Yorkshire and Humber

Route Utilisation Strategy

July 2009

Foreword

I am delighted to present Network Rail's Route Utilisation Strategy (RUS) for the Yorkshire and Humber region. This strategy considers issues affecting the railway in this part of the country over the next decade and gives a view on longer-term issues in the years beyond.

The network across the region is extremely diverse, with heavily used services into and between the major cities; rural areas with lightly used services; as well as heavy freight use, particularly around the major ports. It does not include the East Coast Main Line, however, but it does include some lines in the East Midlands and west of the Pennines where these have been identified as being relevant to the network in the Yorkshire and Humber area.

Reaching this stage has involved following a now well-established process. This began with a comprehensive analysis of the current capability and capacity of the network to measure its ability to meet existing demand. Subsequently, demand projections for the next decade are examined and, taking any planned enhancements over that period into account, any future gaps are identified.

This process showed that, despite current economic conditions, demand from passengers wishing to commute into Sheffield and Leeds, to travel between the two, across the Pennines to Manchester or to the Midlands is expected to continue to grow over the next decade, though initially at a slower rate. It showed that passengers and freight users both want the railway to be available earlier and later; and that links between some major cities – for example, from Bradford or Sheffield to Manchester – are slow and unattractive to passengers. It highlighted that future growth of freight traffic may be compromised by certain pinch-points or areas where the loading gauge clearance is insufficient.

In addition, a number of locations have been identified where the increasing number of train services have highlighted the limitations of the infrastructure, with growing congestion and occasionally significant delays occurring.

The general approach in the short and medium term will be to progressively provide the infrastructure capable of taking more and longer trains, and faster journeys where possible, as well as the capability for additional freight services to meet the projected growth in demand.

This RUS was initially published as a Draft for Consultation in September 2008, and I would like to thank all those who responded. Its production has been led by Network Rail, but it has been developed by the whole industry. A large number of organisations, including our customers, the passenger and freight operators, have been fully involved and I would like to thank them all for their efforts.

Iain Coucher
Chief Executive

Executive summary

Introduction

The rail network varies greatly across the Yorkshire and Humber Route Utilisation Strategy (RUS) area. The largest conurbations centred around Leeds and Sheffield have a high concentration of heavily used urban and inter-urban services, whereas the less populated areas to the east have a greater proportion of lightly-used rural services. Some parts of the network, such as Immingham, are very heavily used by freight traffic whilst others are solely passenger. Similarly, there is no one body responsible for transport planning such as Transport for London or Transport Scotland. Whilst the interests of the principal urban areas are represented by South Yorkshire Passenger Transport Executive (PTE) and West Yorkshire PTE (and to a lesser extent – in terms of geography rather than roles and responsibilities – Greater Manchester PTE), local authorities in the remainder of the area range from geographically very large shire counties such as North Yorkshire to quite compact unitary authorities. The National Park Authorities and Associated British Ports also have a role to play.

Scope and background

The Yorkshire and Humber RUS adjoins the infrastructure covered by the already-published East Coast Main Line, North West, and Lancashire and Cumbria RUSs, and the East Midlands RUS currently in preparation. Several members of the rail industry Stakeholder Management Group (SMG) are common to some or all of these RUSs. There is a considerable interface with the North West RUS in the corridors from South and West Yorkshire to Greater Manchester.

The RUS covers broadly the area from Scarborough, Hull and Cleethorpes in the east to Newark, Chinley, Stalybridge, Rochdale and Skipton in the west, with the exception of the East Coast Main Line (ECML). It considers issues over a 10-year time period from 2009.

It has had issues passed to it from the North West RUS, the Lancashire and Cumbria RUS, the ECML RUS and the Freight RUS. The Network RUS, currently under development, will also address some issues, such as electrification, which may impact on the RUS area.

Process

The RUS initially analyses the current capability and capacity of the railway in order to measure its ability to cater reliably for existing demand and thereby highlight any present-day ‘gaps’. Forecasts of predicted demand over the coming 10 years are then examined, and forecast future gaps identified. These forecasts take account of committed schemes which are due to be delivered in the next few years.

A set of options is then generated which could potentially meet the known and predicted gaps. These options are then analysed in order to gain an understanding about which of them offer the most promising and value for money solutions.

The RUS is put out to consultation in order for stakeholder responses to be sought and considered and for options to be thereby refined. The Draft for Consultation was issued in September 2008, with a formal consultation period from September to December 2008, during which 130 written responses were received. The comments were analysed and taken into account in development of the finalised strategy set out in this document.

The Yorkshire and Humber RUS process has been overseen and directed by the SMG

which comprises representatives from the Train Operating Companies (TOCs), Freight Operating Companies (FOCs), the Department for Transport, Network Rail, the Association of Train Operating Companies (ATOC), Passenger Focus, the PTEs and the Office of Rail Regulation (ORR) (as observers).

Gaps

This RUS identified six generic gaps:

Peak crowding and suppressed growth: Demand for rail commuting into Leeds, Sheffield and Manchester has been growing strongly in recent years with the result that many trains during the high peak are now close to or, in a few cases, beyond their nominal capacity. Significant overcrowding in peak hours is forecast if additional capacity is not provided.

Off-peak crowding and suppressed growth: Growth in demand for TransPennine Express services in the core Manchester – Leeds via Huddersfield corridor has been exceptionally strong in recent years and significant overcrowding is forecast such that demand management measures will be required if additional capacity is not provided.
This prediction is based on growth projections of an average of 3.6 percent per year and is dependent on a number of assumptions, in particular fares policy (RPI+1% is assumed, although this is potentially conservative for unregulated fares) and external effects such as road congestion and motoring costs. Increased overcrowding at various times of day, including weekends, is expected if further capacity is not provided.

Engineering access: On certain route sections, present methods of maintenance and renewal imply regular and lengthy possessions to keep the infrastructure fit for purpose. Increasingly, these do not fit comfortably with: demand for passenger services to operate later on weekday evenings and to start earlier on Sunday mornings; growing demand – especially on south Humberside – for 24-hour freight access; and a strong desire that passenger services in key corridors should as far as possible be free from bus substitution.

Regional links: There is a perception of poor connectivity in certain corridors. In particular, the service between Bradford and Manchester is slow by comparison with services between other major centres, as a result of numerous station stops combined with some low speed restrictions. The Sheffield – Manchester service is considered to be unattractive at two fast trains per hour when compared with the Leeds – Manchester via Huddersfield frequency.

Freight capability: Parts of the RUS area have restrictive loading gauge clearance when compared with the Freight RUS aspirations for W9, W10 and W12. Such restrictions reduce the suitability of the lines affected for diversionary purposes as well as hindering development of the intermodal container market. Identified key capacity pinch-points such as the Hope Valley and Hare Park Jn – South Kirkby Jn threaten to handicap future growth in the freight business. The absence of any loops of 775 metres within the RUS area limits the options for running the longest freight trains in line with FOC aspirations.

Reactionary delays: A number of key locations have been identified where very significant delays occur, notably Whitehall Jn, Sheffield station and Swinton Jn. Congestion at these locations is related to the design of the rail infrastructure which has become increasingly constrained as train services have grown in response to demand, whilst ‘quick win’ solutions have almost invariably been taken up.

Short-term strategy 2009 – 2014 (Control Period 4)

Train services

The general approach will be that of progressive train lengthening and on some corridors providing additional peak shuttle services to relieve overcrowding, as additional rolling stock becomes available. At Leeds, the capacity provided by the recent remodelling has largely been used up because of rapid growth. There is room to expand platform capacity on the north side of the station, which will suffice for Airedale, Wharfedale and Harrogate services, but expansion in the centre and south of the station is far more challenging. Part of the solution proposed for the next decade is to introduce more short distance cross-Leeds services, using a new turnback facility to the east (near Micklefield). Two solutions to alleviate crowding east of Leeds have been identified.

There will be some journey time improvements between Leeds and Manchester, together with the introduction of an additional service each hour as part of a general recast of services on the Huddersfield route. The additional trains run between Manchester and Leeds with extensions to Selby or beyond at least in the peak hours. Possible journey time improvements may be undertaken on other corridors.

Additional freight services will be accommodated in line with Freight RUS forecasts, while W10 gauge clearance to four Yorkshire terminals is expected to be provided from Felixstowe. Introduction of a regular clock face timetable on the ECML as proposed in the ECML RUS, and now being developed for the December 2009 timetable, is also expected to assist considerably in terms of improving the pattern of local and 'east – west' services. Once the programme of enhancement projects on the ECML is complete there will be a further improvement to passenger services between the RUS area and London together with a large increase in freight paths to/from Peterborough and beyond.

Infrastructure enhancements

The following schemes in the RUS area would be needed in order to deliver the changes to services detailed above:

- platform lengthening on a number of lines to accommodate increased train length[1]
- new and increased passenger train servicing and stabling facilities[2]
- new or improved turnback facilities at Horsforth, Rochdale, Stalybridge, Castleford and in the Micklefield area[1]
- some small scale capacity enhancement in the Calder Valley
- at Leeds, one or two additional bay platforms beside Platform 1 and additional track or platform infrastructure at the south west of the station subject to further development work[1]
- various small scale capacity and linespeed enhancements between Leeds and Manchester via Huddersfield, probably including upgrading and lengthening of Diggle loop and upgrading of Marsden loop[2]
- Intercity Express Programme (IEP) infrastructure works[2]
- some W9/W10/W12 gauge enhancements, funded by Hutchison Ports UK and possibly others identified through the Strategic Freight Network mechanism
- remodelling of Shaftholme Jn[3]
- a fourth running line at York Holgate and associated enhancements[3]
- small scale projects to enhance performance, provide marginal capacity improvements and/or journey time improvements funded via the Network Rail Discretionary Fund.

Those schemes that are not funded through the ORR Determination for Control Period 4 (CP4) or other funding sources will need to be deferred to Control Period 5 (CP5).

1 The ORR Final Determination for Control Period 4 provided allowances to meet the HLOS on Strategic Routes 10 and 11, which encompass the Yorkshire and Humber area.

2 Scheme specifically shown as funded in ORR Final Determination

3 ECML scheme specifically shown as funded in ORR Final Determination

Medium-term strategy 2014 – 2019 (Control Period 5)

The following recommended changes to train services form the proposed strategy for CP5.

There would be continued train lengthening on local services, including the additional shuttles introduced during CP4. A 43-minute journey time Leeds – Manchester via Huddersfield should become standard for most fast services, with a further recast of services on the Huddersfield route to allow this to happen. A 'standard hour' service of three fast trains per hour would be introduced between Sheffield and Manchester. Improved journey times would be introduced in the Leeds – Sheffield via Barnsley corridor, between Sheffield and Manchester and between Bradford and Manchester. Freight paths are expected to be further increased on those routes highlighted in the Freight RUS plus routes where further growth is driven by gauge enhancement. Improved capacity, performance, linespeeds and engineering access will be provided between Immingham and Wrawby Junction and between Hessle Road Jn and Gilberdyke. Subject to the realisation of projected housing growth in the Pontefract area, a half-hourly Knottingley to Leeds service would be provided.

New rolling stock is expected to begin to bring benefits with:

- greater seating capacity on London – Yorkshire services as the result of IEP introduction
- IEP dual fuel sub-fleet could provide potential for improved London links for towns/cities not on electrified routes
- new generation Diesel Multiple Units starting to replace the Pacer/Sprinter fleet
- possible extension of electrification within the RUS area.

It is envisaged that the following projects will be needed to deliver the above train service strategy:

- further platform lengthening
- further capacity and linespeed enhancements between Leeds and Manchester via Huddersfield
- further enhancement to the track and signalling at Castleford
- doubling of the Dore & Totley station curve and new loops in the Hope Valley[4]
- additional crossover at Bradford Interchange and some bidirectional signalling[4]
- capacity and performance improvements in the Rotherham area
- enhancements between Wrawby Junction and Brocklesby[4]
- enhancements between Ulceby and the Immingham dock complex
- possible extension of electrified network within the RUS area
- 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
- any further W9/W10/W12 loading gauge works identified through the Strategic Freight Network mechanism
- other schemes identified as representing to reduce reactionary delay and/or improve the balance between engineering access and continuity of service operation.

4 In association with renewal schemes

Long-term context 2019 – 2039 (Control Period 6 and beyond)

The Government's 2007 White Paper suggests a general doubling of both passenger and freight traffic nationally over a 30-year period; however it is recognised there may be wide variations on individual routes or parts of routes according to local circumstances. In the event of very rapid growth there is little doubt 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 opportunities offered by the wider rail network. These could include, for example, making use of any remaining capacity for growth on lines within the RUS area followed by use of remaining capacity on lines outside the RUS area. There could also be options for re-opening currently disused lines where feasible or construction of some completely new sections of railway. The latter could be unconstrained by traditional limitations on maximum speed, loading gauge and other output characteristics.

The corridors where increased capacity is expected to require significant infrastructure investment are:

- Leeds – Micklefield Jn
- Leeds – Huddersfield – Manchester
- Doncaster – Hare Park Jn
- Sheffield – Manchester
- Sheffield – Swinton – Moorthorpe.

If growth materialises at a higher level than projected in the RUS or there is a policy of driving modal shift then some of the above investments would be required in CP5.

Contents

1. Background

1.1 Introduction to Route Utilisation Strategies

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 (further amended in April 2009) to require the establishment of Route Utilisation Strategies (RUSs) across the network. Simultaneously, the ORR published guidelines on RUSs. A RUS is defined in Condition 1 of the network licence as, in respect of the network or a part of the network[1], 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 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 ORR guidelines on Route Utilisation Strategies, 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 would wish to see 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 (eg. 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 The definition of "network" in Condition 1 of Network Rail's network licence "includes 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 development and explain how Network Rail should consider the position of the railway funding authorities, the likely changes in demand and the potential for changes in supply. 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 conditions and the guidelines. These and other documents relating to individual RUSs and the overall RUS programme are available on the Network Rail website (**www.networkrail.co.uk**).

1.1.5
The 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). There is also extensive informal consultation outside the rail industry by means of a Wider Stakeholder Group (WSG).

1.1.6
The ORR guidelines require options to be appraised. This is initially undertaken using the Department for Transport (DfT) appraisal criteria. 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.

1.1.7
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 reach them, in turn form an input to decisions made by industry funders and suppliers on issues such as franchise specifications, investment plans and the next HLOS.

1.1.8
Network Rail will take account of the recommendations from RUSs when carrying out its activities. In particular they will be used to help to inform the allocation of capacity on the network through application of the normal Network Code processes.

1.1.9
The ORR will take account of established RUSs when exercising its functions.

1.2 The RUS programme

The completed RUS programme will cover the entire rail network in Great Britain and commenced with the publication of the consultation document for the South West Main Line RUS in October 2005. There will be 19 RUSs in total, of which 11 have been published and have become established under the terms of Licence Condition 1. The remainder are currently at varying stages of development. Full details of the programme can be found on the Network Rail website (**www.networkrail.co.uk**).

1.3 Document structure

Chapter 2 describes the geographic scope of the RUS, the time horizon and the planning context within which it is being developed.

Chapter 3 summarises the current capabilities and usage of the strategic routes within the RUS area, drawing on input from key industry stakeholders, and highlighting particular issues.

Chapter 4 discusses anticipated changes in supply and demand and the schemes planned to enhance or improve the routes and services covered by the study. This helps to identify the benefits which will flow from these improvements, as well as the potential for synergy between committed or expected schemes and those developed by the RUS.

A key step in the process is the sifting of the issues and analysis of the future year forecasts in order to identify gaps and develop options for addressing them. **Chapter 5** analyses these gaps and options.

Chapter 6 covers the consultation process, including its purpose and a summary of the responses received and how these have been taken into account.

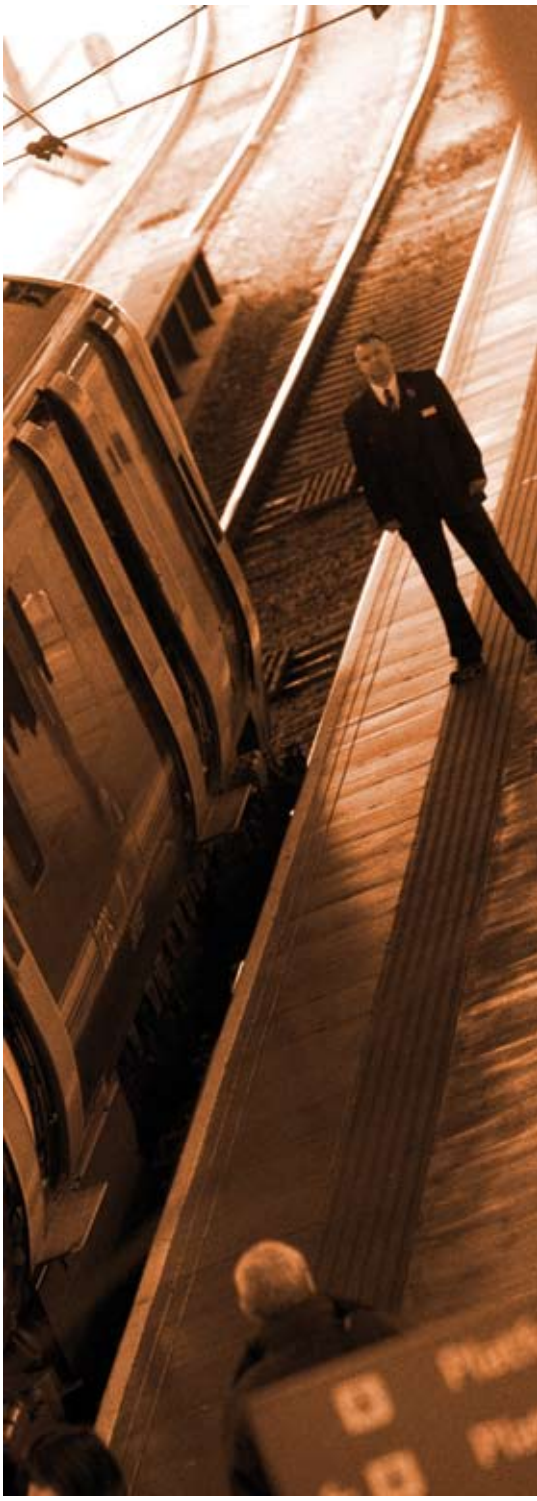
Chapter 7 draws together the conclusions into a strategy comprising recommendations for better use of resources and investment proposals for meeting growth. Recommendations are grouped chronologically using railway industry five-year control periods. The document shows how these interventions meet government targets for the 2009 – 2014 period and describes the industry's strategy for meeting predicted demand during Control Period 5 (2014 – 2019) in the context of likely longer-term developments. The document then looks ahead to the challenges posed to the RUS area in the longer 30-year term.

Appendix 1 shows the freight terminals within the RUS area.

Appendix 2 lists the Department for Transport and Passenger Transport Executive aspirations for enhancement within the RUS area.

Appendix 3 (published on the Network Rail website) details the performance analysis undertaken for the RUS and additional work carried out in response to consultation.

Appendix 4 (published on the Network Rail website) shows the economic appraisals for each of the options detailed in **Chapter 5**.



2. Context and scope

2.1 Geographic scope

The Yorkshire and Humber Route Utilisation Strategy (RUS) covers broadly the network defined by Network Rail's Strategic Routes 10 and 11. This is depicted in geographic and schematic format in Figures 2.1 and 2.2 respectively. It includes all routes in the Yorkshire and Humber region with the exception of the East Coast Main Line (ECML) north of Doncaster and the Middlesbrough to Whitby branch line, both of which are dealt with in the ECML RUS. Also included are a few routes in the East Midlands region, along with some areas to the west of the Pennines where the train services have been identified in other RUSs as being closely relevant to transport needs further east. Excluded are the lines from Skipton towards Carlisle and Lancaster, dealt with in the Lancashire and Cumbria RUS.

The railway within the RUS area naturally falls into a number of discrete corridors which are shown shaded bold in Figure 2.1 and further defined by colour coding in Figure 2.2.

