivity.
Operational analysis	The incremental operating expenditure compared with Option 4.2 is the extra mileage costs of running the additional service in the off-peak.
Infrastructure required	This option requires doubling of Dore Jn and passing loops in the Grindleford area, as identified by the Yorkshire and Humber RUS. The Northern Hub study estimates the cost of these schemes are £16 million and £25 million respectively in 2009 prices at GRIP 1 (initial feasibility estimate).
Passenger impact	Reduced crowding and increased connectivity.
Freight impact	The Yorkshire and Humber RUS developed an outline timetable that could accommodate the extra passenger services and three freight trains every two hours in each direction, as required to meet freight growth.
Link to other options	An extension of option 4.2
Conclusion	The improved connectivity and small increase in connectivity benefits are not sufficient to cover the cost of passing loops at Grindleford or the operating cost of the extended service. This option is therefore not recommended.

Assessment of option 4.4 – run a shuttle all day between Manchester and Sheffield as an extension of the Hull to Sheffield service		
Concept	Extend one Marple/New Mills Central to Manchester Piccadilly service per hour to Sheffield all day and then combine it with the Sheffield – Hull service. To provide more capacity on services between Manchester and Sheffield, and between Sheffield and Doncaster, with additional connectivity benefits compared with Option 4.2.	
Operational analysis	There is assumed to be no additional operating expenditure compared with Option 4.3.	
Infrastructure required	This option requires doubling of Dore Jn and passing loops at Grindleford. The Northern Hub project estimates the cost of this scheme at £16 million and £25 million respectively in 2009 prices at GRIP 1. However, the capital cost of passing loops of Grindleford is assumed to be covered by the Strategic Freight Network Hope Valley train lengthening scheme.	
Passenger impact	Reduced crowding and increased connectivity.	
Freight impact	The Yorkshire and Humber RUS developed an outline timetable that could accommodate the extra passenger services and three freight trains every two hours in each direction, as required to meet freight growth with the above infrastructure schemes. The freight services were timed as heavier trains than those which operate in the daytime currently.	
Financial and economic analysis	The following table outlines the standalone appraisal results:	
	60-year appraisal	**Option 4.4 PV £m**
	Costs (present value)	
	Investment cost	17.2
	Operating cost	64.6
	Revenue	-35.9
	Other Government impacts	7.4
	Total costs	53.3
	Benefits (present value)	
	Rail users benefits	33.8
	Crowding benefits	40.3
	Non users benefits	14.8
	Total quantified benefits	88.9
	NPV	35.7
	Quantified BCR	1.7
	Note: All figures are presented in 2002 market prices The standalone case for extending the services to Hull has a medium value-for-money case, assuming that the cost of Grindleford loops is not included. However, the incremental case of this scheme compared with option 4.1 (which has a high value-for-money case) has a low value for money business case.	
Link to other options	This is an extension of options 4.2 and 4.3.	
Conclusion	The further increase in connectivity benefits is not sufficient to cover the operating cost of the portion of the service between Marple/New Mills and Sheffield. This option is therefore not recommended.	

Therefore, the strategy for this corridor is to lengthen the busiest services between Manchester Airport and Cleethorpes as described in option 4.1, to provide adequate capacity west of Doncaster to 2024 and it is not possible to recommend additional services at this time. However, the Northern Hub project (see Gap 9) provides the infrastructure required to enable an increase in services and improved journey time between Manchester and Sheffield and also provides opportunity for improved connectivity beyond these cities.

Gap 5: Peak crowding on the Retford and Penistone lines, and additional calls at Elsecar

The Penistone line

The Penistone line (**Figure 4.16**) currently has one stopping service every hour between Sheffield and Huddersfield in each direction, and many platforms are only long enough to accommodate trains comprising the equivalent of two 23 metre vehicles.

The Yorkshire and Humber RUS did not analyse capacity on the Penistone line because the planned tram-train trial was expected to provide more capacity on this route. However, the tram-train trial is no longer going ahead on this route and so further work is required. The following analysis shows demand and capacity on services into Huddersfield in the morning peak and combines demand and capacity of all services on the Barnsley corridor into Sheffield to demonstrate capacity issues on this route to 2024. The Penistone line services are currently formed of two-car or three-car Class 142/144s (20m vehicles).

Figure 4.17 shows demand and capacity assuming that each hourly service is made up of a two-car Class 156 service. The demand figures show the mean and the 75th percentile of the passengers on the train each morning. This demonstrates that the equivalent of two-car 23 metre vehicle trains is expected to provide sufficient capacity to 2024, with passengers standing for less than 20 minutes, given the expected changes in demand on this route.

Figure 4.16 – routes used by Retford and Penistone line passenger services

Figure 4.17 – demand and capacity in the morning peak into Huddersfield on the Penistone line

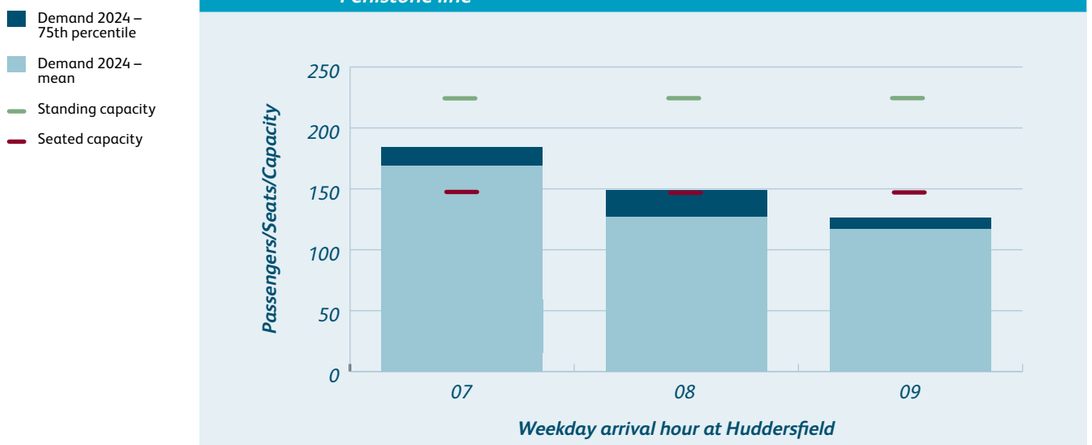
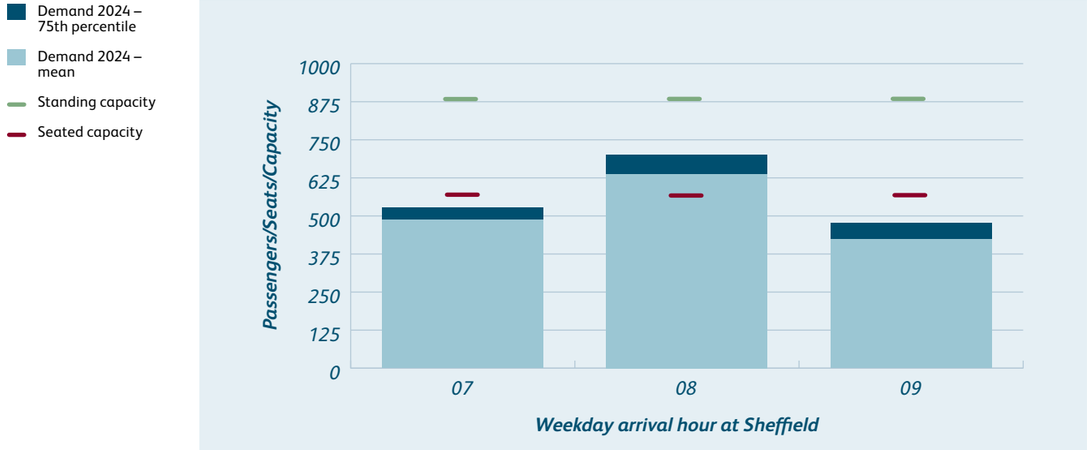


Figure 4.18 shows demand and capacity on the Leeds via Barnsley, and Penistone line services into Sheffield with the observation point at Meadowhall as trains are at their busiest approaching here. Three services run between Leeds and Sheffield on the Barnsley corridor in the morning high-peak hour and all are assumed to be four-car DMUs. Assuming that each hourly Penistone line service comprises the equivalent of a two-car Class 156, the demand and capacity figures demonstrate that there will be sufficient capacity to 2024, with passengers standing for less than 20 minutes.

Another consequence of the tram-train trial no longer being on the Huddersfield – Sheffield route is that the expected ability to reinstate the Elsecar calls in these services is no longer addressed. Due to the tight turnrounds at Sheffield and the effects of the single line sections north of Barnsley following the introduction of a revised Leeds – Sheffield – Barnsley service, train calls at Elsecar were reduced. The overall journey time of the Penisitone line services needs to be reduced by two minutes in each direction to allow this service to call at Elsecar. The better acceleration of tram-train vehicles was expected to allow this to happen.

Figure 4.18 – demand and capacity in the morning peak into Meadowhall on the Barnsley line, including Penistone line, towards Sheffield



The East Midlands RUS identified the maximum infrastructure cost that could support a one-minute journey time improvement between Barnsley and Meadowhall with a BCR of two, benefiting all services on this route. Given the nature of this route it is unlikely that more than one minute of journey time improvement could be found for trains calling intermediately and so a second minute would need to be found north of Barnsley on the Penistone line services to enable the reinstatement of calls at Elsecar. To achieve a Benefit Cost Ratio (BCR) of two, based on the benefits of all Penistone line trains calling at Elsecar, a linespeed improvement with a cost of no more than £1.7 million in 2010 prices would need to be found.

It is recommended that the East Midlands RUS recommendation to further develop journey time improvements between Nottingham, Sheffield and Leeds via Barnsley also includes journey time improvements for Sheffield – Huddersfield services which would allow the Elsecar call to be reinstated rather than reduce overall journey times on these services.

60-year appraisal	Option 4.4 PV £m
Costs (present value)	
Investment cost	1.8
Operating cost	0.0
Revenue	-0.6
Total costs	**1.2**
Benefits (present value)	
Rail users benefits	2.3
Crowding benefits	0.0
Non users benefits	0.2
Other Government impacts	-0.1
Total quantified benefits	**2.4**
NPV	**1.2**
Quantified BCR	**2.00**
Note: All figures are presented in 2002 market prices	

Retford line

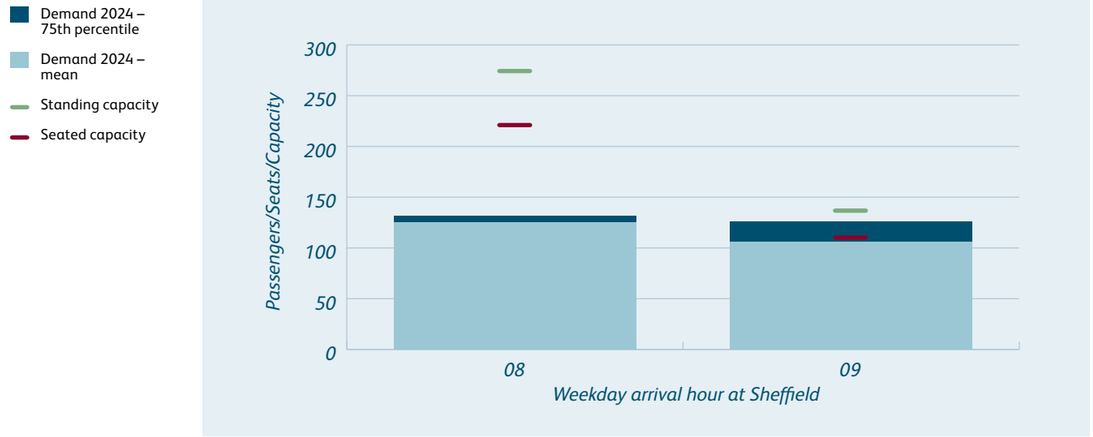
Unlike all other corridors into Sheffield, the Yorkshire and Humber RUS did not find the need for any interventions on the Retford line to 2019. Further analysis is required to see if this is still true to 2024.

Analysis of demand and capacity on the Retford line (**Figure 4.16**) into Sheffield on the following services has been undertaken:

- 07:04 Lincoln to Sheffield service that arrives into Sheffield between 08:00 and 09:00 and is a four-car Class 142 DMU
- 08:27 Lincoln to Adwick service that arrives into Sheffield between 09:00 and 10:00 and is a two-car Class 142 DMU.

Figure 4.19 shows that there is sufficient capacity on the Retford line to 2024 and no further options have been considered to increase capacity on this route.

Figure 4.19 – demand and capacity in the morning peak into Sheffield on the Retford line



Note: Passenger count information for the service in the 0700 hour was not available.

Gap 6: Insufficient freight capacity on the Immingham – Scunthorpe – Knottingley corridor

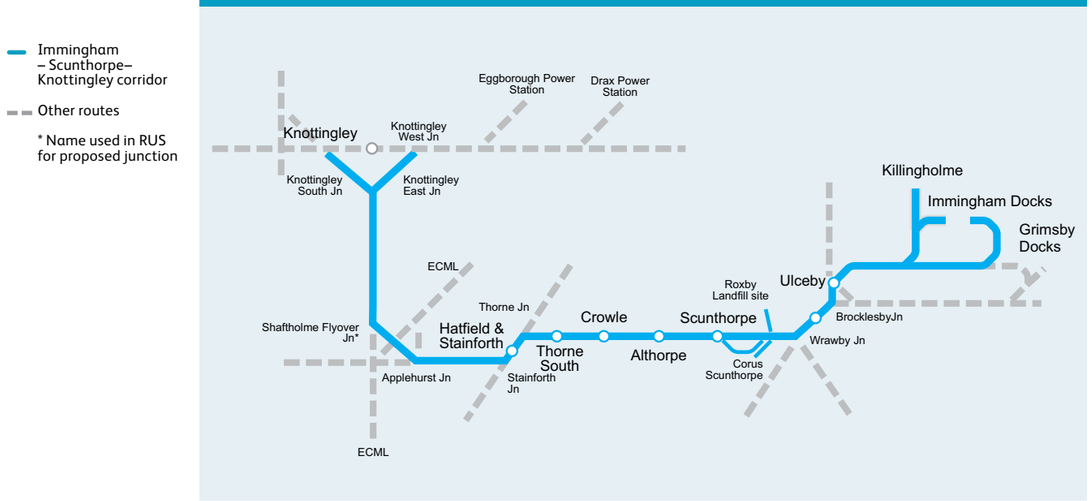
Analysis of the Strategic Freight Network (SFN) forecasts for 2019 and 2030 was undertaken to identify where the number of freight paths required per hour is expected to exceed the capacity available. The areas of concern on the East Coast Main Line will be examined by the East Coast Main Line 2016 Capacity Review (see paragraph 2.4.3) and the only other area where the network is unable to accommodate the required number of freight paths is the Immingham – Scunthorpe – Knottingley corridor (**Figure 4.20**). **Table 4.3** shows the demand for paths in 2019 and 2030 on this corridor.

Table 4.3 – current capacity and SFN forecasts in 2019 and 2030

	Current freight paths available per hour in each direction	2019 forecast freight demand	2030 forecast freight demand
Immingham to Brocklesby	6	5	7
Brocklesby to Wrawby Jn (two westbound lines)	6	5	7
Wrawby Jn to Scunthorpe Foreign Ore Jn	4	4	5
Scunthorpe Foreign Ore Jn to Scunthorpe West Jn	4	4	5
Scunthorpe West Jn to Thorne Jn	4	3	4
Thorne Jn to Hatfield & Stainforth (two lines each way)	5	4	5
Hatfield & Stainforth to Applehurst Jn	4	3	4
Applehurst Jn to Shaftholme Flyover Jn#	4	3	4
Shaftholme Flyover Jn# to Knottingley South Jn	5	3	5
Knottingley South Jn to Knottingley East Jn	2	2	3
Knottingley South Jn to Knottingley West Jn	3	1	1
Knottingley East Jn to Eggborough Whitley Bridge Jn	4	4	4
Knottingley West Jn to Ferrybridge North Jn	2	2	2
Knottingley West Jn to Knottingley East Jn	2	2	1
Eggborough Whitley Bridge Jn to Drax Branch Jn	4	3	4
Ferrybridge North Jn to Milford Jn	2	2	2

 # Name used for the purposes of this RUS to identify where the Immingham – Knottingley and Doncaster – Knottingley routes join once the Shaftholme Flyover project is completed.

Figure 4.20 – Immingham – Scunthorpe – Knottingley corridor



This analysis demonstrates that there is sufficient capacity on all sections to meet the requirements of the 2019 forecasts, unless a half-hourly Knottingley – Leeds passenger service is introduced (see scheme two below).

The following sections/locations have insufficient capacity to meet the 2030 forecasts:

- Immingham to Brocklesby
- Wrawby Jn to Scunthorpe West Jn
- Knottingley East Jn.

Analysis shows that the following infrastructure would be required to provide sufficient capacity in these areas:

Scheme 1 Enhanced signalling to provide four-minute planning headways between Humber Road Jn and Scunthorpe Foreign Ore Jn

Scheme 2 A turnback at Knottingley station so ECS moves associated with the passenger services that terminate at Knottingley do not block Knottingley East Jn whilst shunting (required to meet the 2019 freight forecasts if a half-hourly Knottingley – Leeds service is introduced).

The case for investment is based on the environmental benefits of removing lorries from roads. The following table shows the appraisals assuming that a lorry carries a load of around 29 tonnes and capital costs are £23 million and £12 million respectively for the two schemes in 2010 prices:

60-year appraisal	Scheme 1 PV £m	Scheme 2 PV £m
Costs (present value)		
Investment cost	24.7	12.9
Total costs	**24.7**	**12.9**
Benefits (present value)		
Non users benefits	174.1	42.0
Other Government impacts	-17.8	-4.2
Total quantified benefits	**156.2**	**37.7**
NPV	**131.6**	**24.9**
Quantified BCR	**6.3**	**2.9**

Note: All figures are presented in 2002 market prices

The case is still robust against an increased load per lorry of 40 tonnes. Therefore, the infrastructure detailed above is recommended for implementation to provide sufficient capacity for the 2019 and 2030 SFN forecasts.