Figure 2.1 – Geographic scope

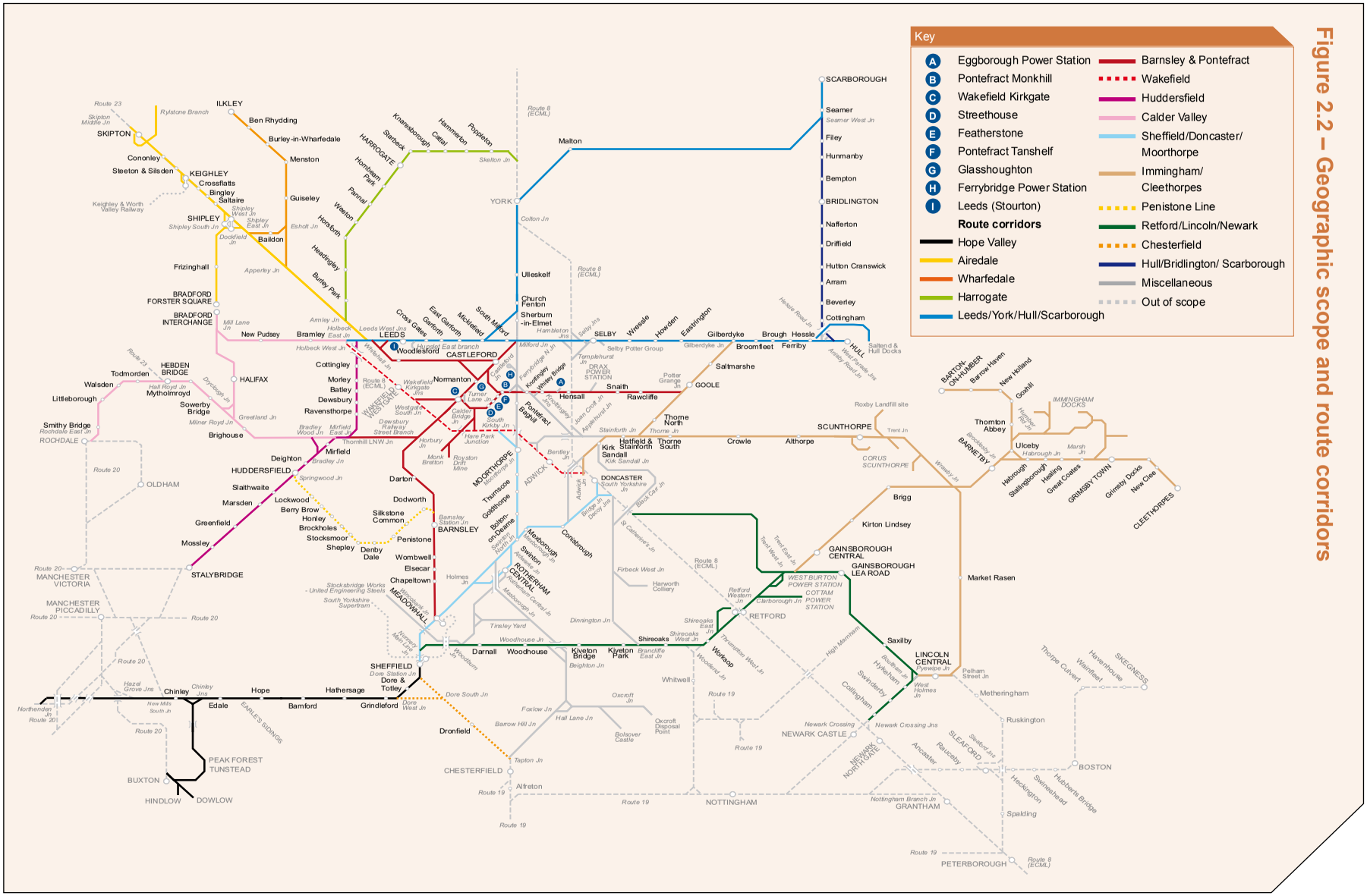


Figure 2.2 – Geographic scope and route corridors

2.2 Services considered

The RUS considers all services that use these routes for part or all of their journeys to the extent necessary to achieve the route utilisation objective – and includes appropriate analysis of those traffic generators outside the scope area which have a significant effect on the pattern of demand within it.

2.3 Linkage to other studies and workstreams

In April 2008, Network Rail submitted an update to its Strategic Business Plan (SBP) to the Office of Rail Regulation (ORR) as part of the regulatory review for the railway Control Period 4 (CP4) which covers the period April 2009 – March 2014. ORR delivered its final determination for this control period in October 2008. The Yorkshire and Humber RUS is consistent with the determination in respect of CP4.

This RUS has interfaces with the following existing RUSs and those under development:

- East Coast Main Line RUS, principally at Wakefield Westgate, Doncaster, Leeds and York
- Lancashire and Cumbria RUS, principally in respect of the Airedale and Calder Valley corridors
- East Midlands RUS, and the Strategic Rail Authority's Midland Main Line RUS at Chesterfield and in Lincolnshire
- Freight RUS, throughout the RUS area
- Network RUS, principally in relation to electrification
- North West RUS, principally in respect of the Calder Valley, Hope Valley and Huddersfield corridors.

This RUS has drawn on a number of Regional Planning Assessments (RPAs). These strategies, published by the Department for Transport, provide a medium-to-long-term planning framework and are the result of extensive engagement between key planning and development bodies in their respective areas:

- East Midlands RPA (published in May 2007)
- Yorkshire and Humber RPA (published in June 2007)
- North West RPA (published in October 2006).

The following more detailed rail strategies for specific areas have been published covering parts of the RUS area:

- Greater Manchester Local Transport Plan (Greater Manchester Passenger Transport Executive)
- South Yorkshire Rail Strategy (South Yorkshire Passenger Transport Executive) – 2004 version and updated draft issued October 2008
- West Yorkshire Railplan 6 (West Yorkshire Passenger Transport Executive).

The following have also provided valuable context for the RUS. Strategies addressing regeneration, inter-regional economic activity, sustainability and tourism issues were referred to during the planning process:

- The Draft Regional Spatial Strategy
- Regional Economic Strategy
- Joint Northern Regional Development Agencies' Northern Way
- Greater Manchester Transport Innovation Fund (TIF) submission.

2.4 Assumptions

During analysis, the following changes to services have been regarded as committed schemes.

- the introduction of an hourly Leeds – Nottingham service implemented in December 2008
- the Intercity Express Programme (IEP), to replace the High Speed Train (HST) fleet, which Network Rail will support with a range of infrastructure works to support operation of the new trains
- the introduction of a two-hourly National Express East Coast service between King's Cross, Leeds and Bradford Interchange/ Harrogate via Hambleton Jn's
- the introduction of three Grand Northern trains per day between King's Cross and Bradford via Pontefract Monkhill and Halifax.

2.5 Time horizon

The RUS primarily considers the period 2009 – 2019. It does, however, look further into the future in line with the 30-year timescale adopted in the Government's 2007 White Paper "Delivering a Sustainable Railway" to identify factors which should influence development of the 10-year strategy.

3. Current capacity, demand and delivery

3.1 Train operators

At present, five franchised and two Open Access passenger train operators and five freight train operators run services over the lines covered by the Route Utilisation Strategy (RUS). These are:

3.1.1 CrossCountry

CrossCountry operates long distance services linking Scotland and the North East with the East and West Midlands, the South and the South West. The franchise commenced in November 2007 and runs until April 2016. The final two years and four months of the franchise are subject to performance targets being met.

3.1.2 East Midlands Trains

East Midlands Trains (EMT) operates regular long-distance high speed services from Sheffield and Chesterfield to London St Pancras International with a small number of trains extended to/from Leeds. It provides a service from Sheffield to the East Midlands, East Anglia, Manchester Piccadilly and Liverpool Lime Street. East Midlands Trains also operates a number of services in the Lincoln area. The franchise commenced in November 2007 and runs until April 2015. The final 18 months of the franchise are subject to performance targets being met.

3.1.3 First TransPennine Express

First TransPennine Express (TPE) operates interurban services with limited stops, notably across the Pennines from most principal centres in the RUS area towards Manchester, as well as from Middlesbrough and Newcastle. The key hubs for TPE in the RUS area are Doncaster, Leeds, Sheffield and York. The current franchise runs until February 2012 with an option for a further five-year extension.

3.1.4 Grand Central

Grand Central operates Open Access services between King's Cross and Sunderland via the East Coast Main Line (ECML) and Eaglescliffe.

3.1.5 Hull Trains

Hull Trains operates Open Access services between King's Cross and Hull via Doncaster and Selby.

3.1.6 National Express East Coast

National Express East Coast (NXEC) is the principal operator of long-distance high speed services from the RUS area to London King's Cross. In addition to the main ECML services from Leeds, NXEC provides links to London from Bradford, Harrogate, Hull and Skipton. The franchise commenced in December 2007.

3.1.7 Northern Rail

Northern Rail operates the majority of the services and stations in the RUS area, and is the only operator to run services in most of the corridors. The Northern Rail franchise was formed in December 2004 and runs until September 2013. The final two years of the franchise are subject to performance targets being met.

3.1.8 DB Schenker

DB Schenker (formerly English Welsh & Scottish Railway) is the largest freight operator in the UK, operating services throughout Great Britain. It is organised into four market-based groups. These are Energy (which includes coal), Construction (which includes domestic waste), Industrial (which includes metals and petroleum) and Network (which includes international, automotive, intermodal, infrastructure and express parcels services).

3.1.9 Direct Rail Services (DRS)

DRS operates traffic for parts of the power generation industry. Over the past few years the company has expanded into the domestic and short sea intermodal markets, and some bulk traffic including coal.

3.1.10 Fastline Freight

Fastline Freight operates intermodal services to and from Doncaster Railport and is starting up coal operations.

3.1.11 First GBRf

First GBRf is an operator of container trains and infrastructure services. They also run a number of bulk market services, including coal, gypsum and Royal Mail trains.

3.1.12 Freightliner

Freightliner operates throughout Great Britain and has two divisions.

Freightliner Limited is the largest rail haulier of containerised traffic, predominantly from the deep sea market.

Freightliner Heavy Haul is a significant conveyor of bulk goods, predominantly coal, construction materials and petroleum, and operates infrastructure services.

3.2 Passenger market profile

3.2.1 Population, demographics and the rail passenger market

The area covered by the RUS has a population of just over five million, of which around 70 percent is located within the West Yorkshire and South Yorkshire metropolitan counties, with populations of 2.1 million and 1.3 million respectively. The majority of this population is concentrated in the Leeds and Sheffield conurbations.

The main urban centres in West Yorkshire have received significant commercial investment over the last two decades and Leeds in particular is now a nationally important location for a number of key tertiary industries such as retail, education, telecoms, legal and financial services. The economy has been largely buoyant over the last 10 years as a consequence of this investment, and although some areas of deprivation still exist, they are less prevalent than in other parts of the RUS area.

South Yorkshire has experienced a significant programme of investment and redevelopment over the last 10 years and economic growth has been accelerating markedly. The legacy of the decline of the mining and steel industries means that a number of areas are relatively deprived; however, there is strong evidence that the economy of South Yorkshire is improving.

Outside the metropolitan counties the population is relatively sparsely spread, although there are some larger clusters of population, particularly in Hull and York. The demographics and economic performance of these areas vary significantly. York, for example, is particularly affluent with an economy that is highly dependent on tourism, whereas Hull is less well off and the economy is made up of more traditional secondary and tertiary economic activity.

The rail passenger market is reflective of the diverse demographic characteristics of the RUS area, and the recent medium-term economic success of the region.

The overall number of passenger trips has increased from around 39 million in 1998/99 to approximately 63 million in 2007/08, which is a sizable increase of over 60 percent. The largest increases have been in trips to and from Leeds and Sheffield, which have grown by around 78 percent and 66 percent

respectively. A significant proportion of this is through increased commuting. Figure 3.1 below details the split of all passenger trips made in the RUS area in 2007/08 and Figure 3.2 shows the 10 busiest station-to-station passenger flows. Rail usage in the RUS area is split between three main markets:

- **Local travel (commuting and leisure).** The majority of passenger trips (62 percent) were made entirely within the RUS area, of which nearly half were during peak periods for the purpose of commuting, and 6 of the 10 busiest individual station-to-station passenger flows are short-distance trips
- **Long distance business and leisure travel (cross-Pennine).** Around 11 percent of passenger trips were made between the RUS area and other stations on the TPE network, such as Manchester Piccadilly, Liverpool Lime Street and Newcastle. Furthermore, Leeds – Manchester is the eighth busiest passenger flow in the scope of the RUS
- **Other long distance business and leisure travel.** Approximately 22 percent of passenger trips are made between the RUS area and other parts of the UK, predominantly London, the South East and the East Midlands.

Figure 3.1 – Summary of all passenger trips made (2007/08)

Area	Annual passenger trips (million)	Proportion of total
Within RUS area	38.9	62%
RUS area to/from cross-Pennine area	7.1	11%
RUS area to/from rest of UK	14.1	22%
Through RUS area*	3.2	5%
Total	63.3	

Source: March 2007/08 LENNON data with an uplift for travel using Passenger Transport Executive (PTE) products

*Based on Yorkshire and Humber Regional Planning Assessment (RPA)

Figure 3.2 – 10 busiest station-to-station passenger flows (2007/08)

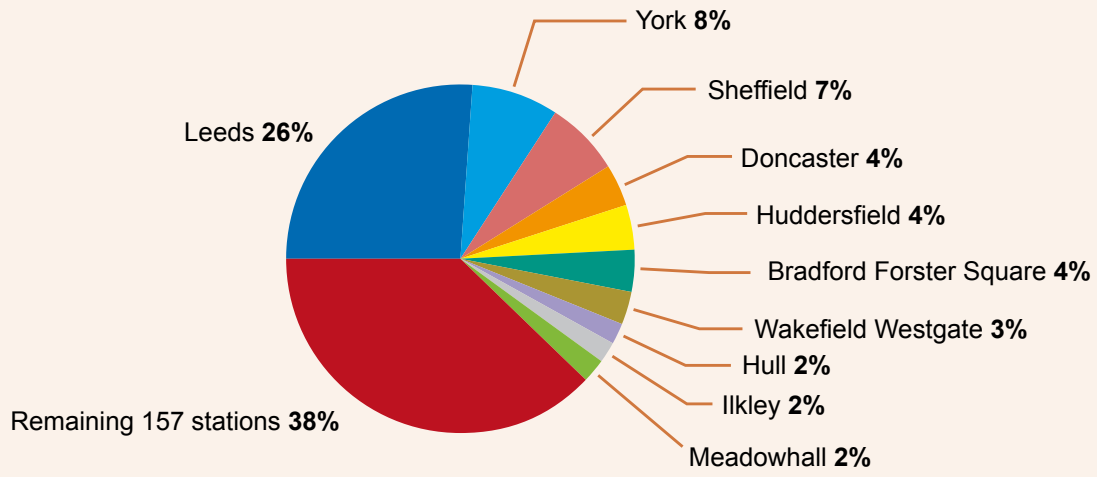
All trips		Within RUS area only	
Two-way station – station flow	**Annual passenger journeys (000)**	**Two way station – station flow**	**Annual passenger journeys (000)**
Leeds – London termini	1,558	York – Leeds	1120
York – Leeds	1,120	Huddersfield – Leeds	976
Huddersfield – Leeds	976	Horsforth – Leeds	695
York – London termini	883	Wakefield Westgate – Leeds	685
Sheffield – London termini	751	Guiseley – Leeds	598
Horsforth – Leeds	695	Shipley – Leeds	595
Wakefield Westgate – Leeds	685	Bradford Forster Square – Leeds*	558
Leeds – Manchester termini	681	Garforth – Leeds	557
Guiseley – Leeds	598	Ilkley – Leeds	539
Shipley – Leeds	595	Keighley – Leeds	514

Source: March 2007/08 LENNON data with uplift for travel using PTE products

* Split between Bradford Forster Square and Bradford Interchange estimated using RPA demand matrices

The size and characteristics of the three main passenger markets mean that the majority of passengers board, alight or interchange at one of the large urban stations. Figure 3.3 below illustrates this. Leeds is by far the busiest station with over 16 million trips per annum, which is around 26 percent of the total. York and Sheffield are the next busiest stations with eight percent and seven percent of the total respectively. Overall the 10 busiest stations account for nearly two-thirds of passenger demand in the RUS area.

Figure 3.3 – Split of passenger demand by station – 10 busiest



Source: RPA Demand Matrices

3.2.2 Peak train loadings

The rapid growth in the commuter market has significantly increased the number of passengers travelling to and from the main urban centres in the RUS area during peak periods. As a result a number of services are operating at or beyond the seating capacity of the rolling stock, and in some cases the seating plus theoretical standing capacity. The most densely loaded trains are those which serve Leeds or Sheffield.

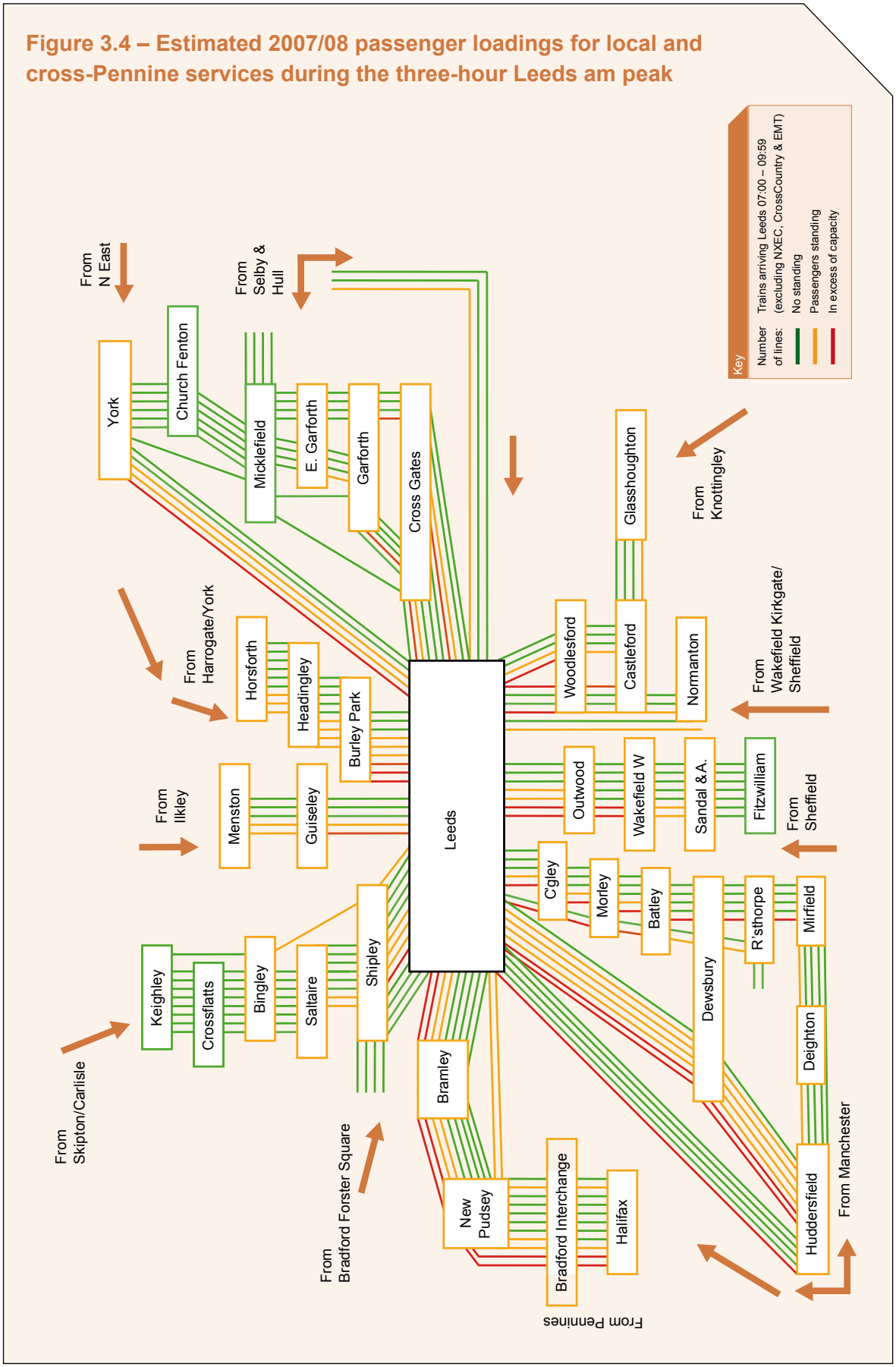
Figure 3.4 below shows the estimated train loading for each train service arriving at Leeds between 07:00 and 09:59 (the am peak).[1] Each coloured line represents one train in the timetable and is coloured green when seats are available, amber when the number of passengers exceeds the number of seats, and red when the number of passengers exceeds the seating and standing capacity for the rolling stock type. The information is based on historical Train Operating Company (TOC) passenger counts and has been updated to 2007/08 using West Yorkshire Passenger Transport Executive (WYPTE) alighting passenger counts at Leeds station. National Express East Coast, CrossCountry and East Midlands Trains services have not been included.[2]

Of the 92 train services that arrive in Leeds during the am peak in the 2007 timetable an estimated 46 have more passengers than seats available, and around 19 have more passengers than the theoretical seating and standing capacity of the rolling stock. This is equivalent to 50 percent and 21 percent of all train services respectively, and on most lines there are more passengers travelling than seats available for all Leeds arrivals between 08:00 and 08:59 (the high peak hour). On average, loads exceed the seating capacity when trains are a little over 20 minutes from Leeds. The Calder Valley line has standing for the longest amount of time with passengers standing from Halifax (39 minutes from Leeds) on four peak services, and the Harrogate line has the greatest proportion of trains with passengers standing (66 percent).

1 For simplicity the am peak has been taken as representative of the pm peak

2 The impact of committed service changes by these operators has been included in the development of options to reduce on-train crowding

Figure 3.4 – Estimated 2007/08 passenger loadings for local and cross-Pennine services during the three-hour Leeds am peak



Source: TOC and WYPTE passenger counts

Figure 3.5 below shows the estimated train loading for each train service calling at Sheffield between 07:00 and 09:59 (the am peak). The information is based on TOC passenger counts, updated with South Yorkshire Passenger Transport Executive (SYPTE) data when necessary. SYPTE believes that the pm peak may be slightly busier, so data for this time period has been used as a proxy where appropriate. The colour coding is the same as in Figure 3.4 and southbound CrossCountry services and London – Sheffield EMT services have not been included.[3]

Of the 45 services included in the analysis that arrive in Sheffield during the am peak approximately 17 have more passengers than the number of seats available. This is equivalent to 38 percent of the total, and the average travelling time from Sheffield at which services exceed the seating capacity is around 20 minutes.

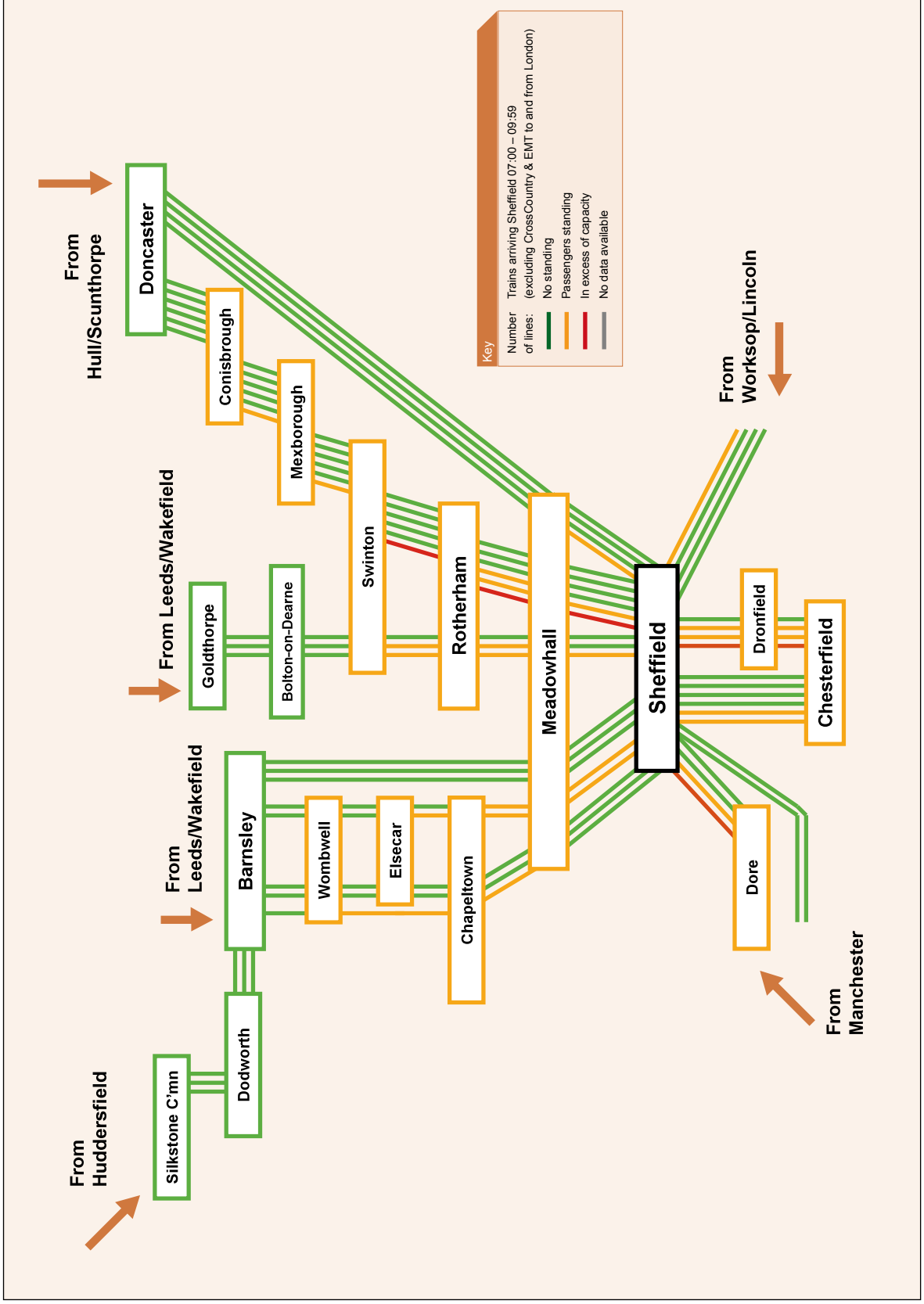
On the Barnsley line there are more passengers travelling than seats available on all trains that arrive during the high peak hour.

3.2.3 Long distance travel – cross-Pennine and other regional links

The north and south cross-Pennine routes form the main east – west rail arteries in the north of England, linking the main city regions west of the Pennines, namely Liverpool and Manchester, with Leeds, Sheffield, Huddersfield, York, Hull, Cleethorpes and the North East. It is estimated that around 14.8 million passengers used these routes to travel to, from or within the Yorkshire and Humber region in 2007/08, which is 23 percent of all rail travel in the RUS area. The data from section 3.2.1 shows that 7.1 million of these trips were to or from the Yorkshire and Humber region.

3 The impact of committed service changes by this operator has been included in the development of options to reduce on-train crowding

Figure 3.5 – Estimated 2007/08 passenger loadings for local and cross-Pennine services during the three-hour Sheffield am peak



Source: TOC and SYPTE passenger counts

Figure 3.6 below illustrates the cross-Pennine route, the other key inter-regional rail links in the north of England, and the approximate train frequency per hour for each.

The core section of the north cross-Pennine route between Leeds and Manchester has a frequency of four trains per hour and a typical journey time of around 50 minutes. Stakeholders have recognised the strategic importance of this route, particularly the Leeds – Manchester flow. The Government White Paper[4] has targeted an improvement in this journey time as a priority for investment, and other industry stakeholders have advocated the need for additional services as there is evidence to suggest that some off-peak trains are loading at or beyond seating capacity.

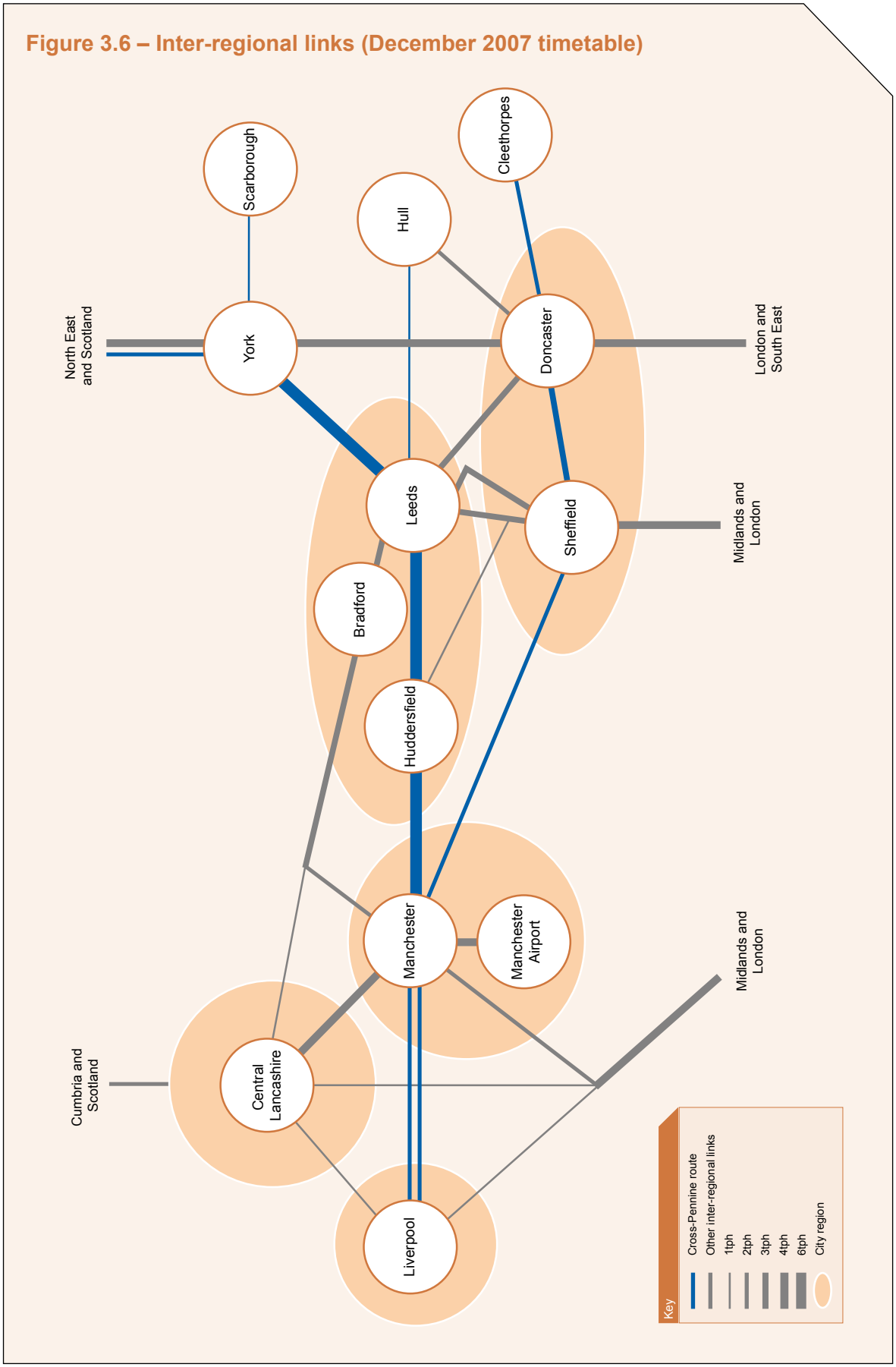
The alternative route between Leeds and Manchester via the Calder Valley is generally viewed as inferior to the north cross-Pennine route, as the Leeds – Manchester journey times are typically around one hour and 35 minutes, and the frequency is only three trains per hour.

The south cross-Pennine route between Manchester and Sheffield is also a priority for stakeholders as the current frequency of around five trains every two hours is lower than for similarly sized conurbations elsewhere in the north of England.

A new regional link was introduced at the December 2008 timetable change in the form of an hourly semi-fast service between Nottingham and Leeds via Sheffield, significantly augmenting existing connectivity with the East Midlands. However, links through the RUS area from the East Midlands to the North West remain relatively restricted, consisting only of the hourly Norwich – Liverpool service plus interchange opportunities at Sheffield. From December 2008 there have been no direct links between West Yorkshire and the Thames Valley, nor between the whole of the region and Birmingham International (for the National Exhibition Centre and Birmingham International Airport) and the South Coast.

4 "Delivering a Sustainable Railway," Department for Transport, July 2007

Figure 3.6 – Inter-regional links (December 2007 timetable)



3.3 Freight market profile

3.3.1 Overview

Within the UK, rail's market share has been growing year on year, up from 10 percent to 12 percent of total freight tonne kilometres (weight of freight multiplied by distance carried) in the 10 years following privatisation. Some of the busiest freight corridors in the UK are to be found within the Yorkshire and Humber area, particularly on the south bank of the Humber and the area represents a key element in the UK rail network for the movement of bulk freight.

A strategy for accommodating the forecast freight traffic across the national network was set out in the Freight RUS, published in March 2007. The Freight RUS also highlighted a number of 'gaps' specific to the Yorkshire and Humber RUS area, which are dealt with in **Chapter 5**.

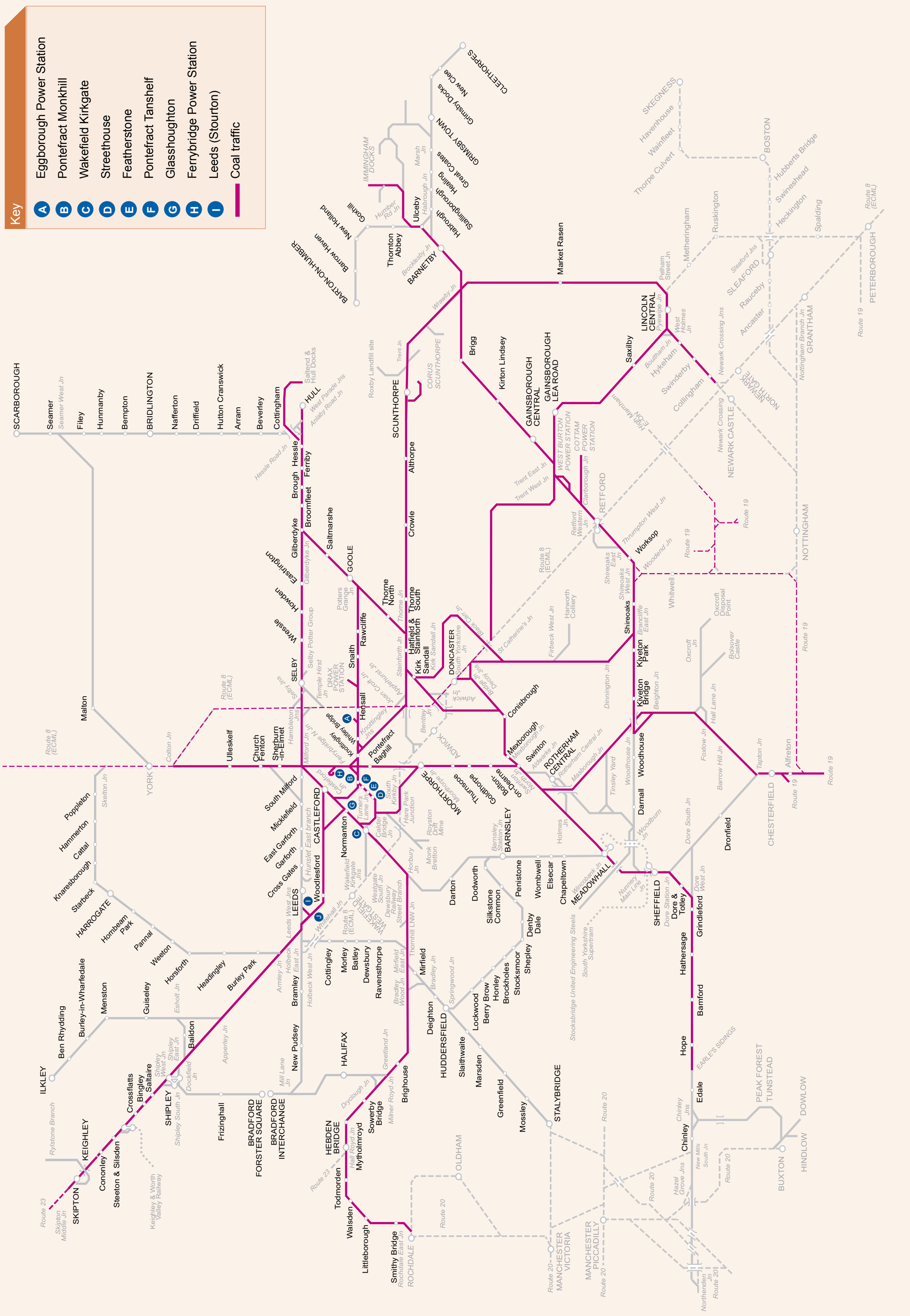
3.3.2 Freight markets

The main markets within the RUS area are described below.

Electricity Supply Industry (ESI) coal

Coal remains the dominant fuel used for generating electricity in the UK. With the tendency towards increases in gas and oil prices, and the time required to build nuclear power stations, in combination with biomass, it looks set to remain competitive for much of the RUS period. ESI coal flows constitute a significant proportion of the freight carried in the RUS area. The largest are from ports (especially Immingham and Hunterston) and from Scottish open cast sites (in Ayrshire and Fife) to the power stations at Drax, Eggborough and Ferrybridge in Yorkshire, and Cottam and West Burton in the lower Trent Valley. There is also a significant coal flow entering the area via Tyne Dock. Coal also passes through the RUS area for Ratcliffe power station near Nottingham. The flows are shown in Figure 3.7.

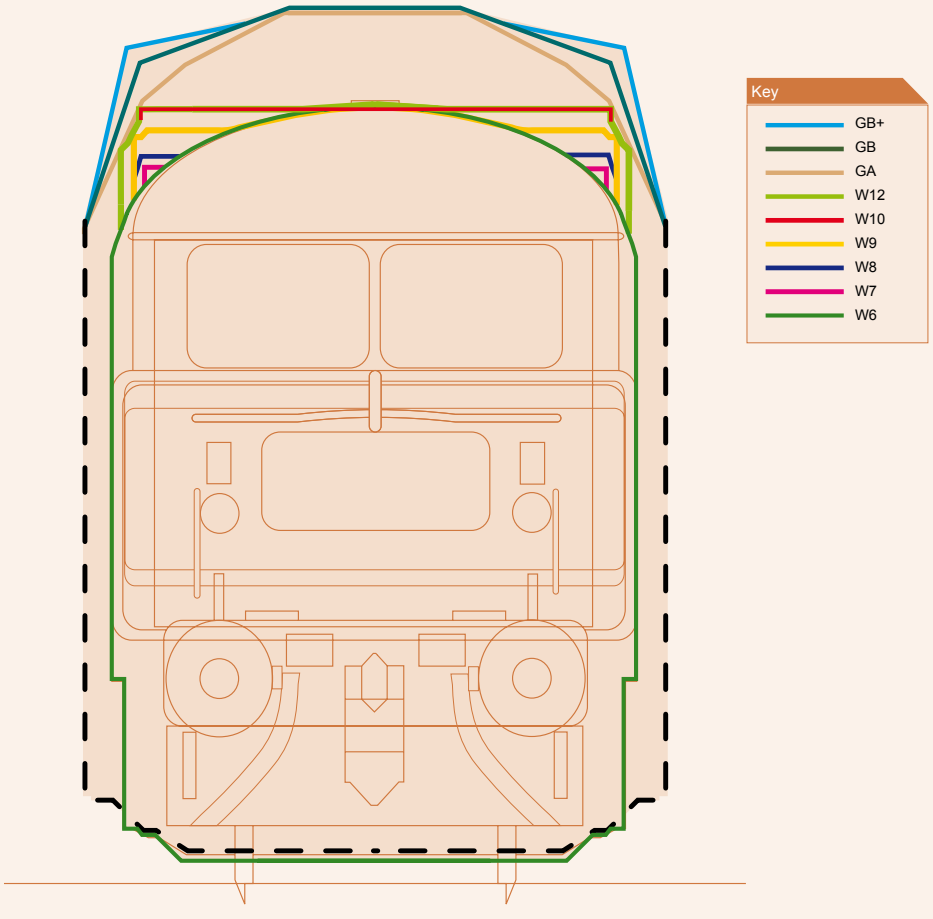
Figure 3.7 – Coal traffic



Intermodal

The total volume of container traffic in the UK is increasing and rail is increasing its modal share of this market. Deep sea containers are carried from Felixstowe, Southampton and Tilbury to terminals in Yorkshire. Deep sea containers are also conveyed through the RUS area from Southampton to Wilton (near Middlesbrough). Smaller flows of containers originate within the RUS area from Immingham. There are also a smaller number of services for European intermodal traffic, such as flows via the Channel Tunnel to Wakefield Europort. The type of containers that can be carried depends on the loading gauge of the overall end-to-end route. Some parts of the RUS area (together with the ECML) are currently W9 gauge cleared, allowing the European traffic described above to be carried. Many other routes within the RUS area are cleared to W8, allowing 8" 6" high containers to be carried on standard deck height wagons. 9" 6" high deep sea containers are increasingly favoured by shipping companies, with the percentage arriving in the UK growing significantly in recent years. Due to restricted loading gauge of less than W10, these larger containers can only be carried on special wagons, which can limit the weight of the containers, and either have small wheels and consequent high maintenance costs, or are much longer than the containers themselves, thereby using maximum train length inefficiently. The various gauge profiles are shown in Figure 3.8. The intermodal routes are shown in Figure 3.9.