There are signalling works scheduled in these areas in CP5 which would therefore be the best time to undertake scheme one, which would give performance and potential linespeed improvement opportunities in advance of the need for an increase in capacity.

In addition, Stainforth Jn is at capacity by 2030, which means that the performance of passenger and freight trains in the area is likely to be affected. This could be alleviated through alterations to the signalling approach control arrangements or relocating Stainforth Jn to reduce the junction margin. This will be examined in more detail during the consultation period.

The analysis has only covered the network owned by Network Rail and has not considered the impact of the growth forecasts on the Associated British Ports railway infrastructure within the port complex at Immingham.

Gap 7: Peak crowding on the Ilkley, Skipton and Wakefield Westgate corridors into Leeds

The Yorkshire and Humber RUS recommended a series of options to deal with expected crowding on the Ilkley, Skipton and Wakefield corridors. However, demand on these routes is expected to be higher than forecast in the Yorkshire and Humber RUS, therefore an assessment of capacity and demand to 2024 has been completed, assuming that the Yorkshire and Humber recommendations are implemented, to see whether a capacity gap is still expected in 2024.

Demand and capacity on the Ilkley line

The Yorkshire and Humber RUS recommended lengthening the current four-car EMUs on the four busiest Ilkley line (**Figure 4.22**) trains (one of which is in the first shoulder peak hour) to six-car EMUs. In the morning peak, two services run from Ilkley to Leeds in each shoulder-peak hour and three in the high-peak hour, providing 18 vehicles' worth of capacity in the high-peak hour.

Demand on this corridor is expected to be very high by 2024, largely because of the proportion of commuters on this corridor and the expected growth in the season ticket market into Leeds.

Figure 4.21 shows the expected capacity provision on the Ilkley line after the implementation of the Yorkshire and Humber RUS recommendations and the forecast demand in 2024. This demonstrates that services will be over seated capacity but not over standing capacity by 2024 and passengers will be standing for less than 20 minutes. Therefore, no capacity gap has been identified in 2024. However, it is recognised that, according to current demand forecasts, by 2024 these services will be very close to capacity. Therefore it is recommended that these services are reviewed in the next control period, taking account of intervening growth.

Figure 4.21 – demand and capacity in the morning peak into Leeds on the Ilkley line

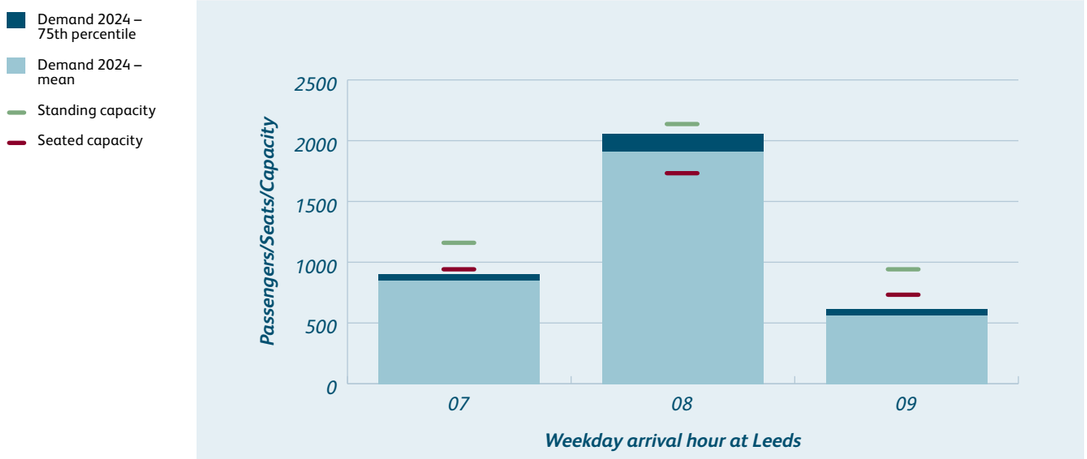
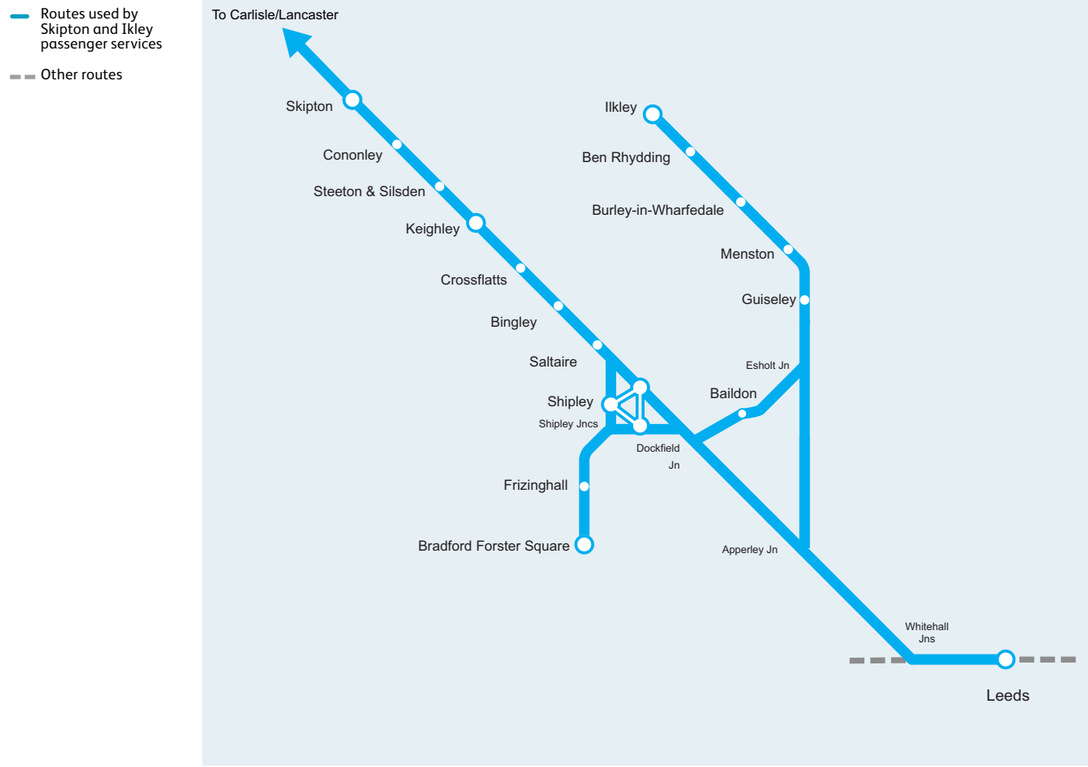


Figure 4.22 – routes used by Skipton and Ilkley passenger services



Demand and capacity on the Skipton line

The Yorkshire and Humber RUS recommended lengthening the busiest current four-car EMUs on the Skipton Line (**Figure 4.22**) to six-car EMUs. The following services currently run in the morning peak with assumed future formations as shown:

- between 07:00 and 08:00 into Leeds:
  - two services run from Skipton to Leeds (EMU services, one assumed to be four-car and the other six)
- between 08:00 and 09:00 into Leeds:
  - three services run from Skipton to Leeds (assumed to be six-car EMU)
  - one service from Ribblehead into Leeds (assumed to be a four-car DMU)
- between 09:00 and 10:00 into Leeds:
  - two services run from Skipton to Leeds (assumed to be four-car EMUs)
  - one service from Lancaster to Leeds (two-car DMU),

Figure 4.23 shows the expected demand and capacity on the Skipton line in 2024, assuming the recommendations of the Yorkshire and Humber RUS have been implemented. This demonstrates that services will be over seated capacity but not over standing capacity by 2024; standing will be for less than 20 minutes. Therefore no options have been identified to provide more capacity on this line.

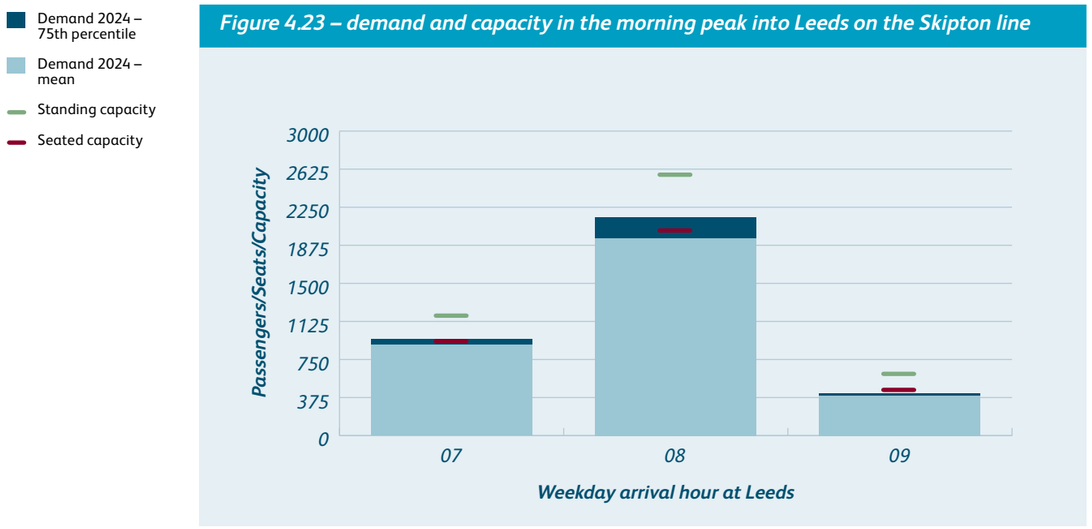


Figure 4.23 – demand and capacity in the morning peak into Leeds on the Skipton line

Note: Information for the 09:18 Skipton to Leeds service that arrives at Leeds at 09:59 is unavailable, therefore the capacity and demand for this service has been excluded.

Demand and capacity on the Wakefield line

The Yorkshire and Humber RUS recommended using higher capacity EMUs on the Doncaster to Leeds trains on the Wakefield Westgate corridor (**Figure 4.24**) and an additional Doncaster to Leeds service in the high-peak hour. The local services that are assumed to run are as follows:

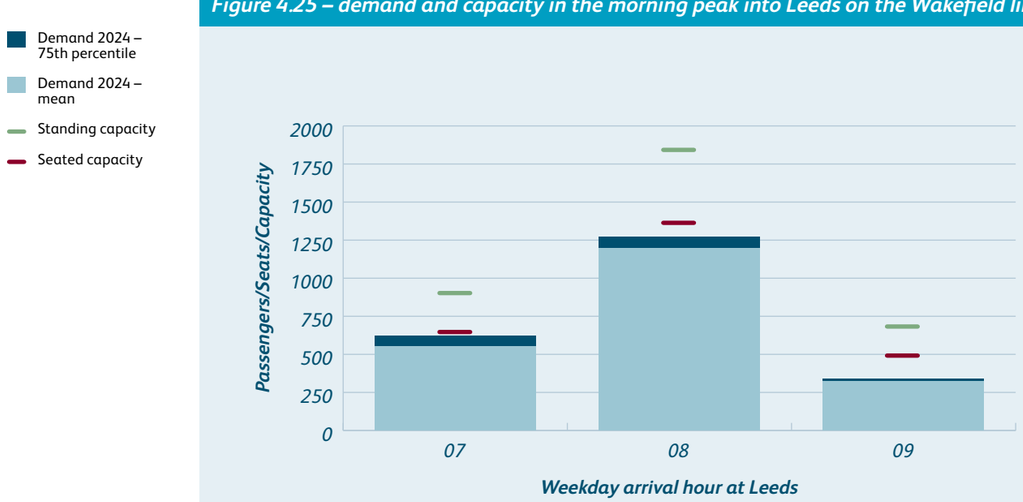
- between 07:00 and 08:00 into Leeds:
  - one service from Doncaster to Leeds (four-car EMU)
  - one service from Doncaster to Leeds (four-car DMU)
- between 08:00 and 09:00 into Leeds:
  - three services from Doncaster to Leeds (four-car EMU)
  - one service from Sheffield to Leeds (four-car DMU)
- between 09:00 and 10:00 into Leeds:
  - one service from Doncaster to Leeds (four-car EMU)
  - one service from Sheffield to Leeds (two-car DMU),

Figure 4.25 shows the expected demand and capacity on the Wakefield Westgate line in 2024, assuming the Yorkshire and Humber RUS recommendation of an extra train from Doncaster to Leeds, plus higher density EMU stock, have been implemented and the Sheffield - Leeds services are comprised of Sprinter DMU rolling stock. Strengthening of cross-country LDHS services provides trains of up to eight-car length from Wakefield into Leeds in the morning peak, which, along with services from London King's Cross, would provide capacity for Wakefield Westgate commuters.

This demonstrates that services will be within seated capacity by 2024.

Figure 4.24 – routes used by Wakefield Westgate corridor local passenger service

Figure 4.25 – demand and capacity in the morning peak into Leeds on the Wakefield line



Gap 8: Accommodating peak services into Leeds station

A number of service improvements are expected between now and 2024 that will cause capacity issues at Leeds station in the high-peak hour.

The expected length of services (both existing and additional ones recommended in the Yorkshire and Humber RUS and this RUS) on all corridors arriving into Leeds in the high-peak hour is as follows:

Corridor	Assumptions on formations of services arriving into Leeds in the high-peak hour in 2024
Bradford Forster Square	4x23m EMU
Calder Valley	4x23m DMU
Castleford	4X23m DMU
East of Leeds local services	4x23m DMU
Harrogate	4x20m DMU
Huddersfield/Brighouse local services	4x23m DMU
Ilkley	6x23m EMU
North cross-Pennine	6x23m DMU (4x23m on Hull services)
Skipton	Services from Skipton 6x23m EMU Services through Skipton 4x23m DMU
Wakefield Westgate	4x23m EMU from Doncaster 4x23m DMU from Sheffield
	Cross-country LDHS: 8x23m DMU London LDHS: 10x26m vehicles

The following recommended extra morning high-peak hour services have also been assumed from recommendations in the Yorkshire and Humber and Northern RUSs:

Yorkshire and Humber RUS:

- two extra Horsforth – Leeds (4x20m DMU)
- two extra Halifax – Leeds (4x23m DMU)
- one extra Knottingley – Leeds (4x23m DMU)
- one extra Doncaster – Leeds (4x23m EMU)
- one extra Manchester – Leeds and beyond (4x23m DMU).

Northern RUS:

- one extra Huddersfield – Leeds semi fast (4x23m DMU).

Analysis of the effect of these service improvements on track and platform capacity at Leeds station shows that the following service interventions trigger the need for the following infrastructure solutions:

Service change	Infrastructure requirement
Lengthening of Ilkley & Skipton services to six-car	New bay platform on north side of station
Additional Horsforth and Halifax services	
Lengthening of Castleford corridor to four-car	Extend Platform 17 to eight-car operation or a new bay Platform 18
Additional Huddersfield service	Change Platforms 13 and 14 to a through platform
Operation of additional interurban services from Manchester to Leeds and beyond	Micklefield turnback facility

The service changes on the Castleford corridor would require either a lengthened Platform 17 or an additional Platform 18. It was the view of the rail industry Stakeholder Management Group (SMG) that a lengthened Platform 17 is more feasible and therefore this cost has been included in the appraisal.

The six lines approaching the west of Leeds station are named A to F lines. The increase in services using E and F lines, including additional trains using E line instead of C line in the May 2011 timetable, means that it is possible that a new G line connecting the Normanton route to an extended Platform 17 would be required to improve timetable flexibility and mitigate the performance effects of running the additional services. A to F lines are the six approaching the west end of Leeds station. This will be investigated further during the consultation period and the results reported in the final Strategy, though consultees are welcome to comment on this in their consultation responses.

The current cost estimates for these enhancements are as follows:

Infrastructure required	Point estimate of capital cost (£m)
Leeds Platform 0	3.5
Leeds Platform 13/14	7.5
Leeds Platform 17 extension	9.5
Micklefield Turnback	24.0
Total	**44.5**

The present value of the capital costs after optimism bias, financing costs and inflation have been taken account of is £48 million in 2002 prices and values.

The capital costs of these enhancements have been appraised as a package of interventions against the operational costs and benefits of the associated service improvements. The costs, benefits and revenue implications of the service changes have been collated and compared with the capital costs of infrastructure at Leeds. This appraisal only includes the costs and benefits throughout the route of the identified trigger peak capacity interventions and the cost of the infrastructure enhancements at Leeds. It does not include the costs and benefits of the rest of the (train lengthening) peak capacity interventions recommended in the Yorkshire and Humber and Northern RUSs listed previously. However, this analysis was undertaken using the current timetable as the basis (with the further addition of the services listed) and it is recognised in that in future timetable structures it may be different services in the package of interventions that trigger the requirement for the additional infrastructure. This is because the current infrastructure at Leeds cannot accommodate the amalgamation of all the train lengthening and additional service interventions.

This gives a combined benefit cost ratio of 2.5.

The phasing of the infrastructure at Leeds will depend on the infrastructure interventions provided in CP4, timing of growth and the availability of additional rolling stock and how it is deployed.

Service change	Yorkshire and Humber RUS Option Code	Costs (£m)	Revenue (£m)	Benefits (£m)
Lengthening of Ilkley & Skipton services to six-car	WH1 & AI1	88	35	110
Additional Horsforth and Halifax services	HA1 or 2 or 3 CV1	105	41	138
Lengthening of Castleford Corridor to four-car	BP1 & BP4	71	28	83
Additional Huddersfield service	-	16	13	23
Fifth cross-Pennine train	HD2	192	138	311
Infrastructure at Leeds		48	-	-
Total		**524**	**267**	**689**
Note: All figures are presented in 2002 market prices				

Gap 9: Strategic connectivity across the north of England

The geographical RUSs that covered the north of England all identified that improved connectivity within the areas they covered is needed. To varying extents they also looked at improving links with other areas. In consequence, the Northern RUS recognises that strategic connectivity across the north of England is a gap and that extensive work by the Northern Way had looked at this issue.

The Northern Way work identified a number of Conditional Outputs, particularly involving improved inter and intra-urban connectivity (including faster journey times) which, if addressed, would contribute to a major increase in the Gross Value Added (GVA) of the north of England. Economic growth is one of the key objectives of the Coalition Government and it recognises that our railways can contribute to this, as well as the objective of carbon reduction.

Network Rail's Manchester Hub Study (see paragraph 2.4.5) then identified a number of gaps to be examined with the aim of achieving the Conditional Outputs in a way that delivers value for money, taking account of wider economic benefits. **Table 4.4** shows the outputs relating to connectivity that were specified by the Northern Way and the corresponding gaps, mainly as identified in the Manchester Hub Study.

The study examined these and found a high value-for-money case for a solution which would address many of these gaps and thereby meets many of the inter and intra-urban connectivity outputs identified by the Northern Way, along with other Conditional Outputs, such as performance, passenger train capacity (which is an extension of the recommendations covered above) and freight path provision.

The solution was based on a sample service proposition that improved connectivity between cities and key towns across the whole of the north of England and also between these and other key destinations within the north (eg. Manchester Airport) or other areas (eg. the East Midlands). Because the benefits stretch way beyond the Manchester area, this scheme has been renamed the Northern Hub.

Following detailed consideration of alternatives, Network Rail identified two strategic options to provide the capability to achieve the conditional outputs: one to allow greater use of Manchester Piccadilly; the other greater use of Manchester Victoria. The work demonstrates that the Manchester Victoria option offers better value for money and greater benefits at a lower capital cost.

The preferred solution (Option 2 in the Study) delivers excellent value for money and provides the opportunity for faster, more frequent and more reliable services, freeing up capacity and providing for future growth in demand. It will:

- increase platform capacity in central Manchester
- remove conflicts which use up valuable capacity
- increase capacity on key lines across Manchester and on major routes across the north.

The preferred option involves:

- a new section of railway west of Manchester city centre at Ordsall, to allow trains to travel from Manchester Victoria to both Manchester Piccadilly and Manchester Airport stations
- major improvements to Manchester Victoria, sallowing many more services to use the station and providing improved facilities for passengers
- new tracks on the north cross-Pennine line between Leeds and Liverpool, and on the Hope Valley between Sheffield and Manchester, to allow fast trains between the major towns and cities of the north to overtake slower trains.

This option provides the capability for significant improvements to rail services across the north of England, including interurban, commuter and freight services.

For interurban services the opportunity is created to:

- increase the frequency of train services between major cities in the north
- improve journey times on the north cross-Pennine route, reducing journey times for passengers between the North East and Yorkshire, and Manchester, Liverpool and other destinations west of Manchester
- improve journey times from Sheffield and the East Midlands to Manchester, Manchester Airport, Liverpool and other destinations west of Manchester
- provide direct journeys from Bradford, Halifax and the Calder Valley, to Manchester Airport and destinations west of Manchester
- provide direct services from Chester to destinations beyond Manchester
- reduce delays to services across the north of England.

On key Manchester commuter corridors the opportunity is created to:

- enable more commuter and local services to run throughout the day
- make commuter and local services faster than ever before
- introduce 15-minute frequency services between Manchester Victoria, Manchester Oxford Road, Manchester Piccadilly and Manchester Airport improving end-to-end journey times by making Manchester city centre more accessible by rail
- connect north east Manchester into the wider rail network by running through Manchester Victoria.

For freight operations the study provides the opportunity to:

- double capacity into the Trafford Park terminals
- provide capacity for traffic to planned new freight terminals.

Therefore the recommended option to meet much of the gap of 'strategic connectivity across the north of England' is Option 2 in the Manchester Hub Study. As well as benefiting the Manchester city region, improvements will be seen for adjoining city regions and other towns and cities further afield such as Newcastle, Middlesbrough and Hull. More information can be found at **www.networkrail.co.uk**

Other RUSs have made recommendations to improve connectivity on those routes outside the scope of the Northern Hub work, for example between Leeds, Sheffield and Nottingham. These recommendations, in combination with the Northern Hub, would enhance strategic connectivity in the north of England.

Depending on the service improvements chosen following completion of the Option 2 works, there will need to be a review of the implications on capacity at other key locations in the north of England including Leeds, Liverpool and Sheffield. Asset renewals in CP6 at the latter two will provide the opportunity to deal with any such capacity issues, as well as to address other RUS recommendations.

Table 4.4 – Northern Way-specified connectivity outputs and corresponding Manchester Hub Study gap

Requirement	Gap
Journey times	
These are target journey times for the key corridors, from a Manchester city centre station (either Victoria or Piccadilly) to the principal adjoining city regions:	The current public times are shown below:
• Leeds 40 minutes	54 minutes
• Bradford 50 minutes	60 minutes
• Sheffield 40 minutes	48 minutes
• Chester 40 minutes	63 minutes
• Liverpool 30 minutes	47 minutes
• Preston 30 minutes.	39 minutes
Growth centres in Greater Manchester	
From each principal rail corridor to each sub-area within the Regional Centre there should be either a direct rail service or a service that requires no more than a single interchange for onward travel by rail, Metrolink or Metroshuttle.	Calder Valley does not link to the Village.
From each principal rail corridor to each of the key town centres, there should be either a direct rail service or a service that requires no more than a single interchange by rail or Metrolink.	Calder Valley does not give a link to Stockport.
From each principal rail corridor to Salford Quays there should be a service that requires no more than a single interchange by bus or Metrolink.	Calder Valley does not reach the Metrolink service to Eccles for connection to Salford Quays.
Connectivity to deliver economic benefits	
All principal corridors to be connected if possible to the same station in Manchester city centre for easy passenger transfer (or through cross-Manchester operation), as well as other central area stations appropriate to the travel market.	Calder Valley services do not reach Manchester Piccadilly, all others do.
The improved connectivity should therefore be used: • where possible, to promote direct cross-city movements (for which train service provision and hence franchising costs will also generally experience cost efficiencies), or • where this cannot be done, to facilitate convenient passenger interchange. This is best done at a single Manchester city centre station to avoid circuitous, time-consuming/counter-intuitive routeing.	Not all corridors connect to the same single station.
Manchester Airport The requirement is for direct services of at least hourly interval service frequency in each of the principal corridors (30 minutes in the case of the Yorkshire and the Humber and North East via Leeds corridors).	The Calder Valley, Chester and the CLC have no direct service to Manchester Airport, and the corridor to the south has only got one if the local service from Crewe is counted as sufficient.
Trans Pennine	
Leeds – Manchester a 15-minute interval service (or better)	Currently four tph a few minutes off an even interval
Sheffield – Manchester a 20-minute service interval	Currently 30-minute interval
Bradford/Halifax – Manchester a 30-minute service interval	Currently two tph a few minutes off interval
Liverpool – Manchester a 15-minute service interval	Currently three fast tph but not at 20-minute intervals

5. Emerging strategy

5.1 Introduction

The study of the routes covered by the Northern Route Utilisation Strategy (RUS), together with those in the first generation of RUSs covering the north of England, has shown that generally the routes are very well used by passenger and freight traffic. The most acute issues are accommodating the growth in commuter journeys and certain interurban flows, and providing additional capacity for freight traffic. This strategy therefore primarily seeks to address the question of growth progressively over time. It is based on the work undertaken in this RUS and those elements of the strategies in the previous RUSs covering the north of England that are unchanged by the work of this RUS.

The RUS process has considered the current and future freight and passenger markets and assessed the growth in each. It has then sought to accommodate this growth effectively and efficiently, in accordance with the route utilisation objective specified in Network Rail's Network Licence. The measures proposed range from lengthening services to provision of additional infrastructure.

The Northern RUS has reviewed the conclusions of the previous RUSs covering the north of England in the light of passenger and freight demand forecasts beyond the timescales previously available, and significant changes in circumstances since publication of those RUSs. It has taken into account other aspirations that stakeholders have indicated they could potentially fund, particularly those of the Department for Transport (DfT). This process has identified new or amended gaps which the RUS has then sought to solve. The recommendations for gaps and options in the previous RUSs that have not been addressed already and remain unchanged by this review still stand. For the gaps addressed by this RUS, options were developed, tested, sifted and modified until feasible solutions were identified that meet value for money criteria and are consistent with anticipated funding.

To align with the 2007 Government White Paper 'Delivering a Sustainable Railway', the strategy also looks forward to interventions which will support long-term freight and passenger growth.

Many of the key recommendations are reliant upon there being additional rolling stock available to the Train Operating Companies (TOCs). Consequently, timescales and final capacity solutions will be dependent on the rolling stock strategy and subsequent acquisition, cascade and deployment of rolling stock across the network.

For Control Period 4 (CP4), which runs from April 2009 to March 2014, there is a process that is seeking to meet the Government's High Level Output Specification (HLOS) requirements through the Network Rail CP4 Delivery Plan and revised TOC operational plans. This process aims to address peak crowding for services into five cities in the north of England using the options proposed for recommendations in the appropriate first generation RUSs, subject to the availability

of rolling stock. The infrastructure and train service outputs of this process at the end of CP4 are the assumed baseline for the Northern RUS. Those recommendations in previous RUSs to accommodate capacity and growth in CP4 (listed in paragraph 5.3), that are not fully implemented by the end of the control period form part of the strategy beyond 2014.

5.2 Principles

5.2.1 Dealing with growth

The general principle adopted in RUSs has been to consider simpler and lower-cost interventions before turning to more complex and expensive solutions. In the first instance, optimising the use of existing infrastructure is examined. Timetabling solutions have always been sought as preferable to infrastructure works, subject to there being no unacceptable performance impact. The next step has been to consider the progressive lengthening of trains to the maximum practical size where heavy demand exists and only then to look towards infrastructure enhancement. Again, the range of options is considered in order, from simpler schemes such as platform extensions, through track and signalling enhancements, capability works for longer freight trains, increased loading gauge for intermodal traffic, to more comprehensive investment in a particular line of route. In some cases, the provision of additional services may offer a solution to peak and inter-peak overcrowding, offers passengers a better service and is better value for money than the cost of simple train lengthening, even taking into account infrastructure capacity improvements.

Looking to the medium term, account has been taken of the opportunity presented by the introduction of further new trains to provide increased capacity per train and to consider the part that increased use of electric traction might play.

5.2.2 Connectivity

Many stakeholders have an aspiration for improved connectivity in and between the many cities and towns in the north of England and with cities elsewhere in the UK and abroad. This would benefit commuting, business and leisure travellers, and therefore the economy. Improvements to rail journey times, service frequency and the availability of direct services would all contribute to achieving improvements in connectivity for the north of England.

Improvements to rail connectivity usually require enhanced infrastructure to improve journey times and to provide capacity for an increased number of services and direct connections. Faster rolling stock and additional vehicles may also be required, the latter particularly to allow increased frequencies and to deal with growth that is driven by the improved connectivity.

The Northern Hub project would provide increased infrastructure capability in the Manchester area and on several routes connecting it with other locations in the north of England. This would allow enhanced services to operate, which would give a step change in connectivity across the north of England.

5.2.3 Performance

Train service performance has improved considerably in recent years but the rail industry continues to identify ways to improve it further.

As with many other parts of the country, issues affecting performance on the rail network in the Northern RUS area are complex, given its diversity of routes and the wide range of services operating over it, with a number of services originating from places well outside the RUS area. It is clear that major factors are the mix of services with varying speed and stopping patterns and the large number of complex junctions and crossings, nearly all on the level, with conflicting train movements. These factors become critical when trains are running out of sequence due to an incident and the strategy seeks to reduce the scale of these issues. RUSs focus on reactionary delays which are those that are caused by trains that have been previously delayed elsewhere on the network by primary delays, which are then delayed further after losing their timetable slot, or cause delays to other trains.

Primary delays are those that arise due to a problem with the infrastructure or the train itself, eg. points failure, vandalism or shortage of train crew. There are other industry processes which focus on reducing these delays and the RUS has not sought to address them.

The first generation of RUSs covering the north of England made recommendations as to how reactionary delay could be reduced, so the Northern RUS, has not specifically studied this issue further. However, for those interventions examined by this RUS, consideration of their affect on reactionary delay has been taken into account.

5.2.4 Electrification

This RUS has assumed in the baseline the electrification of those routes in the North West announced by the Government in 2009. Looking further to the future, electrification of any additional routes will very likely require enhancement of the existing power supply infrastructure but will be dependent on the exact timetable, train formations and classes of traction that will be used. A significant factor will be the power consumption characteristics of any new Long Distance High Speed (LDHS) electric rolling stock and which routes it would be used on.

The strategy for electrification is addressed in the Network RUS: Electrification Strategy. Following the electrification of additional routes in the North West, infill electrification between Leeds and York would bring benefits in terms of faster local services and improved diversionary capability for East Coast Main Line (ECML) services. Further electrification of routes, such as between Manchester and Leeds, the Midland Main Line, and Sheffield and Leeds/Doncaster, would provide further opportunities to convert local and longer distance services to electric operation.

The need for further folling stock to accommodate growth and to replace and/or refurbish obsolete rolling stock during Control Period 5 (CP5) or Control Period 6 (CP6) and perhaps beyond might offer particular opportunities to build a case for electrification, based around the premise that electric traction is generally simpler to maintain than diesel, giving potentially more intensive utilisation and lower maintenance costs, as well as helping to reduce carbon emissions.

All electrified routes within the RUS area have recently been made receptive to regenerative braking, allowing the environmental and financial benefits of regeneration to be exploited by future new build and re-engineered rolling stock.

5.2.5 Rolling stock

The DfT published its Rolling Stock Plan on 30 January 2008. The Plan set out how rolling stock would be used to deliver increased capacity and hence contribute to the capacity outputs required over the period covered by the 2007 HLOS (covering CP4) and beyond. The DfT and train operators have been involved in the development of the Northern RUS. Therefore, the strategy set out in this chapter takes account of the most recent developments, recognising that some aspects are still under discussion between DfT and some operators, particularly Northern Rail. The Northern Rail, TransPennine Express (TPE) and East Midlands Trains (EMT) fleet increases would contribute to providing increased capacity in CP4 and beyond.

Given that the detail of the Rolling Stock Plan is still evolving, the infrastructure enhancements planned for CP4 aim as far as possible to accommodate the rolling stock necessary to meet the HLOS. Joint work by the train operators, the DfT and Network Rail is ongoing.

As mentioned in 5.2.4, beyond 2014 a programme of new build and life extension will be necessary to meet further growth and to address the eventual obsolescence of some of the existing fleet, and further infrastructure enhancements beyond those to be delivered in CP4 will be necessary to continue to make best use of this new rolling stock. This RUS assumes that sufficient electric units are made available to operate all existing services on the routes announced to be electrified in the North West where those services will operate entirely on the electrified network. As well as the requirement for electric stock to deal with growth on these services, particularly in commuter and long distance journeys, rolling stock would need to be made available to help meet growth on routes not currently electrified.

There are a number of electric fleets around the country, including the Merseyrail 3-car units, that will be due for replacement and this procurement of new stock could provide the opportunity for provision of electric stock for some of the additional electrified routes. This issue will be considered in more detail in the Network RUS: Rolling Stock and Depots workstream, which is due to be published for consultation in early 2011.

Further benefits might be achieved by the introduction of a new generation of self-powered trains with better acceleration characteristics than the Sprinter and Pacer fleets, which would minimise journey time differentials between stopping trains and faster services on a number of capacity-constrained corridors and thereby optimise the timetable. Similarly, an increase in the electrified network in the RUS area, with an associated increase in the Electrical Multiple Unit (EMU) fleet, could give an opportunity to procure rolling stock with characteristics that optimise between the needs for rapid acceleration/deceleration, maximum carrying capacity and quick access/egress to reduce station dwell times. The tram-train concept, which is to be piloted in South Yorkshire starting in 2012, may also provide opportunities to deal with some growth issues in the RUS area. These issues are also being considered further by the Network RUS: Rolling Stock and Depots workstream.

For LDHS services operating into the RUS area, benefits in terms of capacity, fleet flexibility and destinations served can be expected from the introduction of new LDHS rolling stock, either directly or through consequential rolling stock cascade. The Class 390 train lengthening in CP4 is expected to accommodate growth on LDHS services operating over the West Coast Main Line (WCML).

5.2.6 Depots and stabling

So far as commuter services into the main northern cities are concerned the strategy is to accommodate the additional diesel vehicles required during CP4 by concentrating maintenance of vehicles at Neville Hill depot at Leeds and Newton Heath in Manchester. In order to do this, provision of additional servicing and stabling facilities is necessary at a number of locations around Yorkshire and the North West. Those currently under consideration by Network Rail and Northern Rail include Leeds Holbeck, Allerton (Liverpool), Hull Botanic Gardens, Blackpool and Skipton (for electric stock). In addition, Allerton depot could provide a maintenance, stabling and servicing facility for the electric units for the routes to be electrified in the North West.

The Class 390 train lengthening programme provides enhanced facilities at Edge Hill (Liverpool) and Longsight (Manchester).

The introduction of any new LDHS rolling stock will have to include consideration of the depot facilities required to allow successful implementation.

Additional stabling and depot facilities will be required for the additional diesel and electric rolling stock required beyond 2014 to accommodate growth on commuter and interurban services in the RUS area. The exact locations will depend on the future balance between electric and diesel rolling stock fleets and where they are deployed.

5.2.7 Power supply

Traction power supply is potentially critical to service developments such as the operation of more frequent and longer trains or newer stock which has a higher power draw. This includes the Airedale and Wharfedale corridors and also routes supplied by the Doncaster feeder where a maximum of two Class 333 units are allowed to draw current at any one time. Power supply modelling is being undertaken taking into account the service strengthening of local services in this strategy.

Power supply requirements for the additional routes in the North West that are to be electrified are being considered as part of the development work for that project.

5.2.8 Freight capability

Freight growth requires a number of capability improvements, particularly capacity for additional services, improved loading gauge clearance of the core arteries over which intermodal freight does, or will need to, operate, and increasing the length of freight trains. These issues will be addressed on some routes in the north of England in CP4 but further works will be necessary, particularly in relation to the first two, for those intermodal arteries and their diversionary routes not addressed, as this traffic will be the main growth market for rail freight. Additionally, the forecast continuing growth of traffic through the Port of Immingham will need the capacity interventions described in **Chapter 4** of this RUS.