Figure 3.8 – Loading gauge envelopes



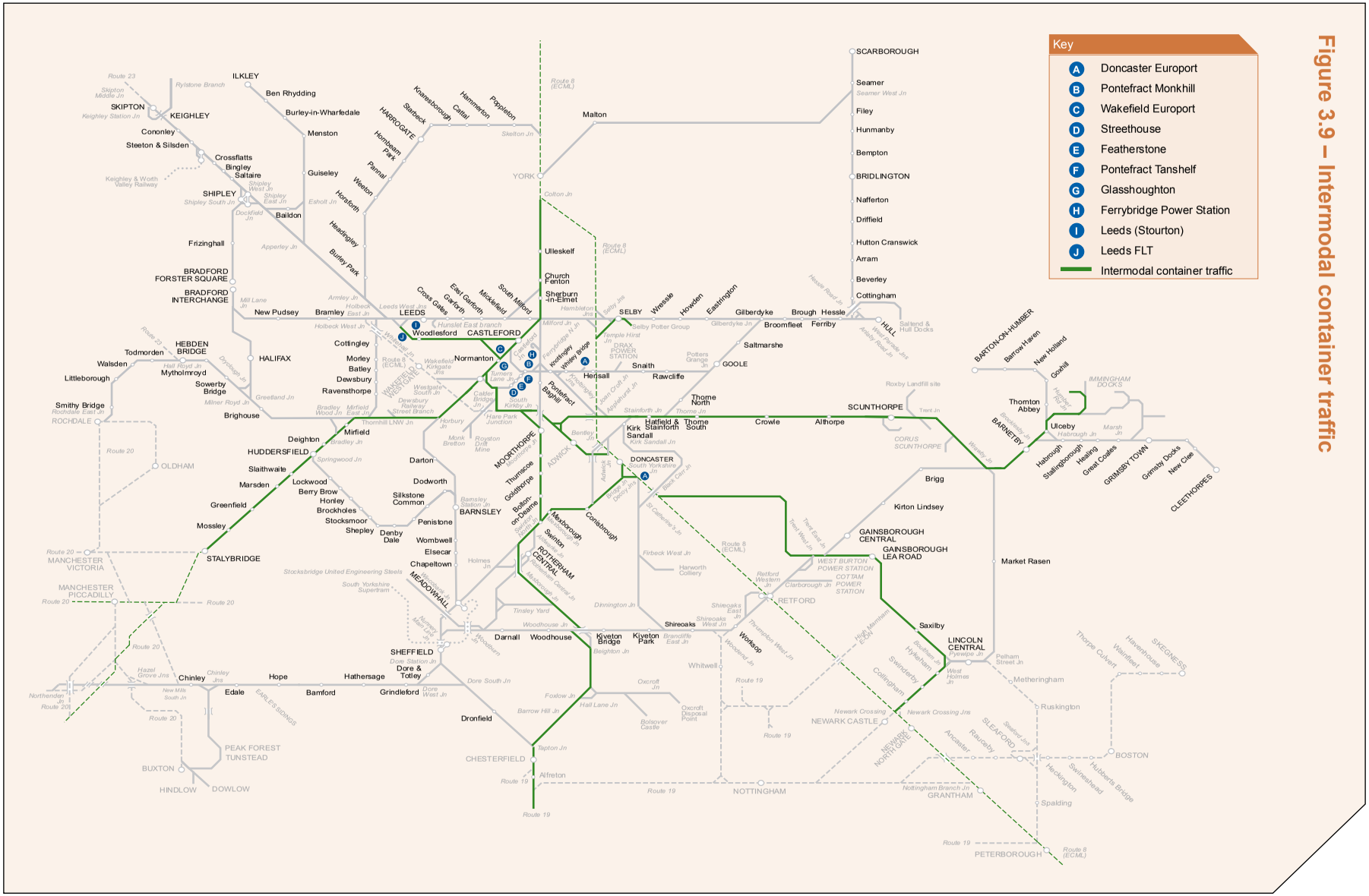


Figure 3.9 – Intermodal container traffic

Figure 3.10 – Construction and aggregates traffic

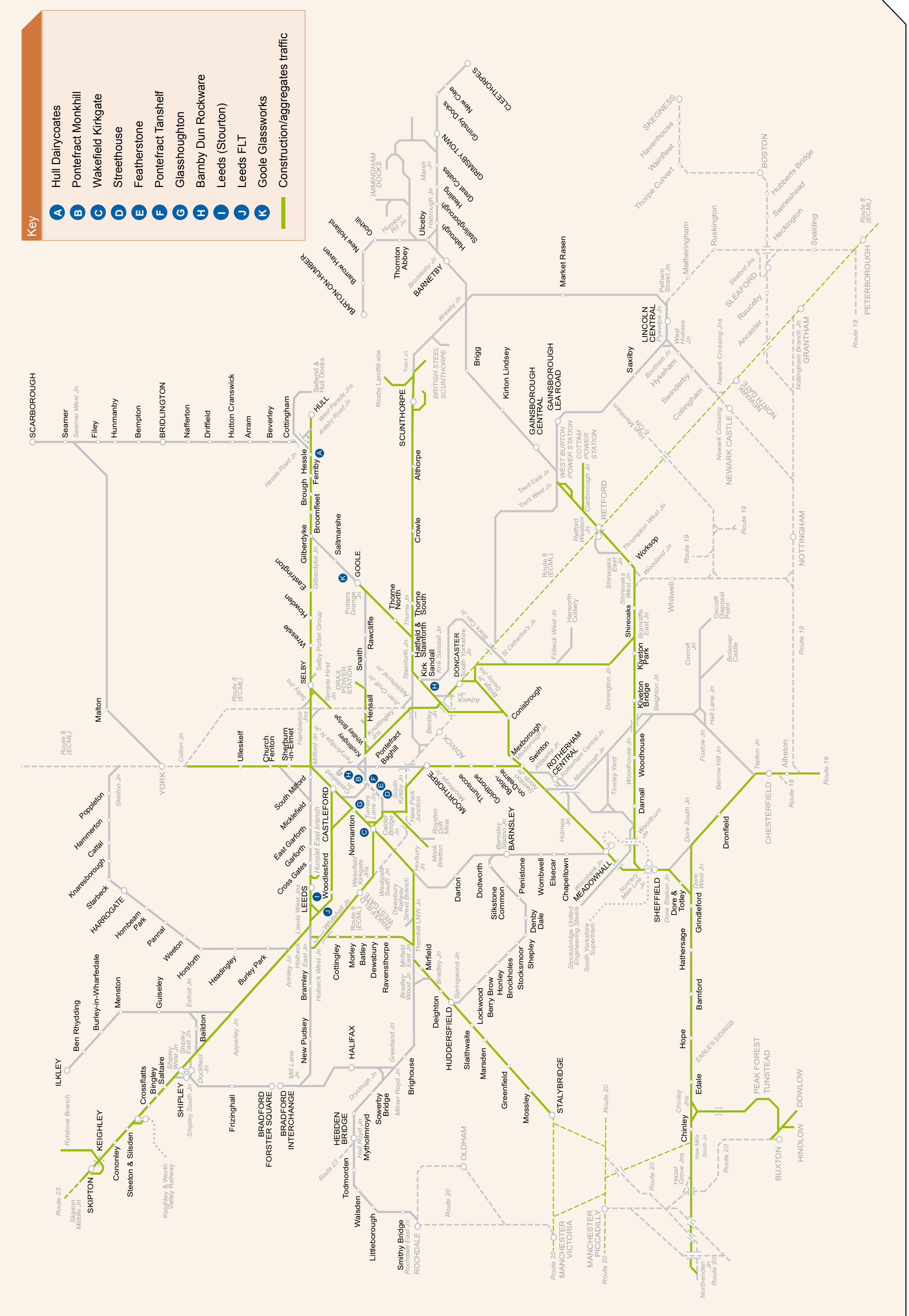
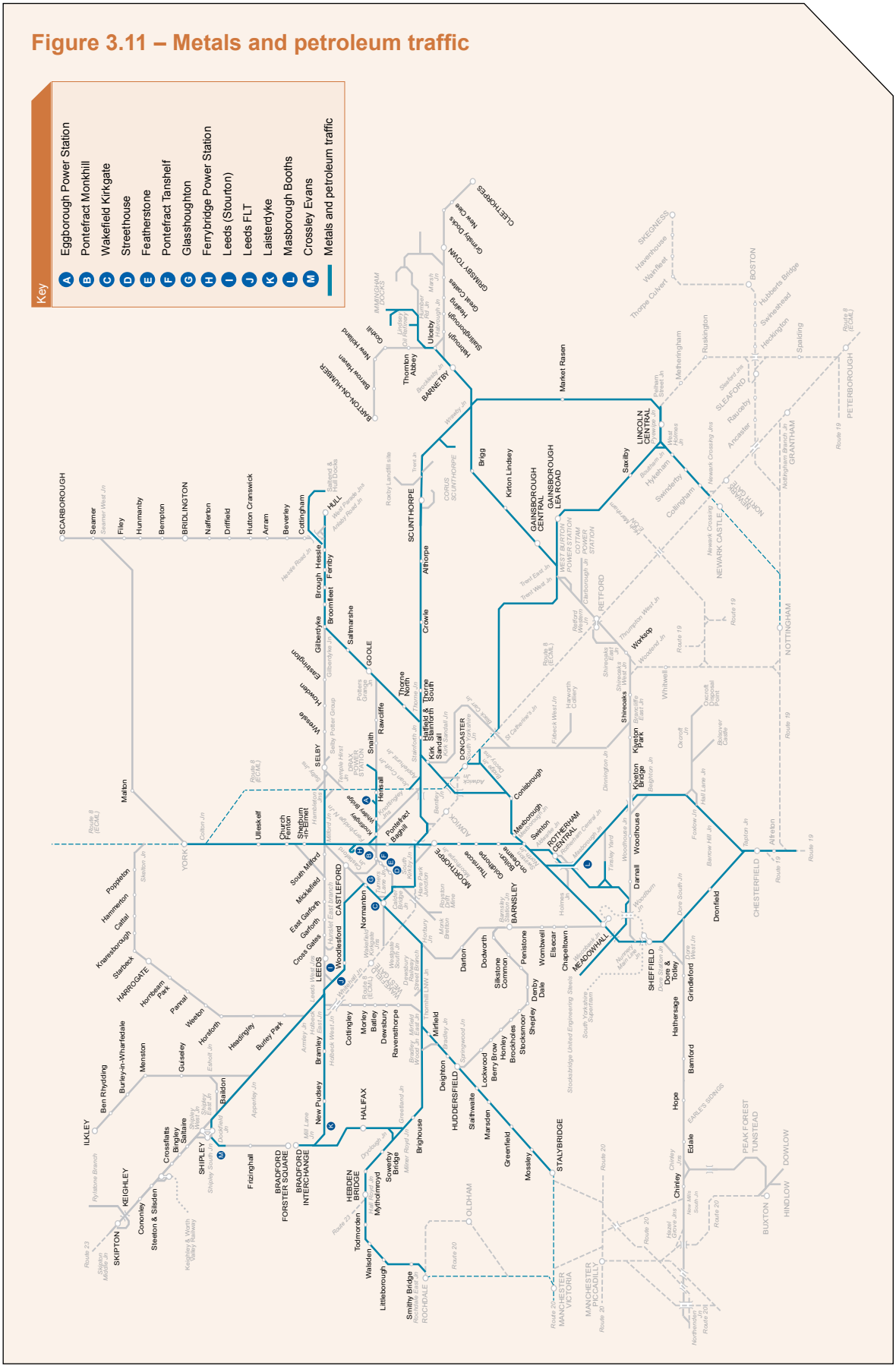


Figure 3.11 – Metals and petroleum traffic



Construction

There are a number of aggregate services that spend at least part of their journey within the RUS area, including services from Tunstead, Peak Forest, Dowlow and Hindlow to a range of destinations – many of them in the North West, but also including Leeds, Selby and south east England. There are also flows from Rylstone to terminals in the RUS area at Leeds Hunslet, Hull Dairycoates and Dewsbury. Significant flows of sand traffic pass from Middleton Towers to Barnby Dun, Monk Bretton and Goole. Domestic waste is conveyed from Manchester to Roxby Gullet. The construction routes are shown in the map in Figure 3.10.

Metals and petroleum

Metals flows are significant in the area with both imported ore and finished steel traffic on south Humberside, further steel activity in South Yorkshire and through traffic to/ from Teesside. Petroleum flows account for relatively lower volumes, with 10 – 12 loaded trains per day originating in the Humber area. There are also growing scrap metal flows in and through the area to and from a number of terminals. The metals and petroleum routes are shown in Figure 3.11.

Other traffic

Automotive, network services (wagonload traffic), premium logistics and power station waste all generate smaller flows. Network Rail's own engineering trains also run along the routes in the RUS area to support infrastructure maintenance, renewal and enhancement activities.

3.3.3 Current freight demand in the Yorkshire and Humber RUS area

Figure 3.12 shows current freight usage of key sections of the route. The data covers the base year of the Freight RUS of 2004/05 and some updated data to reflect 2007 demand. All data is for trains per day in one direction. It can be seen that the heaviest freight flows are around Immingham, although there is a significant level of use over much of the RUS area.

Figure 3.13 shows the active freight terminals in the area – these are detailed in **Appendix 1**.

Freight services require more reserved paths in the Working Timetable (WTT) than are actually used, to permit operational flexibility. For most freight market sectors, unlike passenger services, if there is no demand for the freight service it does not run.

Figure 3.12 – Current freight trains per day on sections of the network

Source: Network Rail Freight RUS

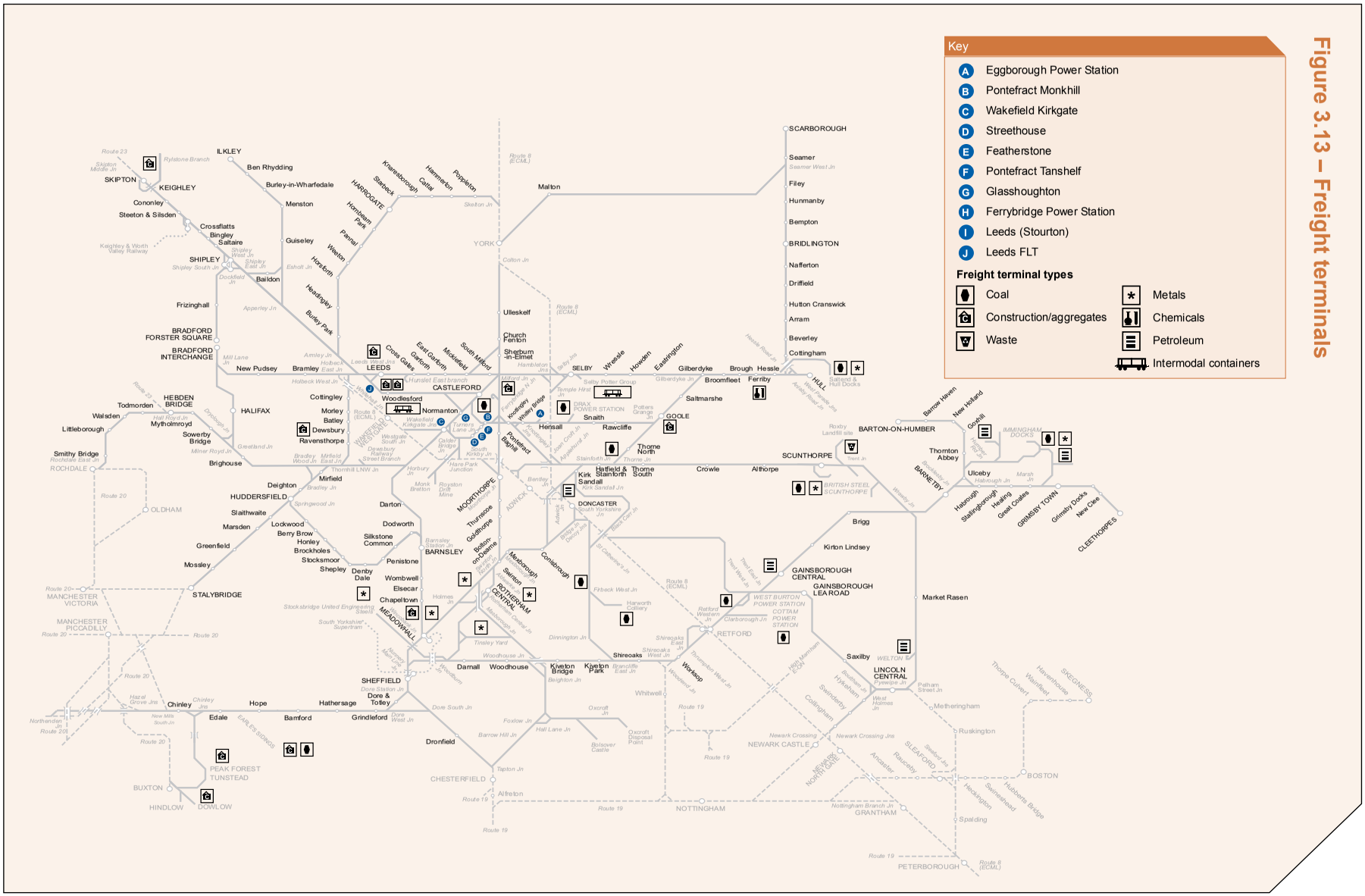


Figure 3.13 – Freight terminals

The Freight RUS contains a national analysis of path utilisation and an explanation of the key factors in each market sector.

The Freight Operating Companies (FOCs) are engaged in a number of initiatives to improve path take-up and efficiency of operations. DB Schenker has developed the concept of the "Big Freight Railway", the purpose being to maximise use of each path on the network. The key focus is on running trains which are longer, heavier and potentially in some cases bigger (both in width and height).

3.4 Yorkshire and Humber rail network

The principal infrastructure and rolling stock characteristics that have been analysed to establish the current route capacity and capability are:

- planning headways
- linespeeds
- junction speeds
- electrification
- loop lengths
- rolling stock types
- platform lengths
- station facilities
- car parking
- integration with other public transport modes
- rolling stock depots and stabling
- loading gauge
- route availability.

3.4.1 Planning headways

The planning headway is a measure of how closely (in time) one train can be timetabled to follow another. Within the RUS area, headways vary from 2.5 minutes on the western approaches to Leeds station, to 8.5 minutes beyond Skipton, and even more on some single line sections. Most notable of the single lines are that between Bridlington and Seamer, the section between Grimsby Town and Cleethorpes, the Harrogate line between Poppleton and Knaresborough, the Penistone line between Barnsley and Huddersfield, the "freight only" South Yorkshire Joint Line (between St. Catherine's Jn and Dinnington Jn) and the section between Dore Station Jn and Dore West Jn. Single lines restrict the number of services that can run and are generally a performance risk. Figure 3.14 shows the sections of single line.

There are a number of lines where the headways vary along the route. In some cases, this suits the service pattern and rolling stock type. However, in others, it can limit capacity, reducing the ability to change the timetable, recover from perturbation, and use as a diversionary route. This is the case along the Calder Valley. Figure 3.14 shows the planning headways across the RUS area.

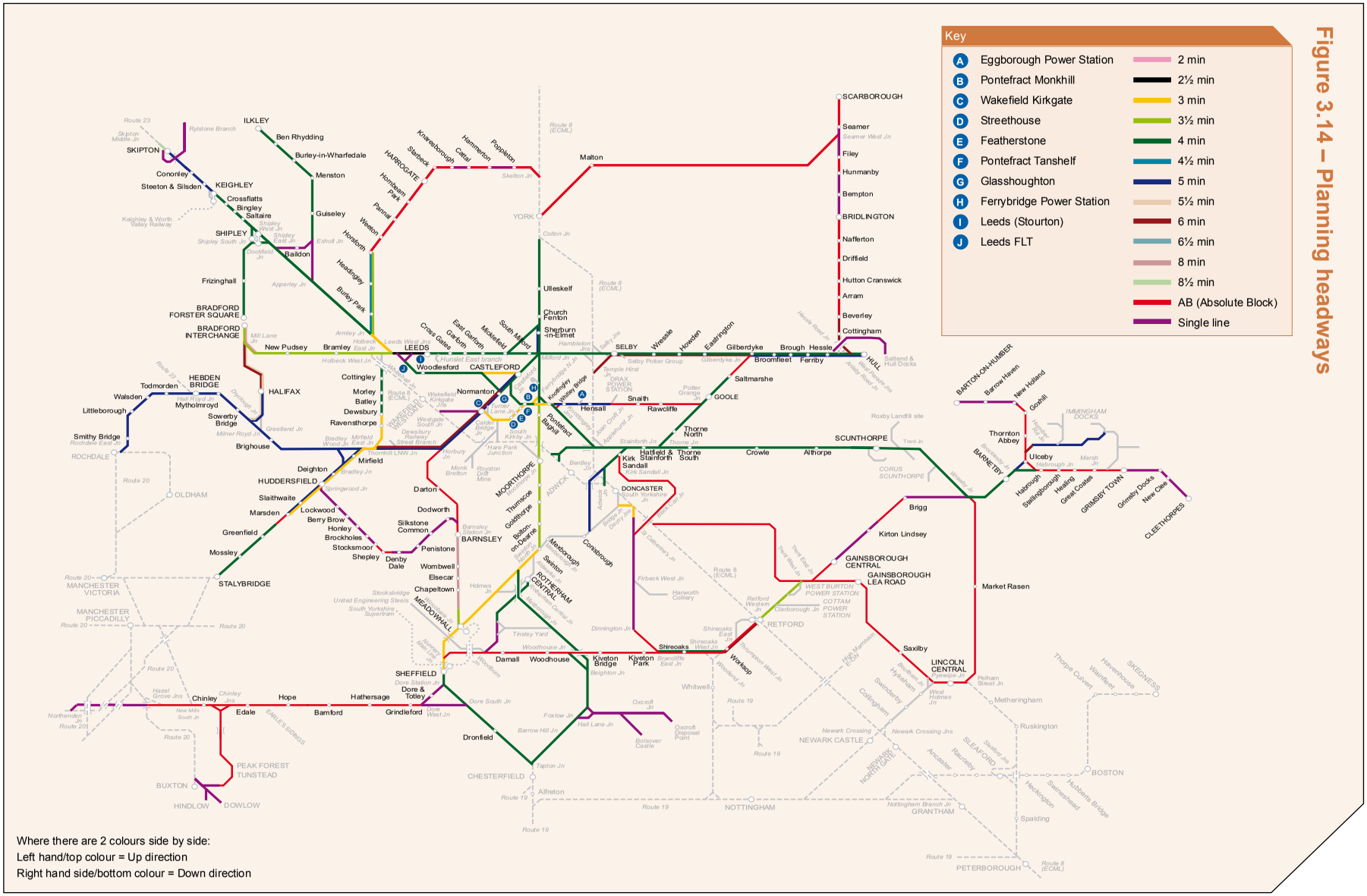


Figure 3.14 – Planning headways

The data was collated from Rules of the Plan and produced by Network Rail for the Yorkshire and Humber Route Utilisation Strategy

3.4.2 Linespeeds

The prevailing linespeed on most route sections is between 50mph and 75mph. All of the passenger rolling stock, however, is capable of at least 75mph, with the electric units and the interurban diesel units capable of 90mph and above. There are a number of routes along which the linespeed varies. This can be inefficient in terms of capacity and journey time, depending on unit types and stopping patterns. This is especially true for the interurban services, which do not stop as regularly as local services. Notable sections where higher linespeeds could result in significant journey time savings include the Calder Valley line and the route from Sheffield to Grimsby via Doncaster, although in the latter case the ability to achieve faster paths would be dependent on the overall traffic mix.

Freight traffic can be constrained by differential linespeeds throughout the RUS area. There are a number of route sections where freight trains have to operate at substantially lower speeds than their passenger counterparts. Equally, there are a number of specific structures in the RUS area which necessitate a specific reduction in speed for some freight traffic.

3.4.3 Junction turnouts

Many of the junction turnout speeds are 30mph or lower. Deceleration from linespeed and subsequent acceleration back to linespeed after crossing a junction costs time and capacity. In some cases, the requirement for approach control signalling impact on journey time and decreases capacity further. Capacity is also constrained by “single lead junctions” (where parallel movements between trains on and off the diverging route are not possible), which cause performance problems. For freight trains in particular, the time taken to decelerate and return to full speed can be significant, with resultant impact on line capacity as well as on fuel consumption. With the trend towards longer and heavier freight trains, the impact is likely to increase.

3.4.4 Electrification

There is relatively limited electrification within the RUS area when compared with other conurbations such as Strathclyde or the West Midlands. Through the middle of the area runs the electrified ECML, with the associated electrified route connecting Doncaster to Leeds. Additionally, the Airedale and Wharfedale routes from Leeds to Bradford Forster Square, Ilkley and Skipton provide a compact local electrified network. There are almost no electrified diversionary options available. The relatively small electrified route mileage means that there are currently few economies of scale for the electric train fleet. For freight trains, the lack of electrification on relatively short sections of secondary routes and at terminals means that often the only economic option is for trains to be diesel hauled for many miles over electrified routes.

3.4.5 Rolling stock types

Passenger services are operated by a wide variety of rolling stock. The majority of fast cross-Pennine services are formed of high acceleration Class 185 units with Class 170s working the remainder. Most local and other regional services are operated by various types of Sprinter rolling stock (Classes 150, 153, 155, 156 and 158) and Pacers (142 and 144) whilst electric local services are operated by Class 333s and a few Class 321s. Long distance services to/from London are operated by Class 91 electric locomotives and mark IV coaches, High Speed Trains (Class 43 diesels), and Classes 180 and 222 diesel trains. Most services through the area connecting the North East and Scotland with the Midlands and South West are operated by Classes 220 and 221, with the remainder using High Speed Trains.

Most freight services are operated by Class 66 diesels though some of the heaviest trains use Class 60s.

3.4.6 Loop lengths

None of the loops in this area is long enough to take the longest 775-metre freight trains. Where there are substantial lengths of mixed use double track, either without loops or with only loops of limited length, the inability for passenger trains to pass slower long freight services is both a constraint on capacity and adversely affects performance. This is most acute on the north and south cross-Pennine routes, where limited stop interurban services share the route with substantial freight and, in some places, stopping passenger operations. Other examples are Doncaster – Brocklesby, Doncaster – Hare Park Jn, Gascoigne Wood – Hull and Rotherham – Doncaster/Moorthorpe.

A number of loops are sometimes used to allow faster passenger or freight trains to pass stopping services during perturbation. Often these are located as a result of historic traffic flows and hence may not be ideally suited to the requirements of today's service patterns. An example is at Diggle where the loop does not have the right signalling arrangements to allow it to be used by passenger trains.

As with junction turnouts, the absence of optimal signalling arrangements can have an adverse impact, particularly for entry to loops. If, for example, a train is forced to reduce speed to take account of an "approach controlled" signal before entering a loop, inevitably this increases the time take to clear the main line.

3.4.7 Platform lengths

Apart from major stations such as Leeds and Sheffield, platforms across the RUS area are largely a mixture of two-, three-, and four-car lengths. In some cases platform lengths vary along a line of route, which means either the train length is constrained by the shortest platform, or stopping patterns have to vary according to train length. Often the shortest platforms are on the periphery of the RUS area (for example, some smaller stations on the Cleethorpes to Barton-on-Humber route cannot fully accommodate all types of modern two-car train).

A particular issue exists on some routes in South and West Yorkshire where increasing demand gives rise to a need for trains of at least four-car length but many stations are of a lesser size. The present rolling stock fleet does not generally provide for selective door opening, which can sometimes provide an alternative to platform lengthening at the more lightly used stations.

3.4.8 Station facilities

Large, busy stations such as Leeds and Sheffield have a comprehensive range of passenger amenities. Those at medium and small stations are more variable. For example, Wakefield Kirkgate is very limited in terms of passenger facilities, despite its city centre location. There are many small, relatively lightly used stations in suburban and rural areas which are unstaffed and as a result offer only basic waiting and information facilities.

3.4.9 Low footfall stations

There are several stations within the RUS area which have been identified as having particularly low levels of usage, as shown in the table below. The "Trips per Day" figure is based on the number of days on which the station is served by trains. Thus for example, Brigg scores relatively high as it is served only one day per week (Saturday) whereas Arram is considerably lower due to the fact that it has a train service every day except winter Sundays.

Table 3.1 – Low usage stations

Station	Entries/exits per year	Trips per day
Kirton Lindsey	168	3
Hensall	327	1
New Clee	336	1
Brigg	665	13
Wressle	691	2
Rawcliffe	802	3
Thornton Abbey	807	2
Eastrington	1436	5
Whitley Bridge	1753	6
Broomfleet	2236	7
Arram	2420	7
Snaith	2825	9
Barrow Haven	3121	9

Source: Office of Rail Regulation (ORR) 'Station Usage 2006/07'

Table 3.1 above shows the 12 most lightly used stations within the scope of this RUS. Most serve rural areas where other public transport is not readily available and where closure would result in a loss of mobility for users who do not have access to their own transport.

Brigg and Kirton Lindsey are served only on Saturdays to meet shopping and leisure travel needs. Whilst the line on which they are situated has recently been upgraded and its opening hours extended, it is expected most capacity will be taken up by freight traffic for which the upgrade was carried out.

Hensall, Whitley Bridge and Snaith are served at a very basic level to provide a commuting opportunity to Pontefract and Leeds which would not easily be met by other public transport.

At the other stations, the service level varies according to demand in the area and the ability to serve the station economically, but in all cases is provided by a local stopping service where minimal gain in terms of journey time, resource utilisation or performance would be achieved if the stop were eliminated. New Clee is unusual in that it is situated in an urban area and operates as a request stop during daylight hours only. This is due to limited lighting provision and there is no business case to improve it as very few people use the station.

Given the role of most of these stations in maintaining a public transport presence in isolated areas no action is proposed at the present time to reduce services or to progress closure. This approach will be reviewed in the event major maintenance or renewal becomes necessary, or if the continued existence of the station is identified as having a significant adverse performance or capacity impact.

3.4.10 Car parking

Most stations within the RUS area provide at least a small number of car parking spaces with substantial provision at larger locations such as Sheffield. Generally, non-provision is restricted to small urban stations where realistically most passengers would arrive on foot, and without costly land purchase there is no space where parking could be created.

A significant number of stations within the Passenger Transport Executive (PTE) areas offer free parking as an incentive to the use of public transport, but elsewhere charges are generally made. Whilst comprehensive survey information does not exist, there is a general perception that at stations with a frequent train service and good highway access, car parks fill early. As such, it is likely that demand for off-peak travel is currently constrained by limitations in car park capacity, although in some cases suitable alternative parking may be available beyond the immediate station area. Passenger Focus has conducted a study to support the analysis of car parking in the RUS and the issues that were identified by this study are discussed in **Chapter 5**.

3.4.11 Integration with other public transport modes

There are a number of locations where the railway intersects or runs close to other modes of public transport. In the Sheffield area, interchange with the Supertram system is especially important, as this network gives easy access to multiple destinations in and around the city. There are two main locations where Supertram interacts most closely with the rail network, namely at Sheffield and at Meadowhall, where stops are located immediately adjacent to the main line stations.

At Sheffield, Meadowhall, Barnsley and Doncaster, high quality rail/bus interchanges are available, with comprehensive facilities provided by SYPTE. Research in South Yorkshire indicates that 20 to 25 percent of rail users use the bus at one or both ends of their rail trip, even at local stations.

There is a similar WYPTE interchange at Bradford Interchange.

Many more minor rail/bus interfaces exist around the RUS area, including that at Barton-on-Humber, allowing rail passengers from the south bank of the Humber to access buses to travel over the Humber Bridge into Hull. A scheme is being developed by East Riding of Yorkshire Council for an improved rail/bus interchange at Cottingham.

3.4.12 Rolling stock depots and stabling

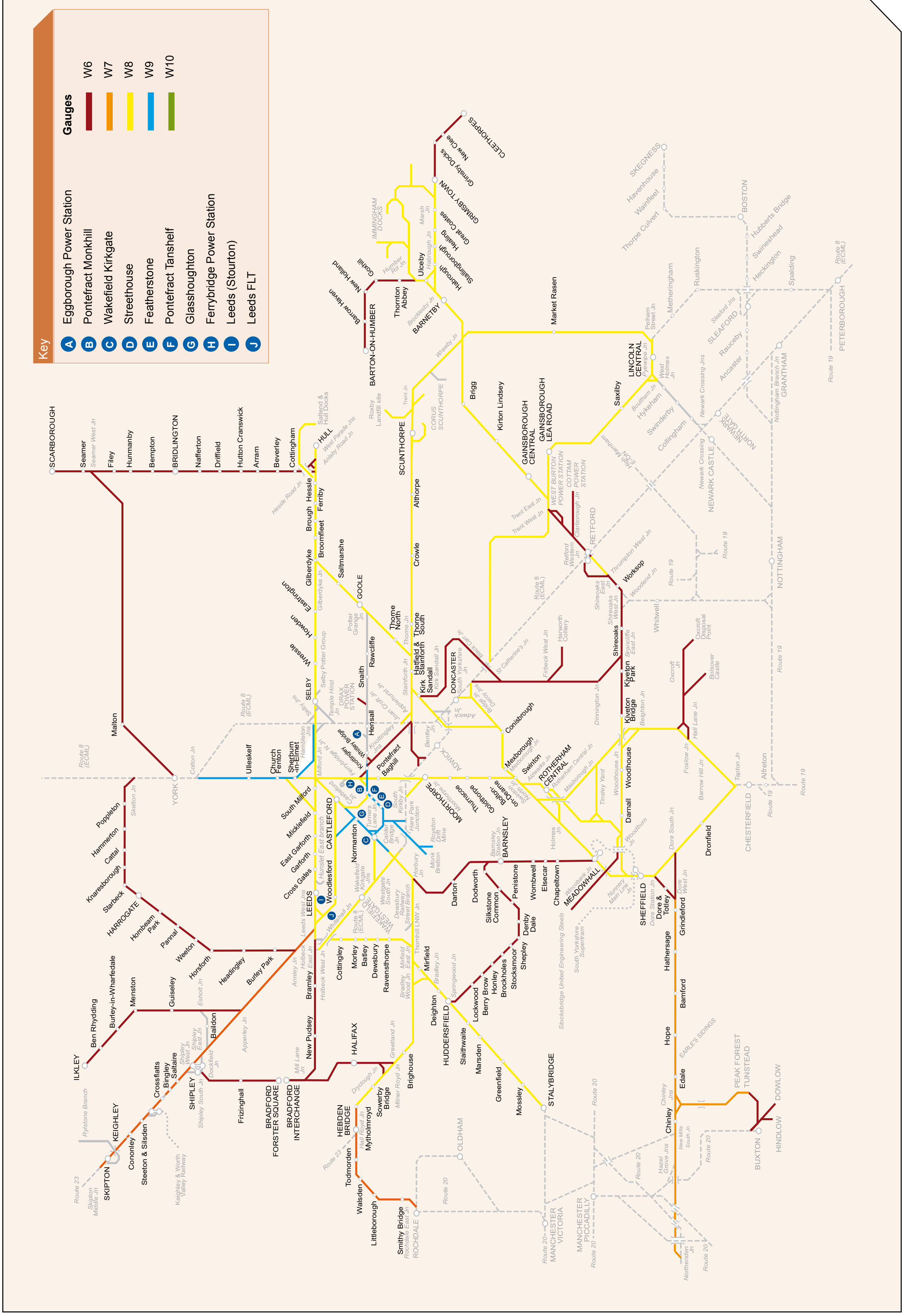
Northern Rail has rolling stock depots at Hull Botanic Gardens, Leeds (Holbeck), Leeds (Neville Hill), Sheffield and Skipton whilst TPE has depots at Cleethorpes and York. Additionally, there is overnight stabling of rolling stock in stations at Bridlington, Doncaster, Cleethorpes, Ilkley, Harrogate, Huddersfield, Hull, Leeds, Lincoln, Scarborough and York.

Neville Hill also has a depot operated by East Midlands Trains, which provides facilities for several long distance high speed operators in the area.

Crofton Depot, operated by Bombardier Transportation, provides facilities for Hull Trains, TPE and CrossCountry and is currently at capacity.

There are other important depots outside the RUS area which are used by services operating within it, for example Ardwick and Newton Heath (Manchester) and Central Rivers (Burton-on-Trent).

Figure 3.15 – Loading gauge



The data was collated from the Route Maps and produced by Network Rail for the Yorkshire and Humber Route Utilisation Strategy process

The major capability and capacity limitations within the existing facilities are described below:

- Rail access to and egress from Neville Hill depot is inflexible, which can cause performance delays on the main line if there are problems at the depot. Development work is progressing on a potential scheme to provide an additional access to the depot from the Leeds direction, an additional loop facility, and the electrification of further lines within the depot
- Most Northern Rail depots and stabling points are either at or close to capacity, which raises a significant issue given that the Department for Transport (DfT) Rolling Stock Plan indicates that the fleet will increase by well over 100 vehicles by 2014. It appears that it will be essential to concentrate maintenance activity at Neville Hill and Newton Heath (Manchester), thereby increasing the need for stabling and servicing at other locations.

A strategic solution to the future provision of adequate depot and stabling facilities is a network-wide issue and will therefore be considered as part of the Network RUS.

3.4.13 Loading gauge

Loading gauge is the profile for a particular route within which all vehicles or loads must remain such that sufficient clearance is available at all structures. In the UK, it typically ranges from W6 (the most restrictive) to W12 (the most generous). See Figure 3.15.

In the RUS area, gauge ranges from W6 to W9, but is predominantly W8 or below. As can be seen in Figure 3.15 in the small area where W9 is available, for the most part clearance exists on only one route. Consequently, if this route is unavailable, alternative options for W9 traffic are not readily available. The current pattern of gauge across the RUS area is a constraint on freight use. The absence of W10 gauge (which would allow 9" 6" containers to be conveyed on standard-height wagons) is a serious limitation on rail's attractiveness in the intermodal container market. Even the primary east – west route across the Pennines is restricted to W8 traffic.

The mixture of gauges means diversionary routes can often be long and circuitous, or trains have to be cancelled when the main route is unavailable. For example, whilst the route across the Pennines via Huddersfield and Stalybridge is cleared for W8 traffic, the other two routes (Calder Valley and Hope Valley) are only cleared for W7 traffic.

3.4.14 Route Availability

The Route Availability (RA) of a specific route is determined by the carrying capability of both its structures and its track. Most of the RUS area is RA7 – RA9, although the line between Hull and Seamer via Bridlington is of lower Route Availability at RA6. However, traffic up to RA10 operates over specified sections of the routes subject to certain speed restrictions. Each such train that exceeds the RA of the route requires special permission to run, and cannot be diverted from that specified route without additional authorisation, which reduces flexibility during perturbation.

3.5 Use of the network

3.5.1 Route utilisation and congestion

Route capacity is limited by a combination of a number of infrastructure features:

- plain line, where faster trains will catch up with slower trains
- junctions, where conflicting moves limit capacity
- station platforms, where the next train cannot arrive until the previous one has departed.

Key constraints in the RUS area are described in section 3.5.3, whilst the detailed analysis appears in **Appendix 3** on the Network Rail website (**www.networkrail.co.uk**).

3.5.2 Performance

Performance is known to correlate with capacity utilisation and also a number of key factors such as restrictive layouts, single lines and short train turnaround times, the specifics of which are discussed in the next section in respect of each of the main corridors in the RUS area.

A major influence beyond the immediate RUS area is the "Manchester Hub", which, due to its complex connectivity between routes, means that delays can have far-reaching and persistent effects over a wide area. Key hot-spots within the hub are Salford Crescent, Manchester Piccadilly and Manchester Victoria, due to the high capacity utilisation and the number of conflicting moves.

Similarly, Nottingham station has an influence on performance in the RUS area because of the impact on the Norwich – Liverpool service and the new Nottingham – Leeds service.

The Train Operating Companies, with support from Network Rail, continuously strive to optimise their performance within the constraints of the route. The (franchise-wide) Public Performance Measure (PPM) for TPE improved from 87.53 percent in 2005/06 to 89.37 percent in 2006/07. The equivalent figures for Northern Rail are 86.46 percent in 2005/06 and 87.30 percent in 2006/07.

From the start of Control Period 4, the FOCs will be the subject of a Freight Performance Measure (FPM) that will provide quantifiable data equivalent to the Public Performance Measure applicable to passenger operators.

Analysis has been undertaken to identify those locations that suffer performance problems caused by "RUS issues", ie. those issues that cannot easily be dealt with through established industry processes.

Reactionary delays were used as the main measure of performance. Reactionary delay gives an indication of the impact that a delayed train has on other services due to it not running in its timetabled path. This often leads to other trains also not running on time. Reactionary delays thus provide a measure of timetable and infrastructure resilience. In particular, reactionary delay figures indicate how accommodating the timetable and infrastructure are of any unplanned disruptive events, and how quickly the timetable can recover once the root cause of the individual disruptive event has been resolved.
A more detailed methodology (**Appendix 3**) appears on the Network Rail website (**www.networkrail.co.uk**). Since the draft for consultation further analysis has been undertaken on performance and the route causes of the reactionary delay, as well as the total amount of reactionary delay at locations split by initial cause. The worst five locations identified are Leeds, Sheffield, Doncaster, Shipley and Huddersfield.

The geography of the railway in the Yorkshire and Humber RUS area is such that services from almost all of the area start/terminate or pass through the hubs at Leeds or Sheffield or Doncaster. Due to the congested nature of these hubs, services interact in such a way that a delayed train from one area can cause delays to trains going to other areas, and hence cause additional reactionary delay. This effect is accentuated by the surrounding busy flat junctions, which increase the likelihood of delay from one corridor impacting on services on other corridors. Notable among these junctions are Whitehall Jn (Leeds), Sheffield and Swinton. Also identified as a major source of reactionary delay is Rochdale, but this is centred on the fact that Oldham Loop trains are regarded as terminating there before starting their forward journey.

Sheffield station undoubtedly suffers from a track and signalling layout originally designed at a time when train operating patterns were significantly different, and is handicapped by the fact that not all through platforms are fully bidirectional.

There are a number of single lines that can accentuate reactionary delay due to the difficulty in regulating trains on and around them. Notable among these is the section

between Dore Station Jn and Dore West Jn with very substantial reactionary delays recorded. Similarly Shipley station with its complex junctions serving a number of different routes suggests that any existing delays will be magnified at this location because of the number of potential conflicting moves. At a somewhat lesser level is the line serving Rotherham Central, with its single track pinch-point between Holmes Jn and Rotherham Central Jn. At a number of locations on the route, short turnarounds at terminal destinations allow little time to recover from earlier delays. Particular examples of this are Rochdale, and as previously mentioned, Huddersfield, although delays are significantly lower here.

3.5.3 Constraints by corridor

Airedale/Wharfedale corridor

This group of lines has experienced strong growth in recent years, but the ability to handle further expansion is limited by the existing track layout and signalling as well as limited platform lengths at a number of stations. In particular, the triangular layout at Shipley restricts scope for platform lengthening at reasonable cost. It is also likely that further expansion of electric operation would require a significant upgrade of traction power supply.

The Airedale corridor is also significant for freight, but growth is constrained by line capacity and loading gauge.

Harrogate corridor

Services on this route are currently limited by the lengthy signalling sections between Leeds and Harrogate and the presence of single line sections on the Knaresborough – York section. In addition, train length is constrained by the four-car platform length at Knaresborough which cannot be lengthened.

Leeds – Scarborough/Hull corridor

Capacity to the east of Leeds is limited by the fact that much of the route is double track only and is required to handle a mixture of stopping and longer distance passenger trains as well as a variety of freight services. Whilst there is a small amount of four-tracking between Marsh Lane and Neville Hill depot, this is heavily used by trains proceeding to and from the depot.

Barnsley/Pontefract corridor

These lines have experienced growth in passenger and freight demand, but development has been restricted (in the case of stopping passenger services) by the need to reverse at Castleford, where there is only one usable platform. However, semi-fast Sheffield – Barnsley – Leeds services which avoid Castleford have been introduced, and further services (extending to/from Nottingham) commenced in December 2008. For freight, an increasing constraint is the fact that much of the infrastructure is limited to W8 loading gauge.

Wakefield corridor

This line is characterised by a wide variety of traffic, including local passenger trains, long distance high speed operations – serving a diverse range of origins and destinations – and various freight trains. The section between South Kirkby Jn and Hare Park Jn was identified in the Freight RUS as a particular bottleneck. Meanwhile, the track layout at Wakefield Westgate constrains performance and has a significant adverse performance impact. The present loading gauge is a constraint for freight.

Huddersfield corridor

Trains to and from Stalybridge bay platform and between Huddersfield and Manchester Victoria must cross the layout at Stalybridge at only 15mph. This reduces capacity, can affect performance and impacts on journey times. Between Stalybridge and Huddersfield, the mix of fast and slow passenger services with freight trains uses up significant capacity on this route. The lack of convenient turnback facilities for passenger trains inhibits the ability to operate short distance local services which would economically increase frequency on the busiest sections and deal with peak overcrowding. The W8 loading gauge constrains the growth of intermodal freight, whilst the characteristics of the loops at Marsden, Diggle and Stalybridge are a constraint to freight traffic in general.

Calder Valley corridor
The Calder Valley corridor serves Bradford and is used as an alternative route between Leeds and Manchester. However, journey times are significantly longer than on the route via Stalybridge, due to it being less direct, the linespeed being generally lower, and the need to reverse at Bradford Interchange. Additionally, capacity is limited by some long signalling headways, which restrict additional or diverted services. Meanwhile, the ability to run longer trains is limited by platform lengths at a number of stations.

The trains from Leeds that terminate at Manchester Victoria do so in the bay platforms. This necessitates crossing the whole layout, and can have a potentially serious impact on performance in times of perturbation.

The lack of W8 (or larger) loading gauge constrains freight and reduces the usefulness of this corridor as a freight diversionary route.

Hope Valley corridor
A characteristic of this route is increasing demand for both freight and passenger traffic. Particular constraints are currently the short section of single track through Dore & Totley station to Dore West Jn, and the fact that the rest of the route is only double track (where capacity is constrained by the difference in running times between fast and slow trains). Loading gauge is a constraint for freight, as are limitations in terms of the maximum practical train length and weight. The Absolute Block signalling on the line, with long block sections, is also a capacity limitation.