5.2.9 Seven Day Railway

It is recognised that there would be merit in moving towards a regime whereby fundamentally the same timetable operated on a daily basis. This reflects the increasing demand that passenger services at weekends should mirror more closely the Monday –Friday service and the growing need of freight customers for consistent daily continuity of supply, in line with what is generally available from the road transport industry.

Network Rail is leading the Seven Day Railway initiative, under which the overall vision is to deliver the working timetable in full, alongside cyclic maintenance, renewal and enhancement requirements. This will entail a need to provide more flexible operational layouts at the time renewals are carried out, together with changes in working arrangements. The latter are likely to include introduction of quicker and simpler procedures for taking and giving up possessions, coupled with changed ways of working to allow greater Adjacent Line Open or Single Line Working train operations, probably facilitated by installation of bi-directional signalling when renewals arise.

In many cases in the RUS area, key towns and cities can be accessed by more than one route, so that reasonable continuity of service is possible at times of engineering work or perturbation, albeit with some journey time extension. A key issue, particularly for freight, is that comparable capability exists on diversionary routes, notably in relation to loading gauge clearance and route availability. It will also be important to make sure that any infrastructure work or changes in the maintenance regime do not disproportionately affect users of local passenger services – which make up a significant proportion of operations in the RUS area – in the interest of longer-distance services.

Most of the RUS recommendations relating to additional services concern the commuter peaks or the main part of the day, the latter on both weekdays and weekends. These are times when there is currently no maintenance access.

A number of routes in the RUS area are used by high passenger train and freight tonnages and the increases in services on these will generally not be sufficient to raise the current maintenance category for the specification and scheduling of maintenance inspections and work. However, the RUS recommendations on some routes to run additional or lengthened services may drive the need for additional maintenance access but application of the Seven Day Railway principles will aim to minimise the effect of this on all passenger and freight flows.

There are a few sections of route for which there is no reasonable diversionary route and so, when renewals or other enhancements are proposed on these, opportunities should be examined to provide a more flexible track layout, such as bi-directional signalling.

In some cases the lack of a 'reasonable' diversionary route is due to alternative routes not being electrified and therefore the Seven Day Railway benefits need to be examined when considering further routes for electrification.

5.2.10 Access to stations

Access to the network was highlighted as a gap in first generation RUSs. Some measures were proposed to improve access to the railway, such as improved interchange and Park & Ride facilities at a number of stations, together with work under the Access for All initiative for which funding will be available until 2015. In CP4, Network Rail's National Stations Improvement fund is being used to improve station facilities at medium sized stations and opportunities are sought to supplement this fund by contributions from other stakeholders for those stations targeted. There will be a continuing need to work with train operators, the Passenger Transport Executives (PTEs), local authorities and other stakeholders to maximise access opportunities both within the Network Rail property portfolio and beyond it to deliver those interventions previously identified that are not funded in CP4.

5.2.11 Station passenger capacity

As commuter numbers increase, there are a number of stations where interventions will be required to deal with crowding at the station, such as on the platforms or at the station exits. This RUS has identified a list of stations **(Appendix B)** where these problems already exist or are most likely to occur. This list has been passed to the Network RUS: Stations, which is looking at this issue nationally, and will be published as a draft for consultation in early 2011.

5.3 Short-term strategy 2009/14 (Control Period 4)

5.3.1 Background

Although the end of CP4 is the baseline for this RUS, an overview of the strategy for CP4 is included here as a lead into the strategy recommended for future control periods.

In July 2007, the Government published the HLOS. This set out the improvements in the safety, reliability and capacity of the railway system which it wished to secure during CP4.

The strategy for CP4 primarily consists of measures to increase capacity on peak passenger services into Leeds, Sheffield, Manchester and Liverpool, to improve cross-Pennine passenger services throughout the day and to provide increased capability for freight.

The summaries in paragraphs 5.3.2 and 5.3.3 represent the current proposals for the use of additional rolling stock being made available through the DfT's Rolling Stock Plan and the infrastructure interventions to support them. However, the number of additional vehicles available for services in the north of England is likely to be significantly less than was expected prior to the start of CP4. As many of the infrastructure interventions in CP4 are designed to deliver the operational plans of the train operators that reflect the use of the additional stock, the list of enhancements is subject to change.

Anticipated dates for delivery of infrastructure projects funded by Network Rail are set out in the Network Rail CP4 Delivery Plan, which is updated quarterly, and the annual Route Plans published in March (both of which are available at **www.networkrail.co.uk**).

The May 2011 East Coast Main Line timetable will deliver a standard pattern of service with increased levels of long distance trains to and from King's Cross which, in turn, will provide additional capacity for journeys between the North East, Yorkshire and London and better connectivity at interchange points. A programme of infrastructure enhancements between London and York, due for completion by 2014, will further improve capacity, journey times and train performance on the route.

The following is a list of train services and infrastructure that form the expected strategy for CP4. Listed next to any specific items that have come from a previous RUS is the reference[1] to the corresponding previous RUS recommendation in **Appendix A**.

5.3.2 Train services

The following changes to train services currently form the expected strategy for CP4:

- the most crowded local services will be lengthened as additional rolling stock becomes available (except on the corridors below where additional services will operate)
- subject to the availability of additional rolling stock, additional peak shuttles will be run as an alternative to train lengthening between
  - Leeds and Horsforth, Doncaster, Bradford Forster Square, and Halifax (YHPC1, YHPC7, YHPC3, YHPC4)
  - Manchester and Rochdale, and Stalybridge (YHPC15, NWPC1)
- a few peak services may be extended through Leeds to a new turnback facility east of Leeds in the Micklefield area (YHPC10)
- increased services between the RUS area and London King's Cross to cater for growth and to reduce journey times on the medium and longer distance flows serving Yorkshire and the North East (ECMLAD1)
- reduction of cross-Pennine journey times between Leeds and Manchester via Huddersfield (YHRC1)
- faster services between Liverpool and Manchester via Earlestown (NWRC7)
- improvements to services in the Tees Valley
- improved services between East Lancashire and Manchester
- additional freight services as forecast in the Freight RUS will be accommodated, with re-routeing where appropriate to take advantage of new freight routeing opportunities such as those provided by the recently upgraded Brigg line and the Shaftholme Jn remodelling project
- performance improvement through reduction in reactionary delay, either in conjunction with other interventions in the CP4 strategy or renewals, where separate value for money and affordable projects are achievable.

5.3.3 Infrastructure

The following schemes are needed in order to deliver the above strategy:

- platform lengthening on a number of lines to accommodate increased train length
- new and increased passenger train servicing and stabling facilities
- new turnback facilities
  - at Horsforth – in conjunction with signalling renewals (YHPC1)
  - in the Micklefield area (YHPC10)
  - at Rochdale – in connection with Metrolink works
  - at Stalybridge – part of a wider enhancement scheme in conjunction with renewals (NWPC1)
- provision of an additional through platform at Leeds by connecting two bay platforms (numbers 13 and 14) and an improved turnback facility in Platform 15 by providing a new crossover at the west end, thus allowing Platform 15 to be used to terminate/start two long trains to/from the west of Leeds (Northern RUS Gap 8)
- linespeed improvements between Leeds and Manchester via Huddersfield, and between Manchester and Liverpool via Earlestown (YHRC1, NWRC7)
- various small scale capacity enhancements between Leeds and Manchester (YHRC1)
- any infrastructure works to allow any new LDHS rolling stock to operate
- W9/W10 loading gauge enhancements, funded by Hutchison Ports UK (completion date is subject to the timing of port developments at Felixstowe)
  - Peterborough – Doncaster – Selby via the East Coast Main Line
  - Newark – Lincoln – Gainsborough – Doncaster
  - Doncaster – Leeds Stourton via Wakefield Europort
- W9/W10/W12 loading gauge enhancements funded by the Strategic Freight Network (SFN) Fund (subject to agreement of the SFN steering group) of:
  - Doncaster – Birmingham via Beighton and the Erewash Valley
  - Doncaster – Berwick upon Tweed (with funding to extend the loading gauge enhancement into Scotland potentially provided by Transport Scotland) (ECMLFC4)
  - Swinton – Moorthorpe – South Kirkby Jn
- loading gauge improvements between Darlington and Teesport, subject to agreement of funding (ECMLFC4)
- various infrastructure improvements to improve capacity, journey times and performance for long distance and other services between London and Peterborough
- upgrade of the route from Peterborough to Doncaster via Spalding and Lincoln to become a key freight route, including W9/W10 loading gauge clearance between Werrington Jn (near Peterborough) and Lincoln, and two freight paths throughout per hour ECMLAD1, ECMLFC3)
- remodelling of Shaftholme Jn to provide a shorter route for Immingham to Aire Valley coal trains, which also removes the conflict between these services and long distance passenger and freight trains using the Doncaster – York route (ECMLFC1)
- a fourth running line between Holgate Jn and York and associated signalling enhancements, providing improved capacity for trains to and from Leeds and addressing reactionary delay to services caused by congestion at York
- first phase of electrification of additional routes in the North West (NEN1, NEN5, NEN10)
- small-scale projects to enhance performance, provide marginal capacity improvements and/or journey time improvements funded via the Network Rail Discretionary Fund, which is expected to include work in the Calder Valley, through Conisbrough tunnel, between Hazel Grove and Stockport, between Ormskirk and Preston, and at Methley Jn (near Castleford)
- schemes being promoted and/or funded by local authorities or PTEs:
  - Tees Valley Metro
  - new stations at Apperley Bridge and Kirkstall Forge
  - reopening a station at Haxby
  - improvements to Wakefield Westgate station
  - enhancement of Micklefield turnback into an interurban park and ride station
  - the reinstatement of the Todmorden Curve
  - increased track capacity between Blackburn and Bolton
  - a new station at Low Moor.

5.4 Medium-term strategy 2014 – 2024 (Control Periods 5 and 6)

5.4.1 Background

The medium-term strategy builds on that proposed for CP4. It assumes that any schemes or service changes in the short-term strategy not undertaken in CP4 will be added to the strategy for the medium term.

The general approach will be further train lengthening to meet predicted continuing growth in demand, though on some corridors additional shuttle services will provide better use of resources and also improve connectivity.

There is an opportunity to help drive a step change in economic activity for the north of England by improving connectivity between the cities and the major towns of the north, and also between them and other key destinations such as Manchester Airport and cities in other parts of Britain.

There will be a continuing need for additional rolling stock, including electric units to take advantage of later phases of the electrification of routes in the North West. In addition, by this time a number of existing rolling stock fleets will be reaching life-expiry or becoming due for a major mid-life overhaul, and the commencement of replacement and refurbishment programmes will create opportunities for improvements in capacity, performance, fuel efficiency and attractiveness to passengers.

The following is a list of train services and infrastructure that form the expected strategy for CP5 and CP6. Listed next to any specific items that have come from a previous RUS is the reference[2] to the corresponding previous RUS recommendation in **Appendix A**.

5.4.2 Train services

In addition to any service changes proposed for CP4, the following alterations to train services form the recommended strategy for CP5 and CP6:

- further train lengthening of local and interurban services, into Newcastle, Middlesbrough, Leeds, Manchester, Liverpool and Sheffield
- an additional all-day hourly service between Manchester via Huddersfield and Leeds (or east thereof) (YHAD1)

1 *The Appendix A reference is made up of the RUS title, and the gap name and number. ie. YHPC3 is the Yorkshire and Humber RUS, Peak Crowding 3 in Appendix A.*

2 *The Appendix A reference is made up of the RUS title, and the gap name and number. ie. YHPC3 is the Yorkshire and Humber RUS, Peak Crowding 3 in Appendix A.*

- additional peak services on some corridors where these make better use of resources:
  - Liverpool and Manchester via Warrington Central (Northern RUS Gap 1)
  - Huddersfield and Leeds (Northern RUS Gap 3)
- a timetable recast on the Bolton and Atherton corridors to make best use of rolling stock following electrification of the Blackpool – Preston – Bolton – Manchester route to meet growth and connectivity requirements (Northern RUS Gap 1)
- additional interurban services across the north of England providing a step change in connectivity between the cities and towns in the north and between these and other key destinations across Britain, some of which would absorb certain extra services recommended elsewhere in this section. The increase in service levels would be accompanied by journey time improvements which would further improve connectivity (Northern RUS Gap 9)
- the opportunity for more commuter and local services or key corridors into Manchester
- lengthening of long distance trains to King's Cross and St Pancras International and other LDHS services, mainly as a result of the introduction of new LDHS rolling stock, which would also allow some extra services to run
- possible increased use of electric trains within parts of the RUS area not covered by the electrification scheme in the North West
- progressive programme of new build and/or refurbishment to replace obsolete rolling stock
- further increases in train paths on those routes predicted to see a significant increase in freight services in the SFN forecasts, particularly between Immingham and the Aire Valley, and a doubling of capacity into the Trafford Park terminals
- further improvements to train performance through reduction in reactionary delays
- improved journey times between Leeds and Sheffield via Barnsley (and onwards to the East Midlands) and re-instate calls at Elsecar in the Huddersfield line services (YHRC10, Northern RUS Gap 6)
- improved performance and faster journeys for freight and passenger trains between Hull and Gilberdyke (YHFC1)
- possible increased frequency of trains serving Rotherham (YHRC5)
- half-hourly service between Knottingley and Leeds (YHRC11)
- enhanced service serving a new station at Robin Hood Airport Doncaster Sheffield (RHADS) (YHRC6).

5.4.3 Infrastructure

It is envisaged that the following projects will be needed during CP5 and CP6 to deliver the above strategy. The exact timing of these will depend on the rate of growth and the availability of funding:

- further platform lengthening
- additional platform at Huddersfield (YHPC5)
- an additional platform at Manchester Airport, required to meet passenger growth into Manchester Piccadilly (Northern RUS Gap 2)
- the Option 2 infrastructure interventions recommended by the Manchester Hub Study (published in January 2010). This project is now referred to as The Northern Hub. It involves a new railway line in Manchester city centre at Ordsall, major improvements to Manchester Victoria, and new tracks between Leeds and Liverpool and between Sheffield and Manchester (Northern RUS Gap 9)
- possible extension of electrified network within the RUS area, as identified in the electrification RUS, which could include:
  - Midland Main Line from Bedford to Sheffield via Derby (NEN2)
  - Sheffield to Doncaster and/or South Kirkby Jn (NEN4)
  - Leeds – York/Hull (NEN3)
  - Manchester – Leeds (NEN3)
  - Northallerton – Middlesbrough (NEN8)
- any further W9/W10/W12 loading gauge works identified by the Strategic Freight Network steering group
- schemes identified as representing value for money to reduce reactionary delay and/or improve the balance between engineering access and continuity of service operation
- enhanced turnback facilities at Castleford (YHBP1)
- improved signalling headways between Immingham and Scunthorpe in association with signalling renewals (Northern RUS Gap 6)
- new layout at Sheffield station and the surrounding area provided in association with signalling renewals in CP6 (YHRD3, Northern RUS Gap 9)
- layout enhancements approaching and at Liverpool Lime Street (high level station) in connection with renewals in CP6 (NWRC22, Northern RUS Gap 9)
- further capacity interventions in the Leeds station area (Northern RUS Gap 8)
- linespeed improvements between Sheffield and Leeds via Barnsley
- improved signalling headways and linespeeds between Hessle Road Jn and Gilberdyke in association with signalling renewals (YHFC1)
- doubling of Holmes Chord and possible improvements to Aldwarke Jn (YHRC5)
- additional crossover at Bradford Interchange and some bi-directional signalling (YHCV1)
- possible incremental improvements to capacity, performance and engineering access in the Doncaster station area prior to more significant enhancement on the back of signalling renewals in the longer term (YHRD1).

Both of the potential strategies for the Leeds – York/Selby line described in the Yorkshire and Humber RUS will use up the last of the remaining capacity during peak periods. It is unlikely that any further growth, in services can be accommodated beyond this though there would be scope for further train lengthening. This is a key constraint in the RUS area and should be a major focus of the industry planning processes once there is clarity on the intended service proposition that The Northern Hub infrastructure schemes would allow. Analysis undertaken for the Yorkshire and Humber RUS suggests electrification of the line would only provide a small track capacity benefit. It is likely that this extra capacity would be occupied within the next 10 years and the analysis suggests that four-tracking some of the sections of line between Leeds and Micklefield would be required to provide sufficient capacity beyond that. Similarly, capacity at Sheffield and Liverpool will also need to be reviewed through the industry planning processes in light of the emerging service proposition from the Northern Hub taking into account the renewals opportunities.

It is also likely that within the next 10 or 15 years demand for travel between the Yorkshire and Humber RUS area, the West Midlands and south thereof will have increased to such an extent that significant train lengthening or a third service every hour will be necessary. This would require a large scale package of infrastructure investment at a number of key locations across the network. Network Rail is developing a holistic view of these key services, which cross RUS boundaries, in the West Midlands and Chiltern RUS which will pull together the findings in relation to these services across other RUSs in the programme.

In the medium term, and possibly more critically in the longer term, track capacity in the Leeds station area will become a major constraint in dealing with passenger growth within and into West Yorkshire. This RUS has identified a number of infrastructure interventions to deal with medium-term growth; however, other options may provide additional capacity either instead of or in addition to these interventions. For example, the operation of more London – Leeds services through to other destinations would free up some further through-platform capacity at Leeds, subject to paths being available on the relevant routes.

Subject to a successful operation of tram-train in South Yorkshire, another opportunity to mitigate capacity issues at Leeds station might be by the deployment of tram-train vehicles on certain local corridors making use of a connection off the heavy rail network close to Leeds station to access new low level platforms alongside the existing station. This may be examined in development work on medium-term interventions at Leeds station, taking into account the results of the pilot scheme.

Similar opportunities may also be identified at Sheffield but operations could extend onto the Supertram network building on experience gained during the planned tram-train pilot scheme between Sheffield and Rotherham which will use the Supertram network between Sheffield city centre and Tinsley.

Delivery of the strategy for the routes covered by this RUS during CP5 and CP6 will require analysis of the value of the different inputs and outputs to understand better the relationships shown, and to produce a robust staged implementation plan with minimum disruption to the operational railway. Some of the inputs might be redefined or eliminated after further development work, but this is considered unlikely because many of the key dependencies are already clear.