Sheffield – Doncaster/Moorthorpe corridor
Capacity is heavily in demand for both passenger and freight services on a route which is generally no more than double track and includes a large number of at-grade junctions in the short distance between Chesterfield, Sheffield and Moorthorpe/ Doncaster. A particular limitation for passenger development is the fact that trains serving Rotherham Central station must use the single track Holmes Chord. The value of the route for intermodal freight traffic is constrained by the present loading gauge of W8. Aldwarke Jn is a particular bottleneck for freight growth.

South Humber
This area is notable for the very intensive freight operation serving the port of Immingham and the Corus steelworks at Scunthorpe. The present loading gauge of W8 is a significant limitation to the development of intermodal traffic via Immingham, as is the present maximum practical length and weight of trains for freight in general. The fact that the route between Doncaster and Immingham is predominantly only double track places a limitation on capacity (though this has recently been eased by the re-opening to regular freight traffic of the Brigg line between Wrawby Jn and Gainsborough).

Penistone line
This line is predominantly single track between Barnsley and Huddersfield, with passing loops only at Penistone station and between Shepley and Stocksmoor. This constraint limits service expansion beyond the present operation. Since 2005, the line has been a Designated Line under the DfT's Community Rail Development Strategy. The line is one of the seven routes chosen for the DfT's Community Rail Development pilot projects. The pilot projects were chosen to demonstrate how the Community Rail Development approach can increase revenue, reduce operational costs and encourage greater community involvement in the local railway. Meanwhile, the line has been proposed as the trial site for tram-train operation, with a target date of 2010 for implementation.

Worksop corridor
This line largely meets currently identified needs. The present predominant loading gauge of W6 would preclude its use for intermodal freight traffic, and could pose a constraint to development of new freight flows from the former Manton Colliery site.

Chesterfield corridor

Beyond the constraints identified in relation to Hope Valley services, the development of services in this corridor is largely determined by timetabling considerations associated with a heavily-used section of mainly double track and a wide range of origins and destinations. With the introduction of the new hourly Nottingham – Leeds service in December 2008 and the possibility of an additional hourly Sheffield – London service in December 2009 use of the line is intensifying significantly with possible performance implications for the future.

Hull – Bridlington – Scarborough line

This passenger-only line largely meets currently identified needs, although aspirations have been expressed for an improved service between Bridlington and Scarborough. The single track sections north of Bridlington would limit major service expansion on that part of the route beyond a broadly hourly frequency, whilst the need to reverse at Hull or Scarborough to serve off-line destinations to the west inevitably impacts on journey time. Turnaround times for some trains at Beverley, Bridlington or Scarborough are quite short, so that any delay to an incoming service can easily affect the return working with potential wider impact, especially given the constraints of single track operation at the north end of the line. Trains of heavy axle weight are subject to a more severe speed restriction, which limits the attractiveness of the route for locomotive hauled trains such as passenger charters or freight.

Other corridors

There are a number of other lines in the RUS area, with most of these being “freight only”. Generally, there are no major issues with these, though some that are single line suffer from performance problems when trains are running out of course.

The South Yorkshire Joint Line, which is a freight-only route between St. Catherine’s Jn (Doncaster) and Brancliffe East Jn (Worksop) is largely single track, and is virtually at capacity. However, this is not thought to raise any issues as traffic levels on this line are understood to have reached a steady state and may even reduce slightly.

The Barton-on-Humber branch carries a Community Rail Designated Service from Barton-on-Humber to Cleethorpes. Since February 2007, the section of this route between Barton-on-Humber and Ulceby North Jn has been a Designated Line under the DfT’s Community Rail Development Strategy.

3.5.4 Current engineering access

A cyclical engineering access strategy for key junctions on the network was jointly developed by Railtrack, its maintenance contractors, and its customers some years ago. This strategy identified a programme of regular extended possessions which sought to deliver value for money and minimise overall disruption to train services. This possession strategy was centred on a series of large (in both geographic coverage and time span), cyclical access opportunities. The aim of this strategy was to provide the opportunity to undertake all major scheduled maintenance activity for the specific area on a regular, planned basis. This approach reduced the number of short, inefficient, but generally non-disruptive possessions. This pattern of possessions has been reviewed on an annual basis since then and the concept has gradually been extended.

A cross-industry review of the engineering access strategy is currently under way, together with evaluation of the Seven Day Railway concept. This is being led by Network Rail, and is intended to be gradually implemented, where appropriate, by 2014. Within the RUS area, the recently completed upgrade of the Brigg line should help facilitate this by allowing diversion of trains away from the Scunthorpe line. As such, the South Humberside area is one of the first for examination as part of the Seven Day Railway initiative. The outcome of this work may result in changes to the current maintenance and renewals plans. Meanwhile, the current strategy has resulted in an evolving engineering access regime that tries to achieve a reasonable balance between engineering and train service requirements.

As mentioned above, there has been an identified need to improve access to the Scunthorpe line on midweek nights, to provide for cyclical maintenance between Wrawby Jn and Doncaster. A solution is in hand for this issue. Beyond this, there are a few locations where there is continued pressure on the access available, notably around some junctions, or on routes for empty stock movements associated with the first or last trains of the day. In these cases, engineering needs must be balanced with train diagramming demands and start of service performance. The normal service patterns allow, in most cases, for adequate maintenance and renewal access, with suitable shift lengths available at weekends and on midweek nights. On some routes this requires the diversion of the limited number of services operating at these times. For example, the core route between York, Leeds and Manchester has a regular passenger service throughout the night. However, the area is quite well provided with diversionary routes, so that with careful planning, continuity of rail service can generally be achieved (albeit with some increase in journey time). Possessions between Thornhill LNW Jn (near Dewsbury) and Heaton Lodge Jns (near Huddersfield) are a known problem for TPE, as the diversionary option via Bradford is substantially longer and maintaining train crew route knowledge over this route is not financially viable for TPE.

Freight diversions are constrained by capability requirements of gauge and weight, such as the very limited availability of W9 routes in West Yorkshire, or the constraints applying to RA10 aggregate trains from the Peak District. While diversion of traffic to road is not an option in the way it can be for passenger operators, some of the freight services have flexibility around the timing and duration of their journeys, and possessions that could affect them are targeted at times of little traffic. Inevitably, growth will increasingly require key routes to be available for more of the time.

4. Anticipated changes in supply and demand

4.1 Forecast passenger demand

4.1.1 Background

The Yorkshire and Humber Route Utilisation Strategy (RUS) area has experienced a sustained period of substantial passenger growth, with 60 percent more journeys made by rail in 2007/08 than in 1998/99 when comparable records began. The key markets identified in **Chapter 3** have experienced the highest levels of growth, with the number of peak period trips between Leeds and the rest of West Yorkshire increasing by 74 percent over this period.

The fastest demand increase has occurred in the more recent past, with growth in key markets since 2002/03 typically in excess of six percent per annum. The magnitude of this recent growth appears to be greater than can be explained by recovery from major shocks to the passenger market that occurred over the period, such as the "Leeds First" station enhancement programme and poor punctuality following the Hatfield accident.

In the period between publication of the Draft for Consultation and the final strategy the UK economy has experienced significant difficulties and there is a general consensus that unfavourable economic conditions will continue in at least the short term. Despite this the most recently available data suggests that growth in regional passenger numbers is continuing, albeit at a slightly reduced rate, it is anticipated that the RUS forecast for 2008/09 will be of the right order of magnitude. Beyond this, central government projections suggest that the economy will recover in the short to medium term, implying only a small reduction in the growth of overall economic output. The precise impact on passenger demand in the RUS area is not clear, though at worst only a small reduction in overall growth by 2019 is likely. On this basis the forecasts have not been adjusted since publication of the Draft for Consultation; however the investment recommended in the following chapters is robust against the perceived worst case scenario.

Future rail passenger demand has been forecast for the period to 2018/19. The forecast was produced using a bespoke demand model based on the forecasting framework published in the Passenger Demand Forecasting Handbook (PDFH) 4.1. This is an industry standard framework for modelling underlying growth and includes global factors such as Gross Domestic Product (GDP), employment, population, fuel costs, and rail fares policy. The projections are unconstrained and take no account of supply side issues such as on-train capacity, which could artificially limit passenger growth. This is a standard forecasting approach which is common to all RUSs.

The model uses 2006/07 LENNON (rail) ticket sales data. This was the most recently available data when the forecasts were produced, and the forecasts have been sense-checked using the 2007/08 LENNON data published subsequently. Rail journeys entirely within West Yorkshire or entirely within South Yorkshire can be made using Passenger Transport Executive (PTE) products which are not recorded in the LENNON sales data. Based on analysis for the Yorkshire and Humber Regional Planning Assessment (RPA) it is estimated that 41 percent and 36 percent of passengers use PTE products to travel within West Yorkshire and South Yorkshire respectively.

Evidence from previous RUSs suggests that the PDFH framework can understate recent acceleration in passenger growth experienced in some urban and interurban rail markets outside London. Network Rail has conducted an extensive validation exercise for the Yorkshire and Humber region and concluded that the PDFH would have underestimated passenger growth between 1998 and 2006.[1]

Econometric analysis was used to investigate the potential explanations for this under prediction and a statistical link was found between the rate of office and retail space occupation in central Leeds and Sheffield, and the shortfall between the PDFH forecast and peak period passenger growth. This explains the majority of the longer-term discrepancy. On the basis of this evidence, Leeds and Sheffield city centre office and retail land take up was included as a new variable in the RUS forecasting model.

A further uplift was applied to the first three years of the forecast to account for the portion of short-term historical growth that could not be explained by the econometric analysis. This followed an approach developed during the North West RUS and was conducted in partnership with industry stakeholders.

Three scenarios were developed using this approach. These are as follows:

- **Low Scenario:** PDFH based forecast including the impact of office and retail take up in Leeds and Sheffield
- **High Scenario:** PDFH based forecast including the impact of office and retail take up in Leeds and Sheffield, as well as an uplift for the first three years to account for unexplained rapid short-term growth
- **Central Scenario:** PDFH based forecast including the impact of office and retail take up in Leeds and Sheffield, as well as an uplift to account for unexplained short-term growth which returns to the long-term trend more quickly than in the high scenario.

1 By 2006 the rail passenger market had recovered from the impact of the Leeds First project and poor punctuality following the Hatfield accident

4.1.2 Overall growth forecasts

Figure 4.1 below details passenger numbers for the whole RUS area since 1998/99 and the projected passenger growth for the period to 2018/19. Over this period the total number of passenger trips is expected to grow by between 31 percent and 52 percent, which is equivalent to between 2.2 percent and 3.5 percent per annum. The central forecast is towards the upper end of this range with a total passenger growth of 46 percent (3.2 percent per annum) expected. This is purely an underlying forecast and takes no account of potential frequency or capacity improvements which may impact demand further. The demand impact of RUS schemes has been assessed in the work presented in **Chapter 5**.

Benchmarking is difficult as few comparable forecasts have been produced; however, the RUS projections are within the range of 25 to 56 percent over 10 years (2.1 to 4.5 percent per annum), as published in the RPA for Yorkshire and Humber. The central forecast is of a similar magnitude to the North West RUS central forecast of 44 percent over 12 years (3.1 percent per annum). The Government's High Level Output Specification (HLOS) am peak demand projections which cover the period 2008/09 – 2013/14 forecast demand growth of around 4 percent per annum for Leeds and 2.5 percent per annum for other urban areas (including Sheffield). This is largely consistent with the shorter-term RUS demand forecasts for Leeds, which project peak growth to 2013/14 of 4.3 percent per annum, although the RUS prediction for Sheffield of 4.8 percent per annum is higher than the figure implied in the HLOS.

Figure 4.1 – Underlying passenger growth forecast for the Yorkshire and Humber RUS area

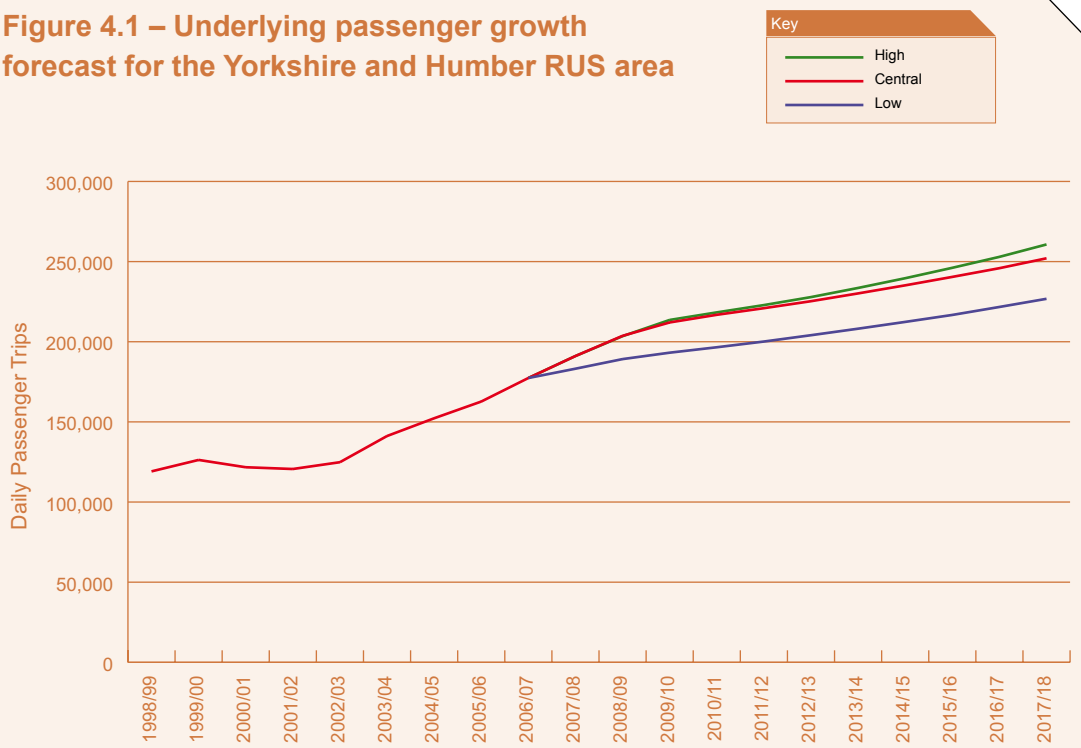
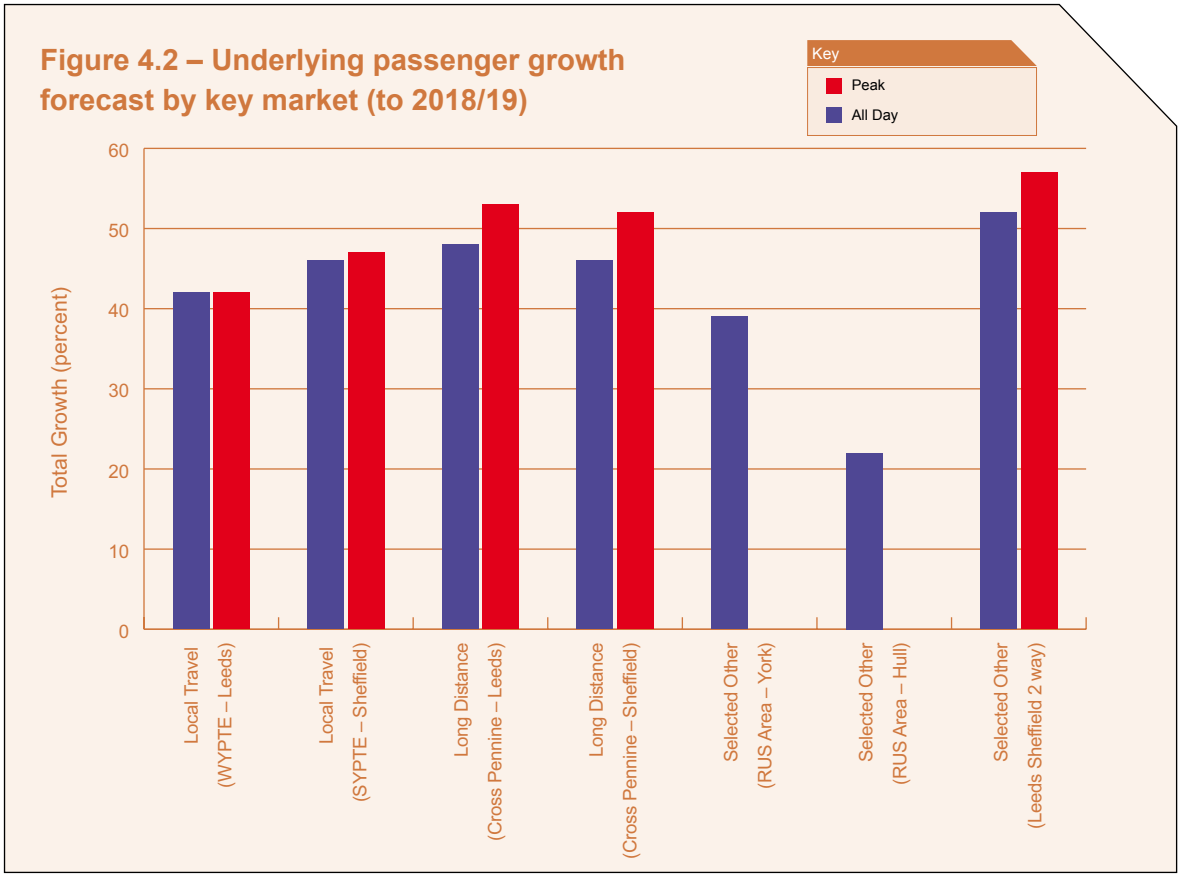


Figure 4.2 – Underlying passenger growth forecast by key market (to 2018/19)



4.1.3 Growth by key passenger market

Figure 4.2 illustrates the passenger growth forecast for the key markets identified in **Chapter 3**, as well as for a selection of other smaller markets.

The market for longer-distance travel on the cross-Pennine routes is forecast to grow at the fastest rate, with the number of trips to Leeds and Sheffield anticipated to increase by 48 percent and 46 percent respectively. It is anticipated that a greater than proportional share of this growth will occur during peak periods, with 53 percent and 52 percent more trips forecast during the busiest three hours in the mornings and evenings. Significant growth is also expected during the inter-peak (10:00 – 15:59), predominantly as a result of increased demand for business and leisure travel stimulated by the economic prosperity of the Leeds, Sheffield and Manchester city regions. The sizeable increase in demand for cross-Pennine services will have significant implications for the ability of the rolling stock and infrastructure to accommodate future passenger numbers, as will predicted growth in commuting demand into Leeds and Sheffield.

The market for local travel is expected to experience significant growth over the RUS period with the number of passengers travelling to Leeds and to Sheffield from their respective PTE areas forecast to increase by 44 percent and 48 percent by 2018/19. This is equivalent to 3.7 percent and 3.8 percent per annum. Passenger growth is expected to be evenly spread across all time periods. Furthermore growth in the number of passengers travelling between Leeds and Sheffield is forecast to be particularly large with an increase of 54 percent expected by 2018/19. These projections are indicative of the strength of both the office and retail cores of Leeds and Sheffield. The growth forecast for Sheffield is higher than the HLOS demand projections for the Department for Transport's (DfT) group of "other urban areas", which includes Sheffield. This is because the HLOS

figures include other conurbations that are not expected to grow as quickly as Sheffield, and also because the projections are based solely on PDFH which appears to underestimate demand growth for this type of market.

Slightly lower levels of passenger growth are expected in markets outside the central PTE areas. The number of passengers travelling to York is predicted to increase by 41 percent (3.4 percent per annum) over the next 12 years, and the number of passengers travelling to Hull is expected to grow by 24 percent (1.8 percent per annum) over the same time period.

4.1.4 Passenger growth and future gaps

The continued increase in the demand for travel by rail is a key factor behind a number of the RUS 'gaps' that are detailed in the next chapter.

The local and cross-Pennine rolling stock and infrastructure are already congested during peak periods. Many commuters stand on most routes into and out of Leeds during the high peaks and shoulder peaks, and passengers also stand into and out of Sheffield on some lines during the high peaks. On the basis of the passenger growth forecasts, this on-train crowding will become significantly worse. In the absence of any interventions, by the end of Control Period 4 (CP4) the daily number of morning peak trains in the RUS area with passengers standing would increase from approximately 61 to 79, and the number of trains with more passengers than the theoretical seating plus standing capacity would rise from 20 to 39.

Passenger growth during the inter-peak is likely to result in overcrowding at a time of day where historically there has been sufficient rolling stock capacity to accommodate demand. This issue will be most prevalent in the cross-Pennine market, where a number of individual services are already operating at or close to their seating capacity over some sections of the route. In the absence of any interventions, by the end of CP4 it is anticipated that up to 75 percent of all services operating between Manchester and Leeds (via Huddersfield) during the inter-peak will have some standing passengers. Similarly, there is increasing crowding between the peaks on Liverpool – Norwich services over the Manchester – Sheffield – Nottingham section.

Since the Leeds First Project and the 2004 TransPennine Express timetable recast, the number and timing of services between most destinations within and beyond the RUS area has been adequate for the key passenger markets. However, the significant and sustained passenger growth means that more frequent services and reduced journey times are increasingly required to meet the needs of these markets.

4.2 Forecast freight demand

The Freight RUS was published in March 2007 and subsequently established. This predicted a growth of 50 percent in gross tonne miles (GTM) by 2014/5. The forecasts described below are from this document. At present the longer-term industry view has been set by the DfT's 2007 White Paper "Delivering a Sustainable Railway" which anticipated a doubling of the rail freight market over the next 30 years.

Network Rail is currently working with Freight Operating Companies and other stakeholders to develop a longer-term set of projections for the whole of the UK. As a result it will be necessary to continually monitor the level of freight growth and update the requirement for freight infrastructure enhancement prior to Control Period 5 (CP5).