5.5 Long-term context (Control Period 7 and beyond)

The 2007 White Paper 'Delivering a Sustainable Railway' aspired to a doubling of both passenger and freight traffic nationally over a 30-year period, though there may be wide variations on individual routes or parts of routes according to local circumstances. The Government recognises the role that rail has to play in helping to deliver two of its key objectives: economic growth and carbon reduction.

This section of the document examines what a doubling of passenger and freight traffic over the 30-year period 2009 to 2039 could mean for the RUS area. It is assumed that all passenger markets would generally double. However, for freight the SFN forecasts for 2030 have been used to identify those routes where the increase in freight path requirements are most significant. Not surprisingly, these are generally on the core national arteries connecting the ports, the Channel Tunnel and regional distribution centres as the majority contribution to a national doubling of rail freight would be intermodal traffic.

In the event of high growth of traffic on existing routes there is little doubt that the strategy for handling demand in the longer term must look first to make best use of the existing infrastructure in the RUS area and then to the opportunities offered by the wider rail network. These could include, for example, making use of any remaining capacity for growth on lines outside the RUS area. There could also be options to provide the additional capacity through reopening currently disused lines, or construction of some completely new sections of railway, although the practical difficulties of doing so must not be underestimated. However, a benefit of new or reopened lines is that they could be unconstrained by traditional limitations on maximum speed, loading gauge and other output characteristics and can be built with very little impact on the existing network, thereby minimising disruption to services during construction.

On the north-south axis the development of one or more high speed routes would provide much reduced journey times, increased frequency of services to London from key locations in the north and would release capacity on the existing north-south routes, which would allow growth in journeys between locations not on the high speed route and London, and freight growth, as well as a many other opportunities for connectivity. Should the high speed services use the existing stations in any of Leeds, Liverpool, Manchester and Sheffield, there will be a need to examine the capacity issues, how the significantly longer trains can be accommodated, and how to provide connections to other routes.

In order to accommodate a doubling of commuter journeys on each rail corridor, the short-to-medium term strategy of either train lengthening or additional services gives the foundation for the longer term. Continued growth could be addressed largely through progressive train lengthening both of existing services and the 'peak-busting' additional services described in the short and medium-term strategies.

Much of the network capacity to allow a doubling of the passenger markets in the north of England would be provided by the Northern Hub schemes. Increasing the capacity through Leeds and east thereof, through Sheffield and north/east thereof, and into Liverpool Lime Street (which are not within the scope of the capacity works for the Northern Hub) would result in most of the remaining additional infrastructure being in place to accommodate that doubling of passenger numbers on services in the north of England.

More widely, steps might be taken to encourage staggering of working hours in major urban centres – perhaps incentivised by fares policy. This could help to reduce the adverse effect of relatively short morning and evening peaks in terms of rolling stock assets fully utilised for only a very short period of each day. Longer, less intense peaks could certainly contribute to a reduction in crowding and more efficient operation of the local passenger transport network. The development of new ticketing technology to introduce more flexible and sophisticated pricing in the high peak hour and peak shoulders should be accorded a high priority. This will build on the work already done at industry level to identify appropriate standards for the potential national application of future ticketing solutions and other demand management techniques. The lead time in developing and proving such solutions means that while the full benefits are unlikely to be realised in the short to medium term, some early impact may be made.

The introduction of new LDHS rolling stock trains on services between London King's Cross and the RUS area should deliver much of the doubling of capacity on 'franchised services' over that provided when the 2007 White Paper was published. This would be achieved by an increase in seats compared with the current rolling stock, the additional service per hour provided in the proposed May 2011 timetable and the extra peak hour services recommended in the East Coast Main Line RUS. The shortfall for a doubling of capacity would probably be provided by two extra trains each way per hour. The East Coast Main Line 2016 Capacity Review published for consultation in August 2010 examines the introduction of further LDHS trains alongside increases in quantum of other service types on the ECML, including the SFN 2030 freight forecasts. The final version of the Review will be reflected in the Final Northern RUS document.

As far as freight growth is concerned, as described above, accommodating a significant increase in intermodal growth is necessary. This requires loading gauge enhancement to W9, W10 and W12, to allow train lengths up to 775 metres (to maximise use of train paths, locomotives and drivers) and the provision of additional freight paths on the key freight arteries through the RUS area, including associated diversionary routes.

Those arteries where increased capacity would be the most challenging are:

- Rotherham – Swinton – Moorthorpe – Hare Park Jn
- Doncaster – Colton Jn.

The first of these will need four-tracking of significant sections, which would need to be considered in relation to eliminating some of the flat junctions in the Rotherham to Sheffield corridor as well, but this will have benefits for other types of freight traffic growth, increased passenger services, train performance improvement and moving towards a Seven Day Railway. The other requires solutions to future routeing of passenger and freight traffic through the Doncaster station area and attention given to making most effective use of the lines via Hambleton and Askern.

The Doncaster station area needs to be examined not only in the context of the freight growth above but for the longer-term increase in passenger services from London to the RUS area and Scotland is met, and other service improvement aspirations in Yorkshire. This could lead to a major upgrade of the network in this area when signalling renewals become due.

In summary, the high-level strategy to deliver a doubling of passenger and freight in the longer term should aim to make use of a mixture of enhancements to the existing rail network and new high speed routes. The exact balance between the two will depend on the routeing of any new lines and therefore which current major passenger flows would transfer to them. This would determine how the capacity of the existing routes would then be used to cater for the remaining passenger and freight flows.

5.6 Alternative growth scenarios

As mentioned above, the previous Government's 2007 White Paper 'Delivering a Sustainable Railway' aspires to a doubling of both passenger and freight traffic nationally over the next 30 years. It is recognised that there may be wide variations on individual routes or parts of routes, according to local circumstances. In the event of rapid growth it is clear the strategy should focus on making the best use of the existing network in the first instance, and then on opportunities to develop the network more widely. There has been strong growth in recent years in rail demand in the RUS area, particularly around Leeds, reflecting its considerable growth as a regional commercial centre.

The demand forecasts used in this RUS represent the growth projections derived from the housing, population and employment forecasts contained in DfT's TEMPRO model, overlaid with information from Regional Planning Assessments and some bespoke overlays. It is expected that the recommendations for the 10-year RUS period are robust against the short-term uncertainties in the UK economy. However, as highlighted in the 2007 Government White Paper, longer-term demand forecasts can be very uncertain and extremely sensitive to economic conditions. It will therefore be important periodically to update the industry's understanding of the need for further investment in the light of growth to that point in time and updated demand forecasts. One of the mechanisms for this would be though Network Rail's Licence Condition to review established RUSs.

The RUS strategy is expected to cater adequately for forecast growth in passenger and freight demand into the next decade. In the event that growth in demand does not meet the RUS forecasts, then clearly it would be possible to delay or abandon interventions where appropriate, provided that decisions are made in time to avoid major expenditure commitments. Equally, if growth continues at recent high levels and exceeds the forecast over the next decade, then some of the measures for the longer term may have to be accelerated.

6. Consultation and next steps

6.1 Introduction

Consultation with stakeholders, both within and outside the rail industry, is essential to the successful development of a Route Utilisation Strategy (RUS). Close involvement of stakeholders helps to ensure that:

- the correct gaps are identified
- the widest range of options is considered and the most appropriate solutions recommended
- implementation of the strategy can be undertaken more quickly.

6.1.1

According to the RUS Guidelines:

"Network Rail should develop a Draft RUS in conjunction with relevant stakeholders. It should then publish this Draft RUS, specifying a reasonable consultation period within which representations may be made. Having taken account of any representations received, Network Rail should publish and provide to ORR the RUS it proposes to establish, together with any representations."

ORR Guidelines on Route Utilisation Strategies
April 2009

In order to deliver this obligation in an effective manner, various consultative groups were established for the Northern RUS.

6.1.2 Stakeholder Management Group (SMG)

The SMG consists of representatives from:

- Department for Transport
- Train Operating Companies
- Freight Operating Companies
- Passenger Transport Executives
- Association of Train Operating Companies
- Passenger Focus
- Office of Rail Regulation (as observers).

This group meets periodically, acting as a steering group for the RUS.

6.1.3 Working groups

Detailed analysis and appraisal work is undertaken in industry Working Groups, whose outputs are then approved by the SMG.

6.1.4 Wider stakeholder briefings

Briefings were held for those organisations outside the rail industry, including local authorities, Government Agencies, ports and airports and workshops were held with rail user groups and Community Rail Partnerships.

These meetings are undertaken to provide that stakeholders outside the rail industry have the opportunity to contribute to the RUS process and that they are briefed and prepared to make best use of the formal consultation period.

6.2 How you can contribute

Contributions to assist in developing this RUS are welcome. Specific consultation questions have not been set; comments on the document as a whole are welcome but feedback on the demand forecasting methodology and options that address the gaps identified is particularly sought. Consultation responses can be submitted either electronically or by post to the addresses below:

northerng2@networkrail.co.uk

Northern RUS
RUS Programme Manager
Network Rail
Kings Place
90 York Way
London N1 9AG

6.3 Response date

This RUS will have a formal consultation period of 13 weeks. The RUS consultation period is usually 12 weeks but this has been extended to avoid the Christmas and New Year periods. The date for receiving responses is 14 January 2011. Earlier responses would be very much appreciated in order to maximise the time available to respond in the final RUS document.

6.4 Next steps

After the formal consultation period closes, the SMG will agree any further work that is required and the final RUS document will be published in spring 2011.

Appendices

Appendix A

As discussed in previous chapters, the strategic gaps in the Northern RUS were derived by reviewing the recommendations of the previous RUSs[1] covering the north of England. These have been reviewed in the light of funded interventions for CP4 and CP5, including the Secretary of State for Transport's announcement in 2009 on the electrification of a number of routes in the North West, along with the passenger growth forecasts to 2024 and the agreed Strategic Freight Network (SFN) forecasts for 2019 and 2030. Account has also been taken of RUS recommendations that change those published in earlier RUSs.

Each first generation gap can be broadly categorised as follows:

- gap that will have been addressed by the end of CP4 (the baseline for this RUS) so is 'closed'
- gap which will still be a gap at the end of CP4 but for which the previous RUS recommendation is still appropriate
- gap which will still be a gap at the end of CP4 but for which the intervention needs reviewing due to more recent changes
- gap that has changed sufficiently that the previous intervention may not be entirely appropriate.

This appendix summarises each recommendation, the anticipated progress by the end of CP4 and therefore whether it was reviewed by the Northern RUS.

Key to gap references

Abbreviation	Meaning
AD	All-day crowding
EA	Engineering access
FC	Freight capability
PC	Peak crowding
RC	Regional connectivity
RD	Reactionary delay
EN	Electrification

1 All RUSs can be found at **www.networkrail.co.uk**

Appendix A – East Coast Main Line RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
AD	1	Option 3.3	All-day crowding on London – East Midlands/Yorkshire/ North East/ Scotland services	Increase LDHS (Long Distance High Speed) service levels to 8tph peak and 6tph off peak.	6tph off peak to be introduced in May 2011 timetable. Further improvements to TT following completion of ECML upgrade schemes.	Remaining part of recommendation still holds.	No	
EA	1	Gap 8.4	Capability of Werrington Jn to Newark (and on to Doncaster)	Further opportunities to provide increased diversionary capability should be examined as part of the GN/GE Joint Line upgrade. When signalling renewals are due, bi-di signalling over the two track sections to be considered, as should any necessary powered crossovers, so that 'single line working' can be introduced easily. The Seven Day Railway workstream should examine the opportunities the above offers.	CP4 GE/GN Joint Line outputs currently under development.	First option needs to be amended to reflect that it is likely that separate scheme may need to be investigated through Seven Day Railway process. Other recommendations still hold.	No	
EA	2	Gap 8.5	Capability of Newark to Doncaster Decoy Junctions	Opportunities to enhance the Newark – Lincoln line for diversions should be examined. When signalling renewals are due, bi-di signalling over the two track sections to be considered, as should any necessary powered crossovers, so that 'single line working' can be introduced easily. The Seven Day Railway workstream should examine the opportunities for the above.	No change	Previous recommendation holds.	No	
EA	3	Gap 8.6	Capability of Marshgate Jn to Colton Jn	Examination of the opportunities and requirements for using diversionary routes by the Seven Day Railway workstream, taking into account possible infill electrification east of Leeds, the IEP, and the potential gauge clearance that the Northern W10 project could include W9 and W10 clearance of some or all of the diversionary routes. When signalling renewals are due, bi-di signalling over the two track sections to be considered, as should any necessary powered crossovers, so that 'single line working' can be introduced easily.	No change	Previous recommendation holds. (other than Northern W10 is replaced by SFN gauge strategy).	No	

Appendix A – East Coast Main Line RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
EA	4	Gap 8.7	Capability of Marshgate Jn to Whitehall Jn	Examination of the opportunities and requirements for using diversionary routes by the Seven Day Railway workstream, taking into account possible infill electrification east of Leeds, the IEP, and the potential gauge clearance that the Northern W10 project could include W9 and W10 clearance of some or all of the diversionary routes. When signalling renewals are due, bi-di signalling over the 2 track Doncaster to Leeds route should be considered, as should any necessary powered crossovers, so that 'single line working' can be introduced easily.	No change	Previous recommendation holds. (other than Northern W10 is replaced by SFN gauge strategy).	No	
EA	5	Gap 8.8	Capability of Northallerton to Ferryhill Jn	Examination of the opportunities and requirements for using the diversionary route via Stockton by the Seven Day Railway workstream, taking into account proposals to headways and line speeds between Norton Junctions and Ferryhill Jn, the IEP programme, and that the potential Northern W10 project and Teesport projects could include W9 and W10 clearance.	No change	Previous recommendation holds. (other than Northern W10 is replaced by SFN gauge strategy).	No	
EA	6	Gap 8.9	Capability of Ferryhill Jn to Newcastle	Examination of the opportunities and requirements for using the diversionary route via Sunderland by the Seven Day Railway workstream, taking into account planned headway improvements between Hartlepool and Dawdon and the IEP programme. It should also confirm the level of benefits that could contribute to the Leamside reinstatement costs.	No change	Previous recommendation holds., subject to East Coast Main Line 2016 Capacity Review.	Subject to East Coast Main Line 2016 Capacity Review.	

Appendix A – East Coast Main Line RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
EA	7	Gap 8.10	Capability of Newcastle to Edinburgh	Examination by the Seven Day Railway workstream of enhancing those sections of the ECML in Scotland without bi-directional signalling (only Grantshouse to Innerwick is currently bi-directional) against the alternative of developing the capability of the diversionary route.	No change	Previous recommendation holds.	No	
FC	1	Option 9.1	Freight RUS Gap 12	Reinstatement of Boldon East Curve.	Planned for reinstatement in CP4.	Gap closed	No	
FC	2	Option 9.2	Freight RUS Gap B	Construction of a remodelled junction at Shaftholme.	Shaftholme flyover completed.	Gap closed	No	
FC	3	Option 9.3	Freight RUS Gap C	Provision of two freight paths per hour between Peterborough and Doncaster.	GN/GE Joint Line capacity relief scheme planned for completion in CP4.	Gap closed	No	
FC	4	Option 9.4	The upgrading of certain route sections to W9, W10 and W12 gauge	A programme of feasibility work has been developed which will develop gauge clearance proposals for the routes listed.	No change	Gap to be addressed through SFN process.	No	
FC	5	Option 9.5	Upgrade of electrical power supplies (to eliminate restrictions on the use of Class 92s)	Power supply along the route will be reassessed over the next few years for the introduction of IEP trains. This assessment should consider all other potential electric traction requirements.	No change	Previous recommendation holds.	No	
FC	6	Option 9.6	Increased capability for 775m trains	To be considered during the development of renewals and enhancements where it can be delivered most efficiently.	No change	Previous recommendation holds.	No	
PC	1	Option 6.8	Peak crowding into Middlesbrough	Train lengthening up to 3x23m	No change	Local train growth 30% to 2024. Previous recommendation holds. unless Tees Valley Metro scheme is funded, in which case it is expected that it will support organic growth and additional growth its improved outputs give. Manchester – Middlesbrough growth 45%.	No	
PC	2	Option 7.1	Peak crowding into Newcastle	Train lengthening up to 3x23m	No change	Previous recommendation holds. – maximum 50% growth on all corridors to 2024.	No	

Appendix A – East Coast Main Line RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	1	Option 3.5	Increase in linespeeds on ECML.	Further development in conjunction with improvements to infrastructure capacity and the IEP.	Speed improvements being considered in ECML upgrade schemes where they are only of marginal cost.	Previous recommendation holds.	No	
RC	2	Option 3.6	Improved services to various destinations on and off the ECML.	Preservation of the existing frequency to destinations already served and let the market largely decide the ultimate destinations of further LDHS services subject to normal industry processes.	This process is already in action.	Previous recommendation holds.	No	
RC	3	Option 4.2	ECML north service pattern – Newcastle to Edinburgh: improvements to timetable spread.	Spread largely determined by the development of future timetables but recommended that opportunities to optimise the spread should be considered within the constraints of the service mix. A number of particular recommendations made.	Ongoing	Previous recommendation holds.	No	
RC	4	Option 4.3	ECML north service pattern – Newcastle to Edinburgh: semi-fast service.	Elements of option tested could be considered as part of package of proposals for east of Edinburgh local services which could be investigated further by Transport Scotland through the multi-modal Scottish Transport Approval Guidance (STAG) methodology.	No change	Previous recommendation holds.	No	
RC	5	Option 4.4	ECML north service pattern – Additional Dunbar stops in LDHS services.	Market will identify where some additional calls could be justified.	No change	Previous recommendation holds.	No	
RC	6	Option 4.5	ECML north service pattern – Berwick upon Tweed to Edinburgh local service with new stations at East Linton and Reston.	Dependent on future timetable pattern of Anglo-Scottish LDHS services and freight requirements. Full multi-modal appraisal to be undertaken. Stronger economic case may be possible by combining parts of this option with elements of options 4.6 and 4.8.	No change	Previous recommendation holds.	No	

Appendix A – East Coast Main Line RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	7	Option 4.6	ECML north service pattern – North Berwick to Edinburgh half-hourly off-peak weekday service.	Dependent on future timetable pattern of Anglo-Scottish LDHS services and freight requirements. Full multi-modal appraisal to be undertaken. Stronger economic case may be possible by combining parts of this option with elements of options 4.5 and 4.8.	No change	Previous recommendation holds.	No	
RC	8	Option 4.7	ECML north service pattern – New Down platform at Dunbar.	Recommended for development to reduce some Anglo-Scottish LDHS journey times and improve performance.	No change	This gap could be addressed with funding in CP5.	No	
RC	9	Option 4.8	ECML north service pattern – Dunbar to Edinburgh hourly service.	Dependent on future timetable pattern of Anglo-Scottish LDHS services and freight requirements. Full multi-modal appraisal to be undertaken. Stronger economic case may be possible by combining parts of this option with elements of options 4.5 and 4.6.	No change	Previous recommendation holds.	No	
RC	10	Option 5.1	South and West Yorkshire services – introduction of a new train service to serve Robin Hood Airport Doncaster Sheffield.	Recommended for further consideration in the Yorkshire and Humber RUS.	See RC6	See RC6	No	
RC	11	Option 5.2	South and West Yorkshire services – provide additional capacity on the Sheffield/Doncaster – Wakefield Westgate – Leeds corridor.	Recommended for further consideration in the Yorkshire and Humber RUS.	See PC8, PC12 and FC4	See PC8, PC12 and FC5	No	
RC	12	Option 5.3	South & West Yorkshire services – extension of Knottingley – Wakefield Kirkgate services into Wakefield Westgate.	Recommended for further consideration in the Yorkshire and Humber RUS.	Being considered as part of the West Yorkshire Passenger Transport Executive Major Schemes bid.	Gap being addressed	No	
RC	13	Option 5.3	South and West Yorkshire services – extension of Knottingley –Wakefield Kirkgate to Leeds via Wakefield Westgate	Recommended for further consideration in the Yorkshire and Humber RUS.	Improvements on Knottingley – Leeds services recommended in Yorkshire and Humber RUS on route via Castleford instead.	No longer a gap	No	

Appendix A – East Coast Main Line RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	14	Option 5.4	South & West Yorkshire services – improve South Yorkshire links to London via ECML or Midland Main Line (MML).	Recommended for consideration in Network RUS.	Second off peak service Sheffield – London introduced from December 2009. Linespeed improvements on MML, and ECML Upgrade planned for CP4.	Previous recommendation holds.	No	
RC	15	Option 6.6	Reduction in Tees Valley journey times.	Examine opportunities for linespeed improvements when renewals become due or as part of Tees Valley Metro project.	No change	Previous recommendation holds.	No	
RC	16	Options 6.1, 6.2, 6.3, 6.4, 6.5 and 6.7	Schemes remitted from North East Regional Planning Assessment.	None recommended	No change	No change to previous situation.	No	
RC	17	Option 7.2	Reduction in Tyne Valley journey times.	Examine opportunities for linespeed improvements when renewals become due.	No change	Previous recommendation holds.	No	
RC	18	Option 4.1	York to Newcastle: improvements to timetable spread.	Spread largely determined by the development of future timetables but recommended that opportunities to optimise the spread should be considered within the constraints of the service mix. In particular, opportunities should be examined to reduce the service gaps at Durham.	Ongoing	Previous recommendation holds.	No	
RC	19	Option 10.4	Car parking problems at Sunderland and Eaglescliffe affecting use of service to London.	Use of stations close to Sunderland as there is no station car park at Sunderland, and possible development of Eaglesclffe car park for increasing park and ride	No change	Previous recommendation holds.	No	
FC	1	5.3.13 Stockport option 5	Freight capability (train length) at Buxton.	Buxton remodelling	Schemes not being progressed in full; no funding available.	Gap better solved by other solutions; being addressed by freight capacity scheme.	No	
FC	2	5.3.3 Marple option 2	Freight Capability: East Manchester Route Availability.	Undertake works to remove RA10 restrictions on Peak Forest – New Mills – Guide Bridge – Stockport/ Manchester Victoria.	Majority of restrictions will be removed in CP4.	Gap largely addressed but need for identification of anything else required.	No	
FC	3	5.3.3 Marple option 3	Freight Capability: East Manchester loading gauge.	Undertake works to allow W9 and W10 on Stockport – Guide Bridge – Denton – Ardwick.	Project complete	Gap closed	No	

Appendix A – Lancashire and Cumbria RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
PC	1	6.5.2 Option C1	Commuter demand Barrow-in-Furness – Sellafield insufficient capacity in peak	Peak hour train lengthening in both peaks.	Gap solved by strengthening in 2008 timetable.	Gap closed	No	
PC	2	6.5.2 Option C2	Commuter Demand Whitehaven – Sellafield	Additional train in peaks to serve Sellafield from the north.	Gap solved in Dec 2008 timetable.	Gap closed	No	
PC	3	6.5.6 Option R1b	Peak Crowding Clitheroe – Blackburn – Manchester	Extend morning and evening peak Manchester Victoria – Blackburn services to Clitheroe to provide a half-hourly peak service. Lengthen both services.	Linespeed improvements on the route being undertaken. Implementation of peak hour extensions yet to be taken forward.	Previous recommendation holds.	No	
RC	1	6.5.2 Option C3a	Regional Links: Carlisle – Barrow-in-Furness	Increase service levels using peak stock used in C1 and C2 done as part of timetable	Gap solved in Dec 2008 timetable.	Gap closed	No	
RC	2	6.5.2 Option C4	Regional Links: Barrow-in-Furness – Lancaster	Part of option C3a	Increase service levels using peak stock used in C1 and C2 done as part of timetable.	Gap closed	No	
RC	3	6.5.2 Options C5a to C5d, C8 and C9	Regional Links: Lancaster – Barrow-in-Furness – Carlisle	Enhance infrastructure Whitehaven to Carlisle to give more capacity to allow more frequent service, remove token block working and increase loop options with signalling renewals. Review infrastructure enhancement opportunities when undertaking other renewals.	No change	Previous recommendations holds.	No	
RC	4	6.5.2 Option C6	Regional Links: Sunday service frequency Carlisle – Whitehaven	Implement additional Sunday service within existing resources Carlisle – Whitehaven round trip within current box hours.	Action was expected in CP4 but not yet progressed.	Previous recommendation holds.	No	

Appendix A – Lancashire and Cumbria RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	5	6.5.4 Option S2	Regional Links: Settle and Carlisle line service levels	There is an economic case for the existing service on the Settle and Carlisle Line to become broadly two-hourly and tie into connections with the West Coast Main Line 2008 timetable. There is also a case for operating another three round trips infilling and extending that pattern (Option S2). It is recommended that a scheme is developed based on a minimum passenger frequency of two-hourly, and supplemented with additional services targeted to the passenger market and where space exists in the timetable, and ideally consistent with the rest of the pattern. Develop further, subject to the outcome of the evaluation and the ability to identify acceptable pathing options for both freight and passenger services.	Dependent on discussions between Department for Transport and the incumbent train operator and ongoing requirements for freight paths.	2030 SFN forecasts show significant reduction in paths required so option dependant on any WCML RUS requirements for capacity on the route, therefore in the long term the recommendation is only constrained by any requirement for freight paths identified in the WCML RUS.	No	
RC	6	6.5.4 Option S4	Regional Links: journey times between Leeds and Carlisle	Improve linespeed between Carlisle and Skipton in association with track renewals.	Dependent on track renewal programme.	Previous recommendation holds.	No	
RC	7	6.5.4 Option S6	Regional Links: affects of maintenance and renewal works on Settle & Carlisle line	Optimise maintenance and renewal practices around new service requirements.	This recommendation has not yet been progressed.	Previous recommendation holds.	No	
RC	8	6.5.6 Option R9a	Regional Links: journey times on Roses line	Linespeed improvements – east of Burnley Manchester Road.	Development work being undertaken to identify any value for money schemes.	Previous recommendation holds.	No	
RC	9	6.5.6 Option R9b	Regional Links: journey times Blackburn – Clitheroe	Linespeed improvements – Blackburn – Clitheroe.	No change	Previous recommendation holds.	No	
RC	10	6.5.6 Option R9c	Regional Links: journey times Colne branch	Linespeed improvements – Colne Branch.	No change	Previous recommendation holds.	No	
RC	11	6.5.8 Option OP1	Regional Links: journey times Ormskirk – Preston	Infrastructure improvements to allow an hourly service.	Scheme being developed for possible implementation in CP4.	Previous recommendation holds.	No	

Appendix A – Lancashire and Cumbria RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	12	6.5.8 Option OP2	Regional Links: Southport – Preston	Option OP1, plus replace Burscough Bridge and Burscough Junction with a new interchange station where both lines cross. Existing Southport – Wigan services to be retimed to give a five-minute interchange for Preston/ Ormskirk at the new station. Requires the Preston – Ormskirk service to be speeded up (see above).	No change	Previous recommendation holds.	No	
RC	13	6.5.8 Option OP3	Regional Links: Southport – Preston	Option OP1, plus reinstate Burscough Chord South and operate hourly Southport – Ormskirk, timed to give a five-minute interchange for Preston at Burscough Junction.	No change	Previous recommendation holds.	No	
RC	14	6.5.12 Option MC1	Regional links: station facilities needing improvement to facilitate improved connectivity at this key interchange.	Preston station: relocation of the prefabricated platform buildings located near the entrance/exit at stairwell Platforms 1 and 2.	Scheme being sponsored for delivery in CP4, but is being revisited as scheme costs and work to be undertaken not agreed. Specific gap of Platform 1 and 2 expected to be closed.	Gap closed	No	
RC	15	6.5.12 Option MC3	Regional links: station facilities needing improvement to facilitate improved connectivity at this key interchange.	Carlisle station: provide better interchange facilities, particularly improved access between platforms such as escalators or lifts.	Scheme not been progressed, no funding identified.	Previous recommendation holds.	No	
RC	16	6.5.12 Option MC4	Regional Links: station facilities needing improvement to facilitate improved connectivity at this interchange.	Ormskirk station: provide better interchange facilities, particularly those appropriate if option OP3 is pursued, ie. a bridge with lifts.	Improvement works to existing station facilities now completed via funding from Lancashire County Council and Merseytravel. Other works pending the implementation of option OP3.	Previous recommendation holds.	No	
RC	17	6.5.12 Option MC5	Regional Links: station facilities needing improvement to facilitate improved connectivity at this interchange.	Blackburn station: provide a full length canopy on Platform 4.	Work completed	Gap closed	No	

Appendix A – Lancashire and Cumbria RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	18		Regional links: station facilities needing improvement to facilitate improved connectivity at this interchange if option OP3 is pursued.	Burscough Junction: better interchange facilities if the second platform were to reopen as part of OP3. This may include a bridge and lift.	Subject to discussions with Merseytravel.	Previous recommendation holds.	No	
RD	1	6.5.2 Options C5a to C5d, C8 and C10	Train Performance: Whitehaven – Carlisle	Enhance infrastructure Whitehaven to Carlisle to give more capacity to allow more frequent service, remove token block working and increase loop options with signalling renewals.	Anticipated signalling renewals in CP4 now deferred.	Previous recommendations holds.	No	
RD	2	6.5.4 Option S5	Performance issues due to single track between Carlisle South Jn and London Road Jn.	Re-double the track between Carlisle South Jn and London Road Jn.	No change	Previous recommendation holds.	No	

Appendix A – Merseyside RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
FC	1	6.4.8	Connectivity between Birkenhead Docks and the Midlands.	Rail freight between the Wirral and the Midlands routed via Bidston – Wrexham. Requires infrastructure upgrade work which would have to be delivered for £6 million of public spending. Aspiration of Peel Ports and Wirral Metropolitan Borough Council (MBC).	No change	Previous recommendation holds.	No	
FC	2	6.4.9	Connectivity between Canada Docks and the rail network.	Recommended that the route into Canada Docks is protected from further development until a better understanding of rail freight growth has been understood and assessed.	No change	Previous recommendation holds.	No	
RC	1	6.4.2	Connectivity and journey times between North Wales and Merseyside.	Conduct a more detailed study into extending the Wrexham – Bidston diesel services to Birkenhead North for better connectivity to the Merseyrail Network.	No change	Previous recommendation holds.	No	
RC	2	6.4.2	Connectivity and journey times between North Wales and Merseyside.	Merseytravel to conduct a study into reinstating the Halton Curve.	Demand study completed for Merseytravel and Halton Borough Council, showing medium value business case (BCRs 1.5 – 1.9 depending on option chosen) for new Liverpool – Runcorn – Chester – Wrexham service. NR GRIP stage three study completed.	Previous recommendation holds.	No	
RC	3	6.4.3	Connectivity and journey times between Wigan, St Helens and Liverpool.	Additional hourly inter-peak Wigan – Liverpool semi-fast service.	No change	Gap to be reviewed in light of changes to services driven by NW area electrification.	Yes	See Northern RUS Gaps 1 and 9
RC	4	6.4.5	Connectivity between Skelmersdale and Liverpool.	GRIP three study into extending the Liverpool Central – Kirkby service, to terminate at a new station in the centre of Skelmersdale. Rainford will then become an interchange station for services to and from Wigan Wallgate.	Merseytravel and Lancashire County Council currently undertaking demand study into a range of service options.	Previous recommendation holds.	No	

Appendix A – Network RUS: Electrification

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
EN	1	Option A20.4	Non-electrified routes	Electrify Manchester (Deansgate and Victoria) to Liverpool (Edge Hill) via Chat Moss route. Convert Liverpool to Manchester Airport, Liverpool to Warrington Bank Quay and Manchester to Scotland services to electric traction.	Planned scheme	Closed	No	
EN	2	Option A19.1	Non-electrified routes	Electrify the Midland Main Line and run St Pancras to Nottingham, Sheffield, Derby and Corby services with electric trains, using cascaded diesel trains for other long distance services.	No change	Previous recommendation holds.	No	
EN	3	Option A10.1B	Non-electrified routes	Review business case for electrification of Guide Bridge to Leeds, Leeds to Colton Junction and Hull, Northallerton to Middlesbrough and Temple Hirst to Selby following Manchester Deansgate to Liverpool (Edge Hill). Convert Hull to London and cross-Pennine services to electric traction. Modify cross-Pennine services so that they run between Liverpool and Manchester via the Chat Moss route, and so that Scarborough is served by trains from Preston rather than by north cross-Pennine services.	No change	Previous recommendation holds.	No	
EN	4	Options A13.4/ A13.5/ A19.2	Non-electrified routes	Review business case for electrification of parts of the cross-country network including Doncaster – Sheffield and Moorthorpe – Swinton to allow Edinburgh – Plymouth, Newcastle – Reading and Leeds – Moorthorpe – Sheffield services to convert to electric traction.	No change	Previous recommendation holds.	No	
EN	5	Options A20.1B	Non-electrified routes	Review business case for electrification of Euxton Junction to Manchester and Preston to Blackpool North. Convert Manchester – Blackpool North and Hazel Grove – Preston services to electric traction.	Planned scheme in CP5	Gap closed	No	

Appendix A – Network RUS: Electrification

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
EN	6	A23.1	Non-electrified routes	Review business case for electrification of Oxenholme to Windermere following Euxton Jn to Manchester. Convert Manchester – Windermere and Oxenholme – Windermere services to electric traction.	No change	Previous recommendation holds.	No	
EN	7	B18.2	Non-electrified routes	Review business case for electrification of Ditton Yard to terminal.	No change	Previous recommendation holds.	No	
EN	8	A9.2	Non-electrified routes	Review business case for electrification of Stockton Cut and Bowesfield Junctions to Sunderland following Northallerton to Middlesbrough. Convert London to Sunderland service to electric traction.	No change	Previous recommendation holds.	No	
EN	9	B10.6	Non-electrified routes	Review business case for electrification of Hare Park Jn to Wakefield Europort.	No change	Previous recommendation holds.	No	
EN	10	Option 20.5A	Non-electrified routes	Electrify Huyton to Wigan following Edge Hill to Manchester and Preston to Blackpool North. Convert Liverpool to Wigan and Blackpool North services to electric traction.	Planned scheme in CP5	Gap closed	No	

Appendix A – North West RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
FC	4	5.3.10 Chat Moss option 8	Freight Capability: Bootle branch not W10 loading gauge.	Gauge clear Dittion – Edge Hill – Earlestown to W9 and W10.	Project complete	Gap closed	No	
FC	5	5.3.10 Chat Moss option 9	Freight Capability: No direct access to Liverpool Docks.	Olive Mount chord	Project complete	Gap closed	No	
FC	6	5.3.10 Chat Moss option 10	Freight capacity and performance on Chat Moss route.	Improve signalling headways on back of scheme to close Rainhill signal box.	Project complete	Gap closed	No	
PC	1	5.3.5 Stalybridge option 1	Peak crowding: Stalybridge – Manchester Victoria.	Enhance layout at Stalybridge when re-signalled to increase speed across junction and to/from the bay platform, or relocate/add bay on north side of station (see Stalybridge option 4). Operate additional peak shuttles using resulting improved track capacity.	Track layout enhancement scheme complete.	Other recommendation still stands.	No	
PC	2	5.3.2 Stockport Line Option 6	Peak capacity on Stockport local lines.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary.	Platform extensions provided to meet CP4 Operational Plans.	Gap to be re-examined – 55 % to 60 % (depending on corridor) growth to 2024.	Yes	See Northern RUS Gap 1
PC	3	5.3.3 Marple option 4, 5.3.4 Hadfield line options 2 & 3	Peak capacity on local lines via Ardwick.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary. Possible redeployment of four-car trains on Hadfield line.	Dependent on CP4 Operational Plan.	Gap to be re-examined – 65 % growth to 2024.	Yes	See Northern RUS Gap 1
PC	4	5.3.5 Stalybridge Options 2 and 3	Peak capacity on Stalybridge – Manchester Victoria line.	Train lengthening on Huddersfield and Stalybridge services to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary (up to a maximum of 3x20m eastbound due to constraints at Mossley for Huddersfield services).	Some train lengthening in CP4.	Gap to be re-examined – 55 % growth to 2024.	Yes	Examined and found that previous intervention is robust for growth to 2024, assuming current operating practices continue to be acceptable.
PC	5	5.3.7 Calder Valley Option 5	Peak capacity on the Rochdale line.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary.	Option superseded by Yorkshire and Humber RUS.	Option superseded by Yorkshire and Humber RUS.	No	

Appendix A – North West RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
PC	6	5.3.8 Bolton options 8 & 9	Peak Crowding on the Bolton corridor.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary.	Some train lengthening in CP4.	Previous recommendation needs to be reviewed in light of electrification of Bolton corridor. 55 % growth to 2024.	Yes	See Northern RUS Gap 1
PC	7	5.3.9 Atherton Option 1	Peak crowding on the Wigan/ Southport line.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary.	Platform extensions provided to meet CP4 Operational Plans.	Gap to be re-examined – 65 % growth to 2024.	Yes	See Northern RUS Gap 1
PC	8	5.3.10 Chat Moss options 11 & 12	Peak crowding on the Chat Moss route.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary. Alternative is additional peak hour trains.	Some train lengthening in CP4 and electrification.	Previous recommendations need to be reviewed in light of electrification of the Chat Moss route. 60 % growth to 2024 into Manchester and Liverpool.	Yes	See Northern RUS Gap 1
PC	9	5.3.11 CLC Option 5	Peak crowding on the Cheshire Lines Committee route.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary.	Some train lengthening in CP4.	Previous recommendation needs to be reviewed in light of electrification of the Chat Moss route. 45 % local train growth to 2024 into Manchester and 40 % interurban. 35 % local train growth to 2024 into Liverpool and 40 % interurban.	Yes	See Northern RUS Gap 1
PC	10	5.3.14 St Helens Option 2	Peak crowding on the Liverpool – Wigan line.	Train lengthening to provide additional peak capacity to meet expected growth. Includes platform lengthening where necessary.	Some train lengthening in CP4.	Previous recommendation need to be reviewed in light of electrification of Huyton – Wigan.	Yes	See Northern RUS Gap 1
PC	11	5.3.2 Stockport Line Option 11	Peak crowding: track and platform capacity at Manchester Piccadilly.	Additional bay platform on north side of station.	None	Needs reviewing to see whether services can be accommodated in 2024.	Yes	Not recommended – see Northern RUS Gaps 2 and 9.
PC	12	5.3.10 Chat Moss corridor Option 4	Peak crowding: track and platform capacity at Liverpool Lime Street.	Major capacity and linespeed enhancements on back of signalling renewals, to include additional platforms and increased parallel moves.	None	Previous recommendation to be reviewed in light of electrification of the Chat Moss route and Huyton–Wigan, noting that the West Coast Main Line RUS is also examining services into Liverpool Lime Street.	Yes	Extra capacity not identified as required for dealing with peak growth – see Northern RUS Gap 1.