4.2.1 Electricity Supply Industry (ESI) coal

The largest volume commodity in the RUS area is coal, which is predominantly used in the ESI. The Freight RUS contained two scenarios for the growth of coal. The base case was more coal through the ports of Immingham and Hull in the RUS area and the sensitivity was growth through the port of Hunterston on the west coast of Scotland. Over the past year the base case has been shown as the main source of growth.

The recently enhanced capacity on the Hull Docks branch and the recent enhancement of the Brigg line to allow regular use of this line will help to provide the additional capacity required. This is discussed further in **Chapter 5**.

The substantial increases in gas and oil prices over the past year have increased the attractiveness of coal for the ESI. The use of Flue Gas Desulphurisation (FGD) equipment at power stations requires limestone trains to support the FGD process and gypsum trains to remove the residue. The five power stations within the RUS area have or are fitting FGD. The limestone is expected to originate in the Peak District and traverse the RUS area.

The future of the UK energy policy and carbon emission levels will affect the demand for coal beyond 2015. It is not currently clear how this will affect demand for coal. Biofuel alternatives being considered have double the mass and any growth in this type of fuel at the expense of coal is likely to increase the demand for train paths rather than lead to a reduction.

4.2.2 Metals

The main flows of metals traffic are concentrated on the Corus plant at Scunthorpe, on the Doncaster to Immingham line. There will be some growth in raw materials from the port of Immingham and metal products between Scunthorpe and the Corus plants in South Wales.

4.2.3 Construction

The forecast 10-year growth in construction traffic from the quarries on the Hope Valley line in the Freight RUS had been exceeded in the first year; however the subsequent difficulties faced by the UK construction industry have caused tonnages to reduce significantly. It is anticipated that further growth will occur once the current economic difficulties subside.

Ultimately, growth is expected on the Hope Valley line, from Rylstone (near Skipton) and between Doncaster and Scunthorpe. As operators generally already maximise payloads, volume increases may imply that additional trains will need to operate.

4.2.4 Petroleum

The oil refineries at Lindsey and Humber, close to Immingham, are a major source of petroleum products. The Freight RUS predicted an increase in trains between Lindsey and the West Midlands. There have been some changes in the supply industry following the Buncefield incident. These have given rise to unexpected growth in the number of trains to the south east, operation of which is likely to continue for the foreseeable future.

4.2.5 Intermodal growth

The Freight RUS predicted a large increase in intermodal traffic. There are three types of intermodal commodity, all of which are forecast to grow substantially – deep sea, domestic and Channel Tunnel. Of these, the deep sea market is growing at around five percent per year, mainly driven by the Far East.

The main terminals in the RUS area are located at Doncaster, Selby, Wakefield and Leeds. The Hutchison Ports UK Ltd (HPUK) funded W9/W10 gauge enhancement – proposed for completion by 2013/14 – from the south to the terminals will allow more containers to be conveyed per train. Currently the tallest 9'6" containers must be conveyed in pocket or low loader wagons between the bogies which do not use the entire wagon length. It is expected that these containers will account for over 50 percent of the world intermodal container market within 10 years. The expansion of the ports in the south east such as Felixstowe and Tilbury, and new developments like those at Bathside Bay and Thames Gateway, will continue to increase the number of train movements.

4.3 Potential changes to services and infrastructure

This section identifies planned and proposed changes to supply within the railway system over the period of the RUS. Committed changes have been included (to the extent that they are defined) within the RUS baseline and other changes have been considered wherever they affect the RUS proposals. The changes can be to train services and/or to infrastructure. Major infrastructure schemes are usually accompanied by train service changes whereas minor ones can affect service outputs like journey time or performance. The first three subsections list planned significant investment in the railway network that is currently anticipated to be completed during the RUS period, firstly as part of planned track and signalling renewals and secondly through potential stand-alone enhancement schemes. Renewals often provide the most cost-effective opportunity to realise infrastructure enhancements as the incremental costs of progressing these in conjunction with planned works are generally significantly lower than progressing them as standalone projects. Section 4.3.4 describes significant planned train service changes. For reference, a combined list of aspirations from the key railway funders in the RUS area is provided in **Appendix 2**.

4.3.1 Planned major renewal schemes

A number of major switch and crossing renewal schemes are currently being developed. The formation of RUS options, as described in **Chapter 5**, has exploited the opportunities arising from these schemes where appropriate. These are highlighted in Table 4.1.

The industry will continue to consider ongoing switch and crossing (S&C), and signalling renewal proposals, to identify and assess any future enhancement opportunities. Details of significant future renewal proposals covering all engineering disciplines are contained in the Route Plans that are published each year as part of Network Rail's Business Plan.

Table 4.1 – Planned switch and crossing and signalling renewal schemes with enhancement potential

Renewal project	Potential enhancement opportunity	Operational output	Notes
Horsforth signalling renewal	Provide turnback facility	Increased capacity to meet HLOS passenger growth and improved journey times	Enhancement scheme required to deliver HLOS so funded through the Office of Rail Regulation (ORR) final determination
Rigton – Horsforth signalling renewals	Additional signal sections and linespeed increase	Increased capacity to meet HLOS passenger growth, performance and improved journey times	Enhancement scheme required to deliver HLOS so funded through the ORR final determination
Hope Valley	Linespeed increase	Journey time improvements	In conjunction with planned renewals in CP5
Wrawby Jn – Barnetby – Brocklesby signalling renewals	Potential reinstatement of fourth line and junction remodelling	Improved capacity, performance and Seven Day Railway opportunities	Enhancement opportunity exists, four tracking scheme being developed by Network Rail
Stalybridge signalling renewals	Speeding up of junctions, remodelling and possible provision of north side bay	Improved performance and journey times, and increased capacity to meet HLOS passenger growth	Enhancement scheme required to deliver HLOS so funded through the ORR final determination
Rochdale interlocking works in conjunction with Metrolink (see Table 4.2)	Opportunity to improve the linespeed	Reduction of journey time	Renewals proposed for CP4
Ulceby and Immingham signalling renewals	Capacity improvements on the south bank of the Humber	Improved capacity and performance, and shorter loading times for coal trains	Network Rail is currently undertaking development work on options.
Ferriby – Gilberdyke signalling renewals	Various options for infrastructure improvements on the north bank of the Humber	Improved capacity and performance, and shorter journey times	Renewals proposed for CP5
Dore East signalling renewals	Track doubling through Dore & Totley station	Increased capacity and improved performance	Renewals proposed for CP5
Methley Jn S&C renewals	Track doubling on single lead junction	Increased capacity and improved performance	Renewals proposed for CP4
Thorne Jn S&C renewals	Remodelling to eliminate single lead junction	Accommodate increased freight flows to/from port of Hull and provide performance and journey time improvements	Network Rail is currently developing a potential Network Rail Development Fund (NRDF) scheme

4.3.2 Committed enhancement schemes

The table below details committed enhancement schemes.

Table 4.2 – Committed enhancement schemes

Project	Main promoter	Operational output
Manchester Metrolink Phase 3a – conversion of Oldham Loop to Metrolink	Greater Manchester Passenger Transport Executive (PTE)	Transfer of the Oldham loop to Manchester Metrolink operation, altering the pattern of heavy rail services through Victoria, and with suitable alterations at Rochdale
W9/W10 gauge clearance Felixstowe – Yorkshire terminals via Ely/ECML	HPUK	Ability to carry 9'6" containers on standard height wagons from Felixstowe to Doncaster Europort, Selby, Wakefield Europort and Leeds Stourton
W9/W10 gauge clearance Newark – Gainsborough – Doncaster	HPUK	Ability to carry 9'6" containers on conventional wagons on an alternative route avoiding the East Coast Main Line (ECML) between Newark and Doncaster
Shaftholme Jn remodelling	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Provide shorter journey for freight from Immingham to Eggborough/ Drax/Ferrybridge power stations by running via Askern avoiding East Coast Main Line (ECML) (see Figures 4.3 and 4.4 below). Also provides additional ECML capacity north of Doncaster and improved performance

4.3.3 Proposed enhancement schemes

The schemes highlighted in Table 4.3 are at various stages of development and are currently under discussion with project funders. The ORR's CP4 final determination did not explicitly provide funding for these schemes, however it did provide a £60 million allowance to meet the HLOS capacity metrics on strategic route 10 and £10 million on strategic route 11, which are both contained within the Yorkshire and Humber RUS area.

Network Rail will continue to liaise with stakeholders on these, and any new, projects that may arise.

Table 4.3 – Potential enhancement schemes

Project	Potential funding source(s)	Operational output
West Yorkshire platform extensions	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Handle four-, five-, or six-car trains to accommodate growth on most corridors into Leeds
Leeds Station – new southern entrance	Subject to a Regional Funding Allocation (RFA) bid	Improved station facilities and access, and additional footfall capacity to meet peak growth
Sheffield – Barnsley – Leeds	Funding not yet identified	Increased linespeeds leading to improved journey times
East Leeds Parkway (Micklefield) including a turnback facility	Turnback facility required to deliver HLOS so funded through the ORR final determination. More substantial enhancement to provide a parkway station is subject to an RFA bid	Turnback facility to provide additional peak capacity and possible new parkway station adjacent to M1/A1 to provide new journey opportunities
Greater Manchester station improvement schemes	Funding not yet identified	Provision of improved station facilities including Park & Ride
Station improvement schemes	Train Operating Companies	Provision of improved station facilities
Great Northern/Great Eastern (GN/GE) Joint Line Upgrade	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Increased passenger and freight capacity between Doncaster and Peterborough allowing opportunities for additional passenger services between Yorkshire, the Lincoln area and London. Allows major increase in freight capacity between Doncaster and Peterborough
Depots (route 10)	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Provide servicing and stabling for increased Northern Rail fleet, to meet peak growth
Freight gauge improvements	Third Party and/or Strategic Freight Network (SFN) funding	Provide greater range of routeing options for 9'6" containers on standard height wagons
Leeds – new platforms	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Accommodate peak growth and improve performance
Manchester Piccadilly Platform 0	Funding not yet identified	Increased capacity by conversion of stabling siding into an operational passenger platform
Huddersfield – new Platform 9	Funding not yet identified	Accommodate longer-term peak growth
W10 gauge clearance Gainsborough Trent Jn to Manton Wood	Third Party	Ability to carry 9'6" containers on standard height wagons on Retford – Gainsborough route
Leeds – Manchester linespeed and capacity improvements	Enhancement scheme funded through the ORR final determination	Increased capacity to accommodate HLOS growth, and improved performance and journey times
Depots (route 11)	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Provide servicing and stabling for increased Northern Rail fleet, to meet peak growth

Project	Potential funding source(s)	Operational output
South Yorkshire platform extensions	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Handle four-car trains at various stations in South Yorkshire PTE area to accommodate peak growth
Cottam – new freight chord	Third Party	Allows direct access from Immingham to Cottam power station improving operational efficiency, performance and capacity
Hope Valley loops	Funding not yet identified	Provide new Up and Down loops in the Grindleford – Hope area to improve capacity and performance
Castleford new platform	Enhancement scheme required to deliver HLOS so funded through the ORR final determination	Provide new platform to allow additional services to handle peak growth
Castleford improved track layout	Funding not yet identified	Allow increased service levels to Pontefract area
Robin Hood Airport Doncaster Sheffield (Finningley)	Third party	Provide new station to provide rail link for airport passengers
Wakefield Westgate	West Yorkshire Passenger Transport Executive via Major Schemes bid	Improved station facilities and enhanced track layout to reduce congestion
Calder Valley linespeed improvements	Potential CP4 NRDF scheme	Journey time improvements

Figure 4.3 – Current freight route pre-Shaftholme Jn remodelling

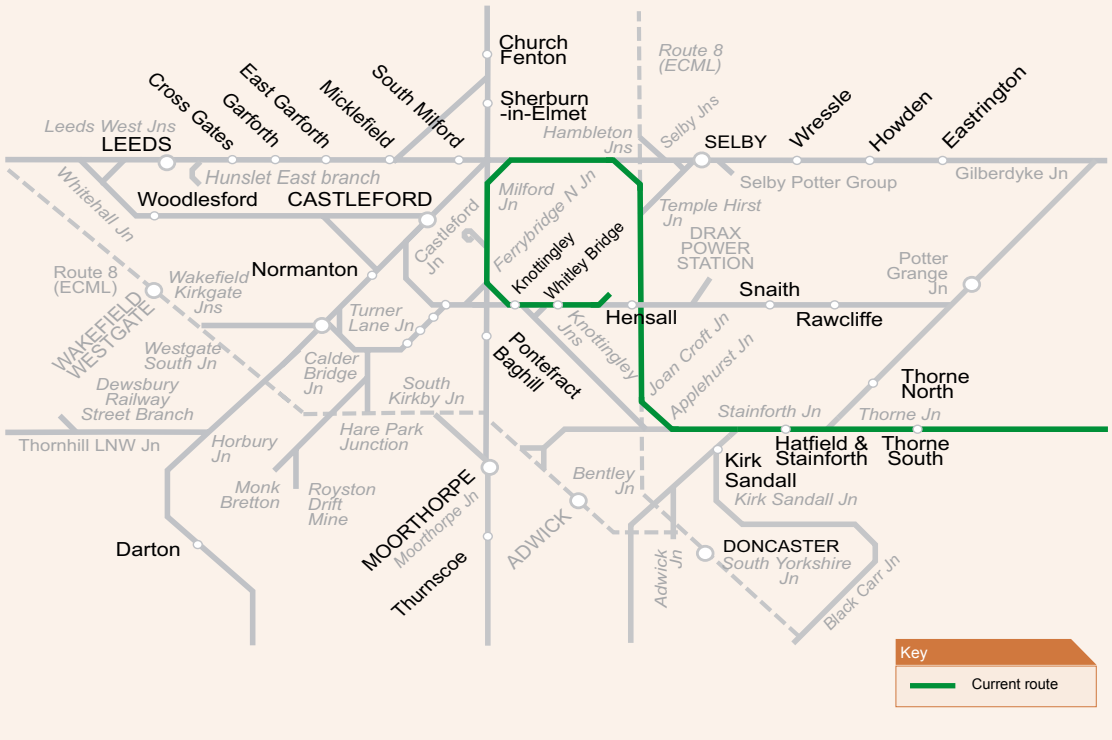
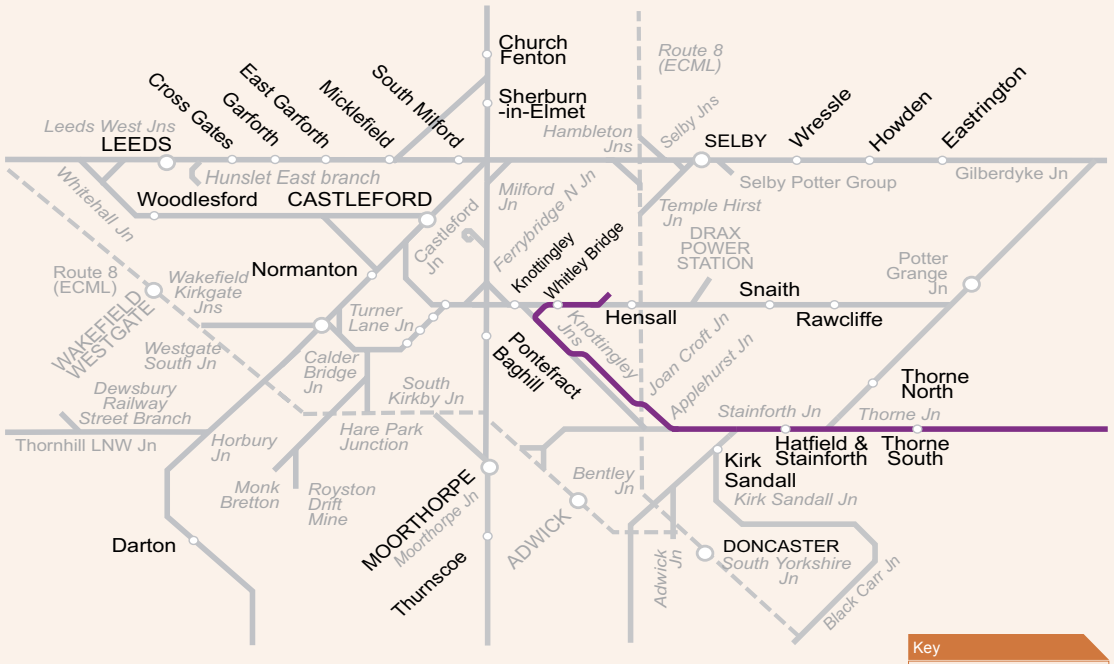


Figure 4.4 – New freight route post-Shaftholme Jn remodelling



Miscellaneous network-wide enhancements

National Stations Improvement Programme (NSIP)

The NSIP is being used to deliver enhancements to passenger facilities at stations. Network Rail is currently developing options for stations in the Yorkshire and Humber area with the operators of the stations with input from local Councils and Passenger Transport Executives (PTEs). There are 11 stations across the RUS area, namely: Bradford Interchange, Dewsbury, Grimsby, Halifax, Harrogate, Huddersfield, Mexborough, Scarborough, Selby, Skipton and Wakefield Westgate. The works will range from structural alterations such as enhancements to canopies and waiting shelters to improvements to seating and customer information services. The works will be implemented throughout CP4, ie. complete by 2014 with synergies being explored where other works are taking place.

Access for All

There are currently four stations in the Yorkshire and Humber RUS area in Tranche 1 of the Access for All programme to provide step free access to station platforms; Grimsby, Huddersfield, Keighley and Shipley. The works are planned for completion starting from April 2009 through to 2014.

Gauge

In the Yorkshire and Humber RUS area there are a number of bridges that constrain current gauge in the Dore to Sheffield route. Network Rail is developing options to remove these restrictions.

On the Stalybridge to Thornhill Jn route Network Rail is looking at options to remove gauge restrictions to current traffic through track slues and track lowering. Current gauge restrictions will remain on the Thornhill Jn to Holbeck East Jn route through Morley tunnel, on the Harrogate route, Bradford Interchange – Leeds and on the Wincobank Jn – Barnsley route as there is no scheduled freight traffic.

In CP4 Network Rail is looking at options to provide W10 gauge clearance on the routes from the Humber ports (Hull/Immingham) to the ECML and on the diversionary route between Shaftholme Jn and Colton Jn via Knottingley and Milford Jn.

W10 gauge clearance works are being examined between Tapton Jn and Rotherham Masborough.

Route Availability Restrictions
Network Rail will look at removing Heavy Axle Weight (HAW) restrictions as and when bridges are strengthened or renewed. HAW restrictions have recently been removed between Bessacarr Jn to Black Carr Jn, Kirk Sandall to Bentley Jn route, over the viaduct at Market Rasen and over a bridge between Masborough Jn and Aldwarke Jn. The 40mph HAW restriction has been removed between Whitehall West Jn and Skipton North Jn together with the 20mph restriction through Thackley Tunnel.

4.3.4 Recent and planned service changes
A Nottingham – Sheffield – Barnsley – Leeds semi-fast service operated by Northern Rail was introduced in December 2008, relieving crowding in this corridor and opening up new journey opportunities, in particular the ability to travel between Nottingham and Leeds without the need to change trains. At the same time CrossCountry increased the length of certain trains in the Sheffield – Wakefield – Leeds – York corridor, which also provides some relief from overcrowding. From December 2008, most of East Midlands Trains' (EMT) London – Sheffield services are formed of Class 222 Meridians, though this has some limitations arising from the fact that not all through platforms at Sheffield are able to handle 10-car trains comprising 23 metre vehicles.

There are currently a number of proposals and track access applications for the ECML which have an impact on the RUS area. The ORR has indicated that it will:

- grant Grand Central a fourth daily return train path between London King's Cross and Sunderland
- grant Grand Northern three daily return train paths between London King's Cross and Bradford Interchange via Pontefract and Halifax
- extend Hull Trains' existing contingent rights until 2014 and convert them to full rights
- convert National Express East Coast's (NXEC) few remaining London King's Cross – Leeds contingent rights to firm rights
- grant NXEC two-hourly additional London King's Cross – Bradford Interchange/ Harrogate services via Micklefield and Leeds and new two-hourly London King's Cross – Lincoln services.

Some of these changes to access rights affect the strategy for Yorkshire and Humber RUS area, and these implications are discussed further in **Chapter 7**.

The upgrade of the GN/GE Joint Line between Peterborough and Doncaster via Spalding, Lincoln and Gainsborough will provide two daytime freight paths per hour in each direction between Peterborough and Doncaster. An increase in freight paths at night will also be provided by always keeping either the Joint Line or the ECML via Retford free from engineering work. The enhancements will allow journey time improvements for existing passenger services and offer the opportunity for better overall service provision.

Finally, EMT is seeking to extend its London – Derby services to Sheffield in December 2009, giving two trains per hour between London and Sheffield. This would affect capacity in the key Chesterfield – Dore & Totley – Sheffield corridor.

5. Gaps and options

5.1 Introduction

Previous chapters have outlined the scope of the Yorkshire and Humber Route Utilisation Strategy (RUS) by presenting the baseline assessment of the study area, and summarising the role of rail in the economic and social well-being of the Yorkshire and Humber region. This analysis has demonstrated that there are several instances where the current rail network is not able to meet existing or future requirements, which are termed 'gaps'.

This chapter presents an analysis of the RUS gaps and the series of options that have been developed to address them. Full details of the option assessments are contained in **Appendix 4**, which can be found on the Network Rail website **(www.networkrail.co.uk)**.

5.2 Generic gaps

For reference, Table 5.1 details the list of high-level gaps that were identified in the baseline assessment. These gaps are generic to the whole RUS area.