Appendix A – North West RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
PC	13	5.3.2 Stockport Line Option 7	Peak crowding: platform capacity on Platforms 13 and 14 at Manchester Piccadilly.	Remove some buildings to improve passenger circulation.	Scheme complete	Gap closed	No	
RC	1	5.3.5 Stalybridge option 1	Regional links: Stalybridge – Manchester	Enhance layout at Stalybridge when re-signalled to increase speed across junction and to/ from the bay platform, or relocate/add bay on north side of station. Improve car parking.	Layout enhancement scheme complete	Other recommendation still stands	No	
RC	2	5.3.5 Stalybridge option 4	Regional links: Stalybridge – Manchester	Introduce additional off-peak service from Stalybridge, to provide three tph service between Stalybridge and Manchester Victoria.	No change	Previous recommendation holds.	No	
RC	3	5.3.8 Bolton option 1	Regional links: Preston – Manchester	Between Manchester and Preston: increase from one fast, one semi-fast and one slow train per hour off-peak to two fast and two slow trains per hour off-peak.	Included in Dec 08 timetable	Gap closed	No	
RC	4	5.3.8 Bolton option 3	Regional links: journey times Manchester – Preston – Blackpool.	Manchester – Blackpool linespeed. Higher speed between Manchester and Euxton Junction and between Preston and Blackpool North including both raising the overall linespeed and addressing permanent speed restrictions.	Some linespeed improvements have been delivered with renewals.	Previous recommendation holds.	No	
RC	5	5.3.8 Bolton option 4	Regional links: Bolton corridor	Remodel Bolton station layout to improve journey times and create improved interchange and car parking when renewals become due.	No change	Previous recommendation holds.	No	
RC	6	5.3.10 Chat Moss option 1	Regional links: Liverpool – Manchester	Liverpool to Manchester additional off-peak services. Increase from one to two fast trains per hour between Liverpool Lime Street and Manchester Piccadilly via Chat Moss in the off-peak with a similar pattern to the existing Liverpool Lime Street to Manchester service.	Electrification of the route and supply of rolling stock will allow increased service, subject to pathing.	Gap to be reviewed in light of changes to services driven by North West area electrification.	Yes	See Northern RUS Gaps 1 and 9.
RC	7	5.3.10 Chat Moss option 3	Regional links: journey times Manchester – Liverpool (via Chat Moss route)	Chat Moss linespeed. Higher speeds between Huyton and Patricroft.	Liverpool – Manchester Line Speed Improvement scheme funded in CP4.	Gap addressed	No	

Appendix A – North West RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	8	5.3.7 Calder Valley options 3 & 4	Regional links: Calder Valley	Through trains to Salford Crescent. Extend Calder Valley trains through Manchester Victoria to terminate at Salford Crescent, allowing interchange with Airport services. Alternatively extend through to Salford Central to get some connectivity benefits.	Extension of Calder Valley services to Salford Crescent was not possible as proposed due to loss of Regional Funding Allocation funded option for Salford Crescent. No change on alternative option.	New option – extension of Calder Valley services right through to Airport achievable with Northern Hub recommendation.	No	
RC	9	5.3.10 Chat Moss option 5	Regional links: Salford – Liverpool connectivity via Chat Moss	Salford Central additional platforms on Chat Moss lines.	Scheme under consideration by Greater Manchester Passenger Transport Executive and Salford City Council.	Previous recommendation holds.	No	
RC	10	5.3.10 Chat Moss option 7	Regional links: connectivity with Metrolink	Improve interchange with Metrolink at Eccles.	No change	Previous recommendation holds.	No	
RC	11	5.3.11 CLC option 2	Regional links: connectivity with Metrolink	Cornbrook or White City new station and interchange.	No change	Previous recommendation holds.	No	
RC	12	5.3.11 CLC option 3	Regional links: Liverpool Lime Street – Liverpool South Parkway.	Increased frequency between Liverpool Lime Street and Liverpool South Parkway through a Cheshire Lines Committee timetable recast, a dedicated shuttle or recast of London Midlands services. To be considered after West Coast Main Line 2008 timetable is implemented.	No change	Gap being reviewed by West Coast RUS.	No	
RC	13	5.3.13 Styal option 1	Regional links: Manchester Airport	Manchester Airport third platform	Project complete	Gap closed	No	
RC	14	5.3.7 Calder Valley Option 2	Regional links: Calder Valley journey times	70mph through Castleton and 90mph between Rochdale and Smithy Bridge.	No change	Previous recommendation holds.	No	
RC	15	5.3.2 Stockport corridor option 14	Regional links: Buxton line and south cross-Pennine journey times	Up to 60mph between Edgeley and Hazel Grove.	Scheme being examined	Previous recommendation holds.	No	
RC	16	5.3.5 Stalybridge corridor option 4	Regional links: north cross-Pennine journey times	Guide Bridge Jn linespeed improvement on Stalybridge route.	Scheme completed	Specific gap closed	No	

Appendix A – North West RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	17	5.3.13 Styal option 3	Regional links: Manchester Airport	Examine new services from Manchester Airport to the south in the West Coast Main Line RUS.	No change	Previous recommendation holds.	No	
RC	18	5.3.14 St Helens Central option 3	Regional links: Huyton – Wigan route improved journey times	Progress linespeed improvements in association with signalling renewals.	No change	Previous recommendation holds., noting that electrification should improve journey times.	No	
RC	19	5.3.10 Chat Moss option 6	Regional links: station facilities needing improvement to facilitate improved connectivity at this interchange	Develop Newton-le-Willows as an interchange with improved station facilities and car parking.	None	Previous recommendation holds.	No	
RC	20	5.3.4 Hadfield corridor option 1	Regional links: access to rail network east of Manchester	Develop Guide Bridge station as an interchange.	No change	Previous recommendation holds.	No	
RC	21	5.3.8 Bolton option 5	Regional links: Manchester connectivity and Manchester Airport access	Salford Crescent remodelling/relocation. Create a new layout at Salford Crescent that creates more capacity on the network for both through trains and trains terminating from the Manchester direction, more capacity on the platforms to handle passengers, and better station facilities befitting a station where people interchange both to connect to and from Manchester Airport services and to and from services to both sides of the city centre.	Scheme changed following the withdrawal of potential regional funding. Scheme being re-evaluated to increase platform lengths at current site.	Northern Hub recommendation provides alternative ways to improve connectivity.	No	
RC	22	5.3.10 Chat Moss corridor Option 4	Regional links: track and platform capacity at Liverpool Lime Street for additional services	Major capacity and linespeed enhancements on back of signalling renewals, to include additional platforms and increased parallel moves.	No change	Previous recommendation holds, noting that the West Coast Main Line RUS is also examining services into Liverpool Lime Street.	Yes	Northern Hub service proposition includes more services into Liverpool – see Northern RUS Gap 9
RD	1	5.3.8 Bolton option 10	Performance: Bolton corridor	Bolton additional platform. Create a fifth platform at Bolton by extending the down loop at Moses Gate. May be an enabler for 5.3.8 Bolton Option 3.	Scheme not progressed	Previous recommendation holds.	No	

Appendix A – North West RUS

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RD	2	5.3.2 Stockport corridor options 9, 10 & 12	Performance of Castlefield corridor	Service frequency and/or headway reductions and/or faster access to Longsight goods line to be examined after the West Coast Main Line 2008 timetable is implemented.	No change	Northern Hub will alter the recommendations on this corridor.	Yes	See Northern RUS Gap 9
RD	3	5.3.2 Stockport corridor option 11	Performance problems caused by late running north and south cross-Pennine Airport services	New platform beside Platform 1 at Manchester Piccadilly to be examined after the West Coast Main Line 2008 timetable is implemented.	Scheme now surpassed by Northern Hub work.	Recommendation is superseded by Northern Hub proposals.	No	See Northern RUS Gap 9
RD	4	5.3.2 Stockport corridor option 12	Performance problems caused by crossing moves at Heaton Norris Jn.	Higher speed junction to be examined after the West Coast Main Line 2008 timetable is implemented.	No change	Previous recommendation holds.	No	
RD	5	5.3.4 Hadfield corridor option 4	Performance problems caused by tight turnrounds at Glossop and Hadfield.	Linespeed improvements on Dinting/Hadfield/Glossop triangle.	No change	Previous recommendation holds.	No	
RD	6	5.3.11 CLC option 6	Performance at Hunts Cross	Hunts Cross remodelling to be considered by the Merseyside RUS.	No change	Previous recommendation holds.	No	
RD	7	5.3.11 CLC option 7	Performance: Warrington Central – Manchester	Glazebrook eastbound loop to be considered in light of West Coast Main Line 2008 timetable implementation and any Cheshire Lines Committee route recast.	No change	Performance on this corridor to be reviewed as part of the Northern Hub proposals.	No	See Northern RUS Gap 9
RD	8	5.3.11 CLC option 8	Performance: Warrington Central – Manchester	Westbound loop approaching Trafford Park. Progress with future renewals.	No change	Performance on this corridor to be reviewed as part of the Northern Hub proposals.	No	See Northern RUS Gap 9
RD	9	5.3.13 Styal option 2	Performance: Styal line	Styal line timetable recast to redistribute intermediate calls. Re-examine in light of implementation of West Coast Main Line timetable 2008 timetable.	Delivered with December 2008 timetable changes.	Gap closed	No	

Appendix A – Yorkshire and Humber RUS

Gap Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of Control Period 4 (CP4) at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
AD	1	HD2	All day crowding on Leeds – Huddersfield – Manchester services	Additional hourly service Manchester – Leeds/ Selby (or Hull subject to strengthened business case).	No change	50 % growth to 2024 without further journey time reductions – previous recommendation needs checking.	Yes	See Northern RUS Gap 3
AD	2	HV3	All day crowding on Sheffield – Manchester services	Additional hourly semi-fast service between Manchester and S heffield (or beyond) probably integrated with a recast service on Marple and New Mills routes to avoid the need for extra paths at Manchester.	Nearly all Liverpool – Norwich services increased to 4x23m operation.	Gap needs to be reviewed following East Midlands RUS recommendation to operate most Liverpool – Norwich trains as 4x23m. 40 % demand growth to 2024.	Yes	See Northern RUS Gap 4
EA	1		Engineering access at key locations and on key corridors	To be taken into account in developing options for infrastructure works – either renewals or enhancements.	Some CP4 schemes will assist delivering the Seven Day Railway.	Previous recommendation holds.	No	
EA	2	LD4	24-hour access required between Leeds and Neville Hill depot for which no diversionary route exists	The Seven Day Railway workstream will need to examine the scope for bi-directional tracks or other mitigation measures.	No change	Previous recommendation holds.	No	
EA	3	SF2	No diversionary route between Sheffield and Nunnery Main Line Jn	To be considered when resignalling takes place in Control Period 6 (CP6).	No change	Previous recommendation holds.	No	
FC	1	Page 77	Freight growth between Gilberdyke and Hessle Road Jn	Longer-term growth will require improved track capacity which should be considered when signalling renewals are due.	No change	Gap needs to be addressed with enhancement funding when signalling renewals take place (probably in Control Period 5 (CP5).	No	
FC	2	Page 77	Limited freight capacity between Leeds and Church Fenton/Gascoigne Wood	Requirement to be taken into account in any service increases on this corridor.	Depends on CP4 interventions	Gap to be recognised in future interventions on this corridor.	No	
FC	3	WF3	Freight growth between Hare Park Jn and Doncaster/ Moorthorpe	Diversion of some existing freight services via Shaftholme flyover to free up paths for new traffic that specifically needs to use the route but growth in CP5 may require infrastructure enhancement on the route.	Shaftholme flyover completed	Gap may require capacity enhancement funding in CP5 or CP6. Draft 2019 Strategic Freight Network (SFN) forecast of 3tph and 2030 SFN forecast 3tph.	Subject to East Coast Main Line 2016 Capacity Review	
FC	4	HD4	W9/W10/W12 gauge enhancement Calder Bridge Jn – Huddersfield – Manchester and Stourton – Dewsbury – Thornhill LNW Jn	Prioritisation and funding provision to be determined through SFN process.	No change	Gap to be addressed through SFN process.	No	

Appendix A – Yorkshire and Humber RUS

Gap Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of Control Period 4 (CP4) at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
FC	5	HV3	Freight growth in the Hope Valley	Additional loops in the Hope Valley (also required for additional hourly off-peak service).	No change (unless loops are provided via the CP4 SFN train lengthening fund).	Gap needs to addressed in CP5 with funding of additional loops in the Hope Valley.	No	
FC	6	SD4	W9/W10/W12 gauge enhancement Chesterfield – Treeton Jn – Rotherham – Doncaster	Prioritisation and funding provision to be determined through SFN process.	Being considered for SFN infill gauge enhancement fund.	Gap to be addressed through SFN process.	No	
FC	7	Page 92	Freight growth between Immingham and Doncaster/ Shaftholme Jn area	Double junction at Thorne Jn and fourth track between Brocklesby and Barnetby.	No change	Gap needs to be addressed with funding of Thorne Jn redoubling on back of signalling renewals and fourth track is a Transport Innovation Fund (TIF) candidate. 2019 SFN forecast 5tph. SFN 2030 forecast 7tph needs accommodating.	Yes	See Northern RUS Gap 6
FC	8	IC1	W9/W10/W12 gauge enhancement Doncaster/Joan Croft Jn–Immingham	Prioritisation and funding provision to be determined through the SFN process.	No change	Gap to be addressed through the SFN process.	No	
FC	9	IC2	W9/W10/W12 gauge enhancement Lincoln – Doncaster	W10 to be provided as part of Hutchison Ports (UK) project and W9 through GN/ GE Joint Line upgrade but prioritisation and funding provision of increment to W12 to be determined through SFN process.	W9 and W10 provided subject to timing of funding by Hutchinson Ports (UK).	Gap largely addressed but increment to W12 to be considered through SFN process.	No	
PC	1	HA1	Peak crowding on the Harrogate Line	Additional maximum 2tph peak shuttles of up to four-car length between Horsforth and Leeds. Some calls taken out of Harrogate services at Headingley and Burley Park to spread loads.	Turnback at Horsforth and shortened block section between Horsforth and Harrogate implemented.	Gap addressed – 50 % growth to 2024.	No	
PC	2	WH1	Peak crowding on the Ilkley Line	Lengthening of all trains from four to six vehicles.	Platform extensions provided subject to three-car electric units being available.	Gap to be re-examined – 70 % growth to 2024.	Yes	See Northern RUS Gap 7
PC	3	AI1	Peak crowding on the Skipton Line	Lengthening of all trains from four to six vehicles. Additional four-car train in high-peak hour between Bradford and Leeds. Use of Bradford services to serve possible new stations at Kirkstall Forge and Apperley Bridge.	Platform extensions provided subject to three-car electric units being available. New stations built.	Gap to be re-examined – 60 % growth to 2024.	Yes	See Northern RUS Gap 7

Appendix A – Yorkshire and Humber RUS

Gap Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of Control Period 4 (CP4) at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
PC	4	CV1	Peak crowding on the Calder Valley Line	Additional maximum 2tph peak shuttles between Halifax and Leeds. Business case for all-day operation but requires further infrastructure enhancement at Bradford which may be needed for more than 1tph in peak hours.	Turnback facility at Halifax already in existence.	Gap largely addressed but all-day operation and possibly 2tph in peaks require funding of additional crossover and bi-directional signalling in association with planned signalling renewals in CP5. 45 % growth to 2024.	No	
PC	5	HD1	Peak crowding on the Huddersfield/ Brighouse Line	Train lengthening to a maximum of 4x23m vehicle trains on local services, including new platform at Huddersfield.	Platform extensions provided to meet CP4 Operational Plans to/ from Brighouse route. Platform extension at Deighton.	Gap partially addressed but new platform at Huddersfield and possibly further platform extensions required. 45 % growth to 2024.	No	
PC	6	HD2	Peak crowding on the Huddersfield Line into Leeds and Manchester	Interurban service enhancements to be a mixture of train lengthening to six-cars and additional hourly service Manchester – Leeds – Selby (or Hull).	Some additional track capacity may be provided between Leeds and Manchester.	Previous recommendation holds. – 50 % growth into both Leeds and Manchester.	No	
PC	7	WF2	Peak crowding on the Wakefield Line	Additional high peak hour Doncaster – Leeds service. Class 333 operation on Doncaster services. Up to 4x23m vehicle operation on Sheffield – Moorthorpe – Leeds trains.	Platform extensions provided between Sheffield and Leeds, derogation for Class 333 operation south of South Elmsall.	Gap to be re-examined – 55 % growth to 2024.	Yes	See Northern RUS Gap 7
PC	8	BP1	Peak crowding on the Castleford Line	Half hourly 4x23m vehicle peak trains between Knottingley and Leeds. Possible all day operation if proposed housing growth takes place.	Platform extensions provided to meet CP4 Operational Plans.	Gap partially addressed but half-hourly Knottingley service requires funding of at least one additional crossover, signalling and a new platform at Castleford.	No	
PC	9	YS1 YS2	Peak crowding on the East Leeds line including York and Selby	Train lengthening to a maximum of 4x23m vehicle trains on local services, some operating only between Micklefield and Leeds. For interurban services a mixture of train lengthening to six cars and an additional hourly service Hull/Selby – Leeds – Manchester. Alternative option to reduce local service to maximum of 3tph and for the Newcastle – Reading service to operate via Leeds with at least one call east of Leeds.	Platform extensions completed for local services.	Gap partially addressed. 50 % local services growth to 2024 and 30 % interurban.	No	

Appendix A – Yorkshire and Humber RUS

Gap Ref	No	Ref in RUS	Gap	Recommended Option	Anticipated progress by end of Control Period 4 (CP4) at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
PC	10	LD1 LD2 LD3	Track and platform capacity at Leeds	Additional bay platform(s) on north side of the station and increased platform capacity on south side. Operation of some long diesel local services through to turnback at Micklefield.	New through platform created by connecting Platforms 13 and 14 plus new crossover to allow Platform 15 to be used also for 2 by 4x23m vehicle trains turning back in the station.	Review in light of 50 % total peak growth into Leeds.	Yes	See Northern RUS Gap 8
PC	11	BP4	Barnsley line	Train lengthening up to a maximum of 4x23m vehicles for Leeds – Sheffield services.	Platform extensions provided.	Gap addressed – 50 % growth to 2024.	No	
PC	12	SD1	Sheffield – Doncaster/ Moorthorpe line	Train lengthening up to 4x23m vehicles on Doncaster/Leeds – Sheffield services.	Platform extensions provided between Sheffield and Leeds.	Gap largely addressed but platform extensions required at Mexborough and Conisbrough and stations east of Doncaster in CP5. 50 % local train growth to 2024 and 40 % interurban growth.	No	
PC	13	HV1	Hope Valley line	Additional three-car semi-fast service between Manchester and Sheffield each peak hour probably integrated with a recast service on the Marple and New Mills routes to avoid the need for extra paths at Manchester.	Nearly all Liverpool – Norwich services increased to 4x23m operation, including all peak trains.	Gap needs to reviewed following the East Midlands RUS recommendation to operate most Liverpool – Norwich trains as 4x23m. 45 % growth to 2024.	Yes	See Northern RUS Gap 4
PC	15	CV3	Peak crowding from Calder Valley line into Manchester	Additional maximum 2tph peak shuttles of up to four-car length between Rochdale and Manchester.	Some shuttles introduced	55 % growth to 2024 but Gap addressed as intervention adds up to 65 % extra capacity.	No	
PC	16	SF3	Track and platform capacity at Sheffield	Capacity scheme to alleviate train lengthening of local and long distance trains at Sheffield to be considered when re-signalling takes place.	No change	Previous recommendation holds.	No	
PC	17	DR3	Track and platform capacity at Doncaster	Identify overall infrastructure requirements for Doncaster station area in order to deliver increased East Coast Main Line (ECML) passenger and freight paths, improve performance and facilitate other aspirations. To be developed further once regular interval timetable is known.	Enhanced interval East Coast Main Line (ECML) timetable introduced.	Performance modelling of May 2011 being undertaken which may identify issues with increased service levels at Doncaster. East Coast Main Line 2016 Capacity Review may also identify issues with the current layout at Doncaster.	Subject to ECML RUS Capacity Review	

Appendix A – Yorkshire and Humber RUS

Gap Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of Control Period 4 (CP4) at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	1	Page 83	Department for Transport journey time aspiration of 43 minutes between Leeds and Manchester	Transfer of some intermediate calls to the fifth train per hour and a programme of linespeed and capacity improvements to avoid faster trains catching up local trains and freight services.	Some linespeed improvements plus possibly small scale capacity improvements.	Gap partly addressed but further linespeed improvements and possible capacity enhancements required in CP5 to achieve 43 minutes.	Yes	See Northern RUS Gap 3
RC	2	Page 82	Greater Manchester Integrated Transport Authority (ITA) aspiration for half hourly Huddersfield–Manchester Victoria local service	Various options could achieve this depending on detail of enhanced service operation on the Leeds – Huddersfield – Manchester corridor including skip-stop calling pattern east of Stalybridge.	No change	Previous recommendation holds.	No	See Northern RUS Gap 3
RC	3	HV3	Service frequency between Sheffield and Manchester	Additional hourly semi-fast service between Manchester and Sheffield (or beyond) probably integrated with a recast service on Marple and New Mills routes to avoid the need for extra paths at Manchester.	All Liverpool – Norwich services increased to 4x23m operation in peaks.	Gap needs to reviewed following East Midlands RUS recommendation to operate most Liverpool – Norwich trains as 4x23m. CP5 funding of improved track layout at Dore may still be required.	Yes	See Northern RUS Gap 4
RC	4	HV4	Journey time between Sheffield and Manchester	Examine opportunities for linespeed improvements and trade-offs with reduced performance allowances and/or altered calling patterns.	No change	Gap to be considered during CP4 and if linespeed improvements are identified (but not funded in CP4) then these would need to be funded in CP5.	No	
RC	5	SD3	Increased service levels at Rotherham Central from 3 to 5tph	Further development of South Yorkshire Passanger Transport Executive scheme taking into account affects of rebalancing the numbers of trains via Rotherham Central and Masborough and the consequent affects on Aldwarke Jn and performance.	No change	Previous recommendation holds.	No	
RC	6	LN2 LN3	Rail access to Robin Hood Airport Doncaster Sheffield (RHADS)	Station to be built by RHADS to be served initially by Doncaster – Lincoln service. Regular service to be considered in relation to future services in Doncaster area.	No change	Previous recommendation holds.	No	
RC	7	CV3	Journey times between Bradford and Manchester	Linespeed enhancements	No change	Previous recommendation holds.	No	

Appendix A – Yorkshire and Humber RUS

Gap Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of Control Period 4 (CP4) at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RC	8	WF4	Journey time improvements on the Wakefield line	Develop further	No change	Previous recommendation holds.	No	
RC	10	BP6	Journey time between Sheffield and Leeds via Barnsley	Investigate further	No change	Previous recommendation holds., noting that the East Midlands RUS recommended further development work on journey times between Leeds, Barnsley, Sheffield and Nottingham and the Northern RUS recommends further linespeed improvements on the route to allow additional calls at Elsecar.	No	See Northern RUS Gap 5
RC	11	BP3	Improved access between the three towns and Leeds	All day half hourly Knottingley – Leeds service once half hourly peak services are introduced.	No change	Previous recommendation holds.	No	
RD	1	Page 99	Increased congestion at Doncaster with Long Distance High Speed (LDHS) and freight service increases	Consider possible train service changes and infrastructure enhancements in the light of emerging December 2010 timetable and future Intercity Express Programme (IEP) requirements.	No change	Subject to East Coast Main Line 2016 Capacity Review. Gap may need further consideration for possible service changes and/ or smaller scale infrastructure enhancements to be funded in CP5 followed by probable major remodelling when Doncaster Switches and Crossings (S&C) and signalling renewals become due.	Subject to East Coast Main Line 2016 Capacity Review	
RD	2	Page 96	Reactionary delays at Leeds	To be taken into account in developing options for future layout changes.	New through platform created by connecting Platforms 13 and 14 plus new crossover to allow Platform 15 to be used also for 2 by 4x23m vehicle trains turning back in the station.	Previous recommendation holds.	No	
RD	3	Page 97	Reactionary delays at Sheffield	To be taken into account in developing options for future layout changes in association with S&C and signalling renewals.	No change	Previous recommendation holds.	No	

Appendix A – Yorkshire and Humber RUS

Gap Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of Control Period 4 (CP4) at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
RD	4	Page 90	Reactionary delays in Rotherham area	To be taken into account in developing options for allowing more services to call at Rotherham Central.	No change	Previous recommendation holds.	No	
RD	5	N/A	Reactionary delay at other locations	To be taken into account in developing options for infrastructure works – either renewals or enhancements.	Some CP4 schemes will reduce reactionary delay.	Gap will be addressed over time as projects are delivered to meet other outputs.	No	

Appendix A – New Gaps

Ref	No	Ref in RUS	Gap	Recommended option	Anticipated progress by end of CP4 at time of publication of the Northern RUS Draft for Consultation	Gap status for Northern RUS	Reviewed by Northern RUS?	Outcome of Northern RUS
FC	1	New gap	Draft 2019 SFN forecasts for Northallerton – York require 3tph freight. 4tph by 2030.	N/A	N/A	Possible new gap, subject to East Coast Main Line 2016 capacity review.	Subject to East Coast Main Line 2016 Capacity Review.	
FC	2	New gap	Draft 2019 SFN forecasts for Shaftholme Jn – Knottingley require 3tph freight. 4tph by 2030.	N/A	N/A	Freight forecasts need accommodating.	Yes	See Northern RUS Gap 6
PC	1	New gap	Retford line peak crowding – 55 % growth by 2024.	N/A	N/A	Route requires examining in the light of new demand forecasts.	Yes	See Northern RUS Gap 5

Appendix B: Station passenger capacity

The Network RUS: Stations document is looking at passenger capacity at stations nationally. It will provide a tool kit of interventions of the best ways to solve different capacity constraints.

As this is being considered nationally, the Northern RUS has not looked at specific gaps and options to deal with passenger capacity at stations. However, the Northern RUS Stakeholder Management Group identified the following stations across the north of England as those which currently have passenger capacity issues or are most likely to become a problem in the future. Also listed are any proposed or planned interventions that have already been identified via various workstreams to solve the capacity issues.

Station	Issue	Proposed solutions
Ashburys	Narrow outbound platform accessed by narrow footbridge/steps. This station serves a growing edge-of-centre employment area, with a further education college, as well as the Sports City complex. On busy match days the station operator has to close the station.	A new direct tram link from Manchester City Centre to the stadium is under construction. This will reduce the use of the station when there are events and hence crowding on the station.
Bradford Forster Square	Bottleneck expected in egress from platforms on busy peak trains.	No planned intervention.
Bradford Interchange	Bottleneck expected at barrier particularly on egress from station on busy peak trains.	No planned intervention.
Chapeltown	In the morning peak, the number of passengers waiting on the platform (which is comparatively narrow) could cause overcrowding problems, especially as a number of trains do not stop at Chapeltown and therefore pass the platform at speed.	No planned intervention.
Dore	Morning peak hour platform crowding. South Yorkshire Passenger Transport Executive have just bought an adjacent site for a 120-space car park.	Possible doubling of the single line through Dore station and provide a second platform with Disability Discrimination Act compliant access in CP5.
Guiseley	Limited footpath and footbridge access to Leeds/Bradford bound platform at peak times.	No planned intervention.
Halifax	Restricted platform capacity on island platform and shared access/egress via stairs to footbridge.	No planned intervention except a new entrance from the waiting room directly onto the Leeds-bound platform that may reduce congestion around the stairs, particularly at morning peak times.
Horsforth	Restricted footway capacity to and from Leeds-bound platform.	No planned intervention.
Huddersfield	Limited capacity on concourse, stairs and subway and on Platform 8, the busiest and most restricted platform.	The station operator is installing lifts to help with access/Disability Discrimination Act issues. A new platform is proposed in CP5 to meet passenger growth and improve passenger and train flows.
James Street	Identified by the Merseyside RUS.	No planned intervention.
Kirk Sandall	Express trains pass the island platform which gets busy during morning peak periods.	No planned intervention.
Leeds	Identified by the Yorkshire and Humber RUS.	Leeds station new southern entrance would improve station facilities and footfall capacity and reduce passenger access times to the development area south of the station. This scheme will help mitigate station congestion particularly around the station barriers/ concourse entrance.
Liverpool Central	Identified by the Merseyside RUS.	Network Rail, Merseytravel and Merseyrail are currently developing possible solutions to the crowding on Liverpool Central platforms.
Manchester Deansgate	Narrow westbound platform can become congested at peak times and late evenings.	No planned intervention.
Manchester Oxford Road	Platforms 1 and 2/3 are served by a footbridge with steps. At busy times (especially in the morning peak) the queue of passengers to exit via the barrier can stretch back onto the platforms. This raises issues when other passengers are pushing in the opposite direction to reach the platforms and board trains, especially at the bottom of the stairs where passengers can be standing/queuing close to the platform edge.	The works in CP4 to make the station Disability Discrimination Act compliant with lifts/access improvements and platform renewals will provide access improvements. Plans to remodel the layout and extend Platforms 1-4 are being examined by the Northern Hub.
Manchester Piccadilly	Platform 13/14 can become congested due to number of trains/people using platform. Passengers queuing to buy tickets when alighting trains can cause congestion/block flow of passengers leaving and entering platforms with tickets. Escalators to Metrolink platforms, taxi rank and short-term parking can become congested. Queues from Metroshuttle stops can block the flow of passengers to/from the station.	Track capacity on the corridor towards Castlefield Jn is constrained by the reoccupation of Platform 13 and 14. The Northern Hub recommended option would create two new through platforms (15 and 16). This would spread passenger flows across four platforms rather than two. Greater Manchester Passenger Transport Executive have discussed Metroshuttle stops with the Department for Transport and this is deferred to refranchising.
Meadowhall	Access to and congestion on Platform 2. Currently access restrictions are put in place on the run-up to Christmas, at weekends and in the evening peak.	No planned intervention.
Salford Central	Excessive stepping height slows boarding/ alighting leading to increasing station dwell times as more people use the station	No planned intervention.
Salford Crescent	Narrow island platform becomes congested with combination of interchange and origin/ destination passengers. Northern Rail staff control access to platform for originating passengers but cannot control numbers alighting for interchange and destination.	Planned extension to existing platform in CP4 but will not provide enough extra space to help with passenger flows.
Saltaire	Restricted platform space for peak passengers on Leeds/Bradford bound platform.	Potential platform lengthening in CP4.
Sheffield	Crowding currently occurs on the steps into the main concourse and to Platforms 2-5 in particular, mainly at peak times.	Station recently redeveloped/refurbished and no further interventions to the station are planned.
Shipley	Spacious platforms, subway ramps and footbridge at original station but restricted new Platforms 1 and 2 and footbridge link could pose a future problem as these also have the highest footfall.	No planned intervention.
Wakefield Westgate	Restricted footbridge access to and from Leeds-bound platform and limited concourse space.	No planned intervention.

Glossary

Term	Meaning
ATOC	Association of Train Operating Companies.
BCR	Benefit Cost Ratio.
Control Period 4 (CP4)	The 2009 – 2014 period.
Control Period 5 (CP5)	The 2014 – 2019 period.
Control Period 6 (CP6)	The 2019 – 2019 period.
DfT	Department for Transport.
Down	The direction of trains normally when travelling away from London.
ECML	East Coast Main Line.
Engineering access	Engineering access is the time on the rail network when no trains operate. This provides the means by which maintenance/renewals and enhancement works are undertaken.
FOC	Freight operating company.
GVA	Gross value added – Measure of the economic productivity of an area.
HLOS	High Level Output Specification.
HS2	Proposed high speed rail link between London and the West Midlands, and potentially beyond.
ISBP	Initial Strategic Business Plan.
Infrastructure	This includes signalling, track, structures and telecom assets associated with the rail network.
Loading gauge	Loading gauge is the profile for a particular rail route within which all vehicles or loads must remain to ensure that sufficient clearance is available at all structures.
MOIRA	An industry standard passenger demand forecasting model which uses many of the principles published in PDFH (see opposite).
Multiple unit trains (DMU & EMU)	These are trains composed of self-contained units, coupled together so that they work in unison under the control of the driver at the front of the leading unit. Each unit is normally composed of two or more semi-permanently coupled vehicles and a driving compartment is provided at each end of every unit. There are diesel multiple units (DMU) and electric multiple units (EMU).
NPV	Net present value – The whole-life economic benefit and revenue generated by a rail capability change minus the whole-life cost of this change.
Optimism bias	A proportional uplift to scheme cost estimates to allow for historical systematic optimism on the part of UK scheme promoters.
ORR	Office of Rail Regulation is the regulator for the railway industry in Great Britain.
PDFH	Passenger Demand Forecasting Handbook (version 5.0) – Industry standard publication containing detailed research on passenger behaviour and trends.

Term	Meaning
PTE	Passenger Transport Executive.
RPI	The Retail Price Index measure of UK inflation.
S&C	Switches and crossings, track components which allow trains to change from one line to another.
SDO	Selective door opening, used where the whole of the train does not fit into a station platform.
SMG	Stakeholder Management Group.
Strategic routes	Network Rail is structured for planning purposes with 17 Routes, which are aligned closely to the traffic flows in the planning areas and operational areas to enable direct use of route plans for delivery.
TOC	Train operating company.
tph	Trains per hour.
Up	The direction of trains normally when travelling towards London.
WCML	West Coast Main Line

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