Table 5.1 – Generic RUS gaps (and short title)

Number	Gap
1	Peak overcrowding on key corridors, especially into Leeds and Sheffield (peak crowding)
2	Overcrowding and suppressed growth between the peaks (off-peak crowding)
3	Suppressed demand for travel when the route is closed for engineering work (engineering access)
4	Inadequate inter/intra regional links (regional links)
5	Inadequate freight capability of the network in terms of diversionary routes, route availability, loading gauge and capacity (freight capability)
6	Poor performance in some areas with high levels of reactionary delays (reactionary delays)

1. Peak crowding:
There are a number of areas where there is evidence of growing overcrowding during peak periods. This applies particularly to a number of commuting and interurban routes into Leeds, Sheffield and Manchester. The situation is such that the full potential for rail in the relevant markets cannot be realised due to the inability within the present train service to accommodate any further growth. Key drivers are almost certainly the general increase in rail travel experienced in recent years, coupled with the continuing development of Leeds, particularly, as a major commercial centre within northern England. Table 5.22 at the end of this chapter compares the additional capacity recommended in the RUS with the requirements for Leeds and Sheffield specified in the Government's High Level Output Specification (HLOS).

Options to alleviate peak crowding include, train lengthening, additional passenger services, altered stopping patterns and utilisation of higher capacity rolling stock that is likely to be made available to the incumbent Train Operating Companies (TOCs) through the HLOS Rolling Stock Plan process. Increasing the capacity of existing rolling stock through refurbishment has not been considered because it only offers a short-term solution, as rolling stock is regularly redeployed under franchise changes. Furthermore, some older types of rolling stock are likely to be life-expired and replaced during the RUS period.

2. Off-peak crowding:
There is increased overcrowding on TransPennine Express (TPE) trains and on those CrossCountry services that run via Leeds throughout the day. As with peak demand, this is believed to be partly driven by the general trend of increased demand for rail travel in recent years and the general expansion of Leeds as a centre. These services have also been improved in terms of frequency and regular interval timetables as well as new rolling stock, all of which will have been instrumental in attracting growing numbers of users. Crowding occurs on East Midlands Trains (EMT) on services that operate between Liverpool and Norwich, especially between Manchester, Sheffield and Nottingham.

3. Engineering access:
There is evidence of demand for passenger services at times when few people traditionally travel, particularly later on weekday evenings and earlier on Sunday mornings. This has undoubtedly been encouraged by such developments as Sunday shopping, liberalisation of licensing laws and increased use of rail links to and from airports. Additionally, there is a demand to operate freight trains on a continuous basis and a desire for weekend passenger services to be free from bus substitution at least for the major trunk flows. On certain route sections regular and lengthy possessions for maintenance and renewals are required to keep the infrastructure fit for purpose. As well as being disruptive to passenger operations, these pose a particular problem for freight operators because many of the lines in the RUS area have restrictive loading gauge clearance, reducing the suitability of these lines as diversionary routes

4. Regional links:
Services between some of the major conurbations within and outside of the RUS area are particularly slow and/or infrequent relative to similarly sized locations in other parts of the UK. Inevitably there is a trade-off between additional station calls and reduced journey times, and it is rarely possible to develop a scheme which can deliver both of these improvements. Where stakeholders have highlighted either journey times or service frequency as a gap, the RUS has considered altering this trade-off in addition to conventional options such as new services and infrastructure enhancements.

5. Freight capability:
The Freight RUS has identified a number of routes where freight traffic will increase but which are currently constrained in terms of both capacity (particularly where passenger services have changed or increased) and capability. The Freight RUS identified aspirations for gauge enhancement to W10 and W12, the elimination of heavy axle weight restrictions and the ability to operate longer trains to maximise the use of train paths, drivers and locomotives. The need for a move to seven-day operation of freight services is mentioned under engineering access above.

6. Reactionary delays:
Reactionary delay occurs as a result of incidents that occur elsewhere on the network, and usually manifests itself at key capacity pinch-points.

This can be a result of outdated or inadequate rail infrastructure, or from timetables with historically tight turnarounds as a result of high rolling stock utilisation. Some reactionary delay is an inevitable consequence of the fact that many of the key stations in the RUS area, such as Leeds and Sheffield, are operating close to capacity, coupled with the interaction of a range of long distance trains serving a wide variety of markets with some highly intensive local services.

5.3 Interaction with other RUSs and geographic areas

Freight RUS
Some parts of the railway within the Yorkshire and Humber RUS area are very intensively used by freight trains and the following gaps identified in the Freight RUS are examined further here:

- Capacity Wrawby Jn – Scunthorpe
- Capacity Hull Hedon Road Jn – Hull Hessle Road Jn
- Capacity Chinley East Jn – Dore West Jn
- Capacity South Kirkby Jn – Hare Park Jn
- Lack of W10 and W12 gauge clearence.

East Coast Main Line (ECML) RUS
The Yorkshire and Humber RUS area is bisected by the ECML and looks primarily at its own gaps and consequent options, whilst ECML gaps and consequent options have been dealt with in the ECML RUS. Clearly, however, both RUSs must be closely aligned. There are several areas where an integrated approach is essential and where, as the major drivers lie within the Yorkshire and Humber RUS area, the gaps and options are considered within this RUS rather than, or in addition to, that already published for the ECML. These are:

- peak crowding into Leeds on services via Wakefield Westgate
- additional services Sheffield – Wakefield Westgate – Leeds
- capacity/pathing of services at Doncaster, including additional ECML trains, a possible new service to Robin Hood Airport Doncaster Sheffield (RHADS) and other stakeholder aspirations to serve this important node
- possible extension of Knottingley – Wakefield Kirkgate services to Wakefield Westgate and Leeds
- freight capacity Doncaster – South Kirkby Jn – Hare Park Jn
- possible use of the Midland Main Line to relieve pressure on the ECML (jointly with the East Midlands RUS)

- depots and stabling for ECML vehicles within the RUS area
- possible Yorkshire destinations for additional services from London King's Cross.

North West, and Lancashire and Cumbria RUSs

The Yorkshire and Humber RUS area is bordered in the west by the North West RUS and, in the north west, by the Lancashire and Cumbria RUS area. With the various cross Pennine rail routes in existence, gaps and options local to the Yorkshire and Humber RUS area have a considerable synergy with gaps and options already considered to the west of the Pennines. The following have been identified as being most naturally addressed within the context of the Yorkshire and Humber RUS:

- services to the east of Manchester, and the need to consider the appropriate number and mix of services for both local and longer-distance travel
- fast regional links Manchester – Leeds and Manchester – Sheffield
- options for the Stalybridge corridor, including the Diggle loop
- stopping patterns and local services Manchester Victoria – Rochdale – Todmorden (and possibly Bradford) following transfer of the Oldham Loop to Metrolink
- journey times in the Calder Valley
- possibility of a fourth train each hour Manchester – Liverpool and operation of cross-Pennine trains on the Chat Moss line
- Leeds – Skipton service levels
- Northern Rail rolling stock strategy.

The Manchester Hub study will also be relevant to routes within the Yorkshire and Humber RUS area.

Inter-regional services between Yorkshire, the Midlands and the South

From the start of the December 2008 timetable CrossCountry's services connecting eastern Scotland, the North East and Yorkshire with the Midlands and South West changed noticeably. Whilst there continues to be a regular pattern of two services per hour running alternately via Leeds and Doncaster, all trains via Leeds now serve the west country and call additionally at Chesterfield, Burton-on-Trent and/or Tamworth. A number of these services have been lengthened thereby addressing some but not all crowding issues. The trains operating via Doncaster all run to Reading and do not call at Birmingham International or Coventry.

Clearly the impact of these changes in connectivity and journey times transcend more than just this RUS area and therefore they will be specifically examined in the East Midlands, West Midlands and Chilterns and Great Western RUSs, as well as this one. The implications of any recommendations will need to be assessed on all affected RUS areas.

5.4 Geographical split

The diverse demographic split and wide geographic spread of the RUS area means that the mix of gaps differs by individual sections of the route. Therefore the route sections have been considered individually. For convenience the geographical summary from the baseline assessment has been reproduced overleaf in Table 5.2.

Some of the route sections are self-contained rail markets with a bespoke set of issues. However, others such as the Airedale line, the Calder Valley line, the Chesterfield line, Doncaster – Immingham/Cleethorpes line, the Hope Valley line, the Huddersfield line and Sheffield-Doncaster/Moorthorpe line form part of much wider markets variously involving an assortment of local stopping services, long distance high speed services, commuter services for the major conurbations and a diversity of freight operations.

Table 5.2 – Geographic split

Serial	Route Section	Includes	Page
AI	Airedale line	Leeds – Skipton Leeds – Bradford Forster Square	71
WH	Wharfedale line	Leeds – Ilkley	73
HA	Harrogate line	Leeds – Harrogate – York	74
YS	Leeds – York/Hull/ Scarborough	Leeds – York – Scarborough Leeds – Selby – Hull Doncaster – Goole – Gilberdyke	75
BP	Barnsley and Pontefract lines	Leeds – Woodlesford – Castleford – Milford Castleford – Wakefield Kirkgate – Thornhill LNW Jn Horbury Jn – Barnsley – Sheffield Castleford/Wakefield – Pontefract Monkhill – Goole	77
WF	Wakefield line	Leeds – Wakefield Westgate – Doncaster/Moorthorpe	80
HD	Huddersfield line	Leeds – Huddersfield – Guide Bridge – (Manchester)	82
CV	Calder Valley line	Leeds – Bradford Interchange – Rochdale – (Manchester) Hall Royd Jn – Gannow Jn (Burnley) Milner Royd/Dryclough – Bradley/Heaton Lodge	85
HV	Hope Valley line	Sheffield – New Mills/Hazel Grove – (Manchester)	88
SD	Sheffield – Doncaster/ Moorthorpe line	Sheffield – Doncaster Swinton – Moorthorpe Rotherham Central Loop	89
IC	Immingham/Cleethorpes line	Doncaster – Cleethorpes Wrawby Jn – Lincoln/Gainsborough Immingham Freight Lines Habrough – Barton-on-Humber Scunthorpe – Roxby Gullet	91
PN	Penistone line	Barnsley – Penistone – Huddersfield	92
LN	Retford/Lincoln line	Sheffield – Worksop – Retford – Lincoln Doncaster – Gainsborough	92
CH	Chesterfield line	Sheffield – Dore & Totley – Chesterfield	94
HS	Hull – Bridlington – Scarborough line	Hull – Bridlington – Scarborough	94
MC	Miscellaneous	Moorthorpe – Church Fenton Adwick/Carcroft – Stainforth South Yorkshire Joint Line Woodburn – Stocksbridge Woodburn – Rotherham Central Monk Bretton Branch Tinsley Yard Skipton – Rylstone Chesterfield – Beighton – Rotherham Masborough	95
LD	Leeds station area	Neville Hill – Engine Shed/Whitehall/Wortley/Holbeck Jns	95
SH	Sheffield station area	Sheffield – Nunnery Main Line Jn	97
DR	Doncaster station area	Loversall – Marshgate	99
	Inter-regional services between the RUS area and the West Midlands		100

5.5 Geographical gap analysis and options

For simplicity, all the options detailed in this chapter are presented on a stand-alone basis. In reality the strategy will comprise the implementation of a package of these interventions to make use of potential synergies in the economic benefits as well as economies of scale. Options have been subject to an economic appraisal consistent with the Department for Transport's (DfT) Transport Appraisal Guidance (WebTAG). Where appropriate, Benefit-Cost Ratios (BCRs) are reported for options which indicate the value for money of each. DfT funding criteria permits recommendation for funding through the RUS process if the BCR is at least 1.5. The figures presented in this chapter result from high-level feasibility work (equivalent to GRIP 1[1]), and represent the most likely value for money based on a range of key sensitivities. value for money has not been quantified when an option is clearly inferior to another that is below the DfT funding threshold.

Airedale line

Peak crowding

Since electrification in the mid-1990s the route has experienced considerable passenger growth, and despite the line being served by high capacity rolling stock, there is significant overcrowding during peak periods. The busiest services are those that operate between Skipton and Leeds, which all have passengers standing during the high peak hour in the mornings and evenings.

Currently services on the route mainly operate in four-car formation, which is the maximum operable within the constraints of many platform lengths. Due to the track layout, lengthening all the platforms at Shipley to accommodate trains that are longer than six vehicles is prohibitively expensive and any scheme to do this would represent poor or low value for money. On this basis six-car operation is the maximum that can be achieved and it is not possible to provide sufficient additional capacity by lengthening current electric trains to six cars, without also increasing the frequency of services on the route.

Given the constraint at Shipley, options to alleviate overcrowding in the short term are limited and are heavily dependent on the mix and availability of rolling stock resulting from the DfT Rolling Stock Plan. For simplicity, options have been assessed using a single set of rolling stock costs.

The recommended option (AI1) is for existing local electric services to operate in six-car formation rather than four-car as currently. In addition, an extra four-car service would operate between Bradford Forster Square and Leeds in the high peak hour, in order to accommodate future demand growth at Shipley which cannot be accommodated by lengthening alone. The preferred option in the Draft for Consultation, which involved operating Skipton – Leeds semi-fast trains together with Keighley – Leeds stopping services, has been discounted as work to develop the DfT HLOS Rolling Stock Plan

1 Guide to Railway Investment Projects, available at **http://www.networkrail.co.uk/aspx/4171.aspx**

suggests that this option would be less effective at dealing with overcrowding than originally thought.

The Leeds – Bradford Forster Square services are expected to be the most lightly loaded over the 10-year forecast period and may be the most suitable to serve potential new stations at Apperley Bridge and Kirkstall Forge, which are both aspirations of West Yorkshire Passenger Transport Executive (WYPTE).

Engineering access

Apart from its commuter role, this corridor has significant leisure passenger demand and freight activity. Leisure travel at weekends tends to be oriented towards the summer and the longer-distance services towards Morecambe and Carlisle. Apart from the Rylstone services, an alternative option for freight traffic generally exists via the ECML and Newcastle – Carlisle although this does involve additional resource costs which preclude its use on a regular basis. For the immediate future, most non-commuting demand can be accommodated by careful possession planning. Following route modernisation in the mid-1990s, significant resignalling is unlikely for some years, but when it becomes due it will be appropriate to review the case for provision of bidirectional signalling.

Reactionary delays

Armley Jn is the key capacity constraint on the Leeds north west corridor as it is shared by services operating on the Wharfedale line and Harrogate line as well as the Airedale line. The combined preferred option for these lines has been developed so that the junction can accommodate all the additional services, and a performance modelling exercise has concluded that no mitigation measures are required.

Freight capability

No specific gaps have been identified on this line, and it is not anticipated that the proposed options will materially affect freight operations as very few freight trains use the line at peak times.

Table 5.3 – Airedale line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
AI1	Lengthen peak Skipton – Leeds services and one additional Bradford Forster Square – Leeds service: ■ all seven peak Northern Rail Skipton – Leeds electric services lengthened to six-car formation ■ one additional high peak Bradford FS – Leeds service in four-car formation ■ platform lengthening.	Peak crowding	Include in the strategy	1.8

Wharfedale line

Peak crowding

The Wharfedale line was electrified in parallel with the Airedale line and has experienced a similarly high level of passenger growth in recent years. Currently, trains have passengers standing during the high peak hours in the morning and the evening, with the busiest services in each particularly overcrowded. Analysis suggests that train and platform lengthening would be relatively straightforward on this corridor, and therefore as train lengthening is normally the most efficient solution where crowding occurs over much of a route, this is recommended. Eight additional peak vehicle arrivals are required to meet overcrowding and the best way to deliver this would be to lengthen the four busiest services to six-car formations. However, the precise deployment of vehicles will depend on the DfT Rolling Stock Plan and this could mean that further platform extensions would be necessary. The scheme offers high value for money, indicated by a BCR of 2.8.

Reactionary delays

See Airedale line.

Freight capability

No specific gaps have been identified on this line, and it is not anticipated that the proposed options will materially affect freight operations as freight trains only use the shared section of the line between Armley Jn and Leeds, and very few freight services use this line at peak times.

Table 5.4 – Wharfedale line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
WH1	Lengthen peak Ilkley – Leeds services: ■ eight additional vehicle arrivals/ departures spread across peak services, increasing the maximum train length to six vehicles ■ platform lengthening.	Peak crowding	Include in the strategy and develop requirements at Leeds station	2.8

Harrogate line

Peak crowding

Significant on-train crowding currently occurs on services during peak periods at the very southern end of the route within about 20 minutes journey time from Leeds. All trains during the high peak hour typically have passengers standing between Leeds and Horsforth, and most trains during the full three-hour peak have passengers standing between Leeds and Burley Park.

As the overcrowding is limited to a relatively short section of the route, the most efficient way to provide additional capacity is to operate additional peak shuttle services from Horsforth, rather than train lengthening or additional services throughout the length of the route. Train lengthening would be particularly problematic as Knaresborough station is directly adjacent to a Victorian viaduct at one end and a tunnel at the other.

It is therefore recommended that five peak-busting services calling at all stops between Horsforth and Leeds are added to the timetable in each peak period. These services would operate in four-vehicle formation and turn back via a new facility in the Horsforth area. Furthermore, it is recommended that up to two through services in each hour do not call at Headingley and/or Burley Park. Requiring local passengers to travel on the Horsforth terminating services will balance the loadings on the southern section of the route and avoid the need for major infrastructure work to make the timetable workable.

A signalling upgrade, with shorter signalling sections between Rigton and Horsforth, will be required to make the timetable fully robust, and it is recommended that this work is carried out when the route is resignalled.

Engineering access

There are two main issues on this line, namely an aspiration for later trains from Leeds to Harrogate (and to a lesser extent from York) and the need to provide for the leisure and conference market at weekends. With the present signalling system, extension of the operating day not only entails reduction in the “no train period” for maintenance, it also implies significant additional signal operations costs. Thus it is likely that any such extension will need to await the resignalling which will provide a more centralised control. Long distance travel to Harrogate can generally be accommodated by possession planning to provide access either via Leeds or via York from mid-morning Sunday onwards.

Reactionary delay

Long signal sections are a source of delay on the line, and the signalling upgrade between Rigton and Horsforth will reduce this.

Freight capability

No specific gaps have been identified on this line, and it is not anticipated that the proposed options will materially affect freight operations as freight trains only use the shared section of the line between Armley Jn and Leeds, and very few freight services use this line at peak times.

Table 5.5 – Harrogate line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
HA1	Horsforth – Leeds Peak shuttles: ■ 5 x four-car new services in each peak ■ revised calling pattern for through trains ■ new turn back facility at Horsforth and enhanced signalling.	Peak crowding	Include in strategy and develop requirements at Leeds station	1.9
HA2	Train lengthening: ■ at least 10 additional vehicle arrivals/departures spread across at least five services in each peak ■ platform lengthening.	Peak crowding	Do not include in strategy as business case inferior and unclear how longer trains could call at Knaresborough	<1.5
HA3	Additional Harrogate/Leeds services: ■ 5 x four-car new services in each peak.	Peak crowding	Do not include in strategy as inferior to HA1. Whole life cost of additional rolling stock cost is greater than Horsforth turnback	n/a

- **Leeds – York – Scarborough and Leeds – Selby – Hull**

The line to York, Scarborough, Selby and Hull is the only line at the east end of Leeds station and all the recommended options to increase on-train capacity to and from the east of Leeds are linked to options for other lines. This section of the chapter details the recommended service pattern east of Leeds, however to avoid duplication, the analysis of the business case for these service alterations is presented in the sections for the relevant lines to the west of Leeds station.

Peak crowding and regional links

On-train crowding currently occurs on the majority of service groups between Leeds and stations to the east including York, Selby and Garforth. The service frequency between Hull and Leeds is currently hourly and a number of stakeholders view this as a particular disadvantage to Hull as the frequency between Leeds and other regional centres is typically much higher. Furthermore, the Hull – Leeds service (which operates fast between Selby and Leeds) is particularly overcrowded between Selby and Leeds during peak periods and train lengthening up to the maximum on the cross-Pennine north route will not be sufficient to accommodate expected future passenger growth. As a consequence of this, provision of an additional fast or semi-fast service is the only practical solution. This severely constrains the number of options available for the whole line section east of Leeds, as the infrastructure can only accommodate a maximum of one additional service per hour during the peak. Analysis suggests that the most efficient way to provide additional capacity on other services is through train strengthening. Two options have been identified based on these constraints:

Option YS1. The first option comprises increasing the cross-Pennine north fleet to provide an additional 14 vehicle arrivals east of Leeds. This would be done by extending the proposed additional hourly Manchester – Huddersfield – Leeds service to Selby or Hull (option HD2), and some selective train lengthening to provide more capacity on the busiest services that operate via York. Economic appraisal suggests that the case for services to start and terminate at Hull rather than Selby is marginal, however industry forecasting tools typically underestimate demand for a step-change of this type, and further validation is required.

In addition to this, the proposed new half hourly Halifax – Leeds shuttle service (option CV1) would be combined with either one or two of the existing local service groups that serve stations to the east of Leeds. This will provide higher capacity rolling stock on local services because four-car sprinter (or equivalent) class units that will be required to provide adequate capacity both sides of Leeds are larger than the local stock that is typically used east of Leeds.

Option YS2. The second option comprises the same extension of the proposed Manchester – Leeds service to Selby or Hull; however one of the existing local service groups would be replaced with a second hourly cross country franchise service that is currently routed via Doncaster. This service would be routed via Leeds and Wakefield Westgate before returning to the original timetable slot at Sheffield, and would call at selected local stations east of Leeds in the peak to provide capacity at some of the local stations. In order to provide sufficient capacity two of these services in each peak would have to be operated using five-car voyager type units rather than four-car as currently. Cross-Pennine services would also make additional calls at local stations to provide some of the capacity lost through the displaced local service group; however it is anticipated that the total number of additional cross-Pennine vehicle arrivals/departures would remain at around 14.

Option YS1 is viewed as the do-minimum way to provide capacity, and option YS2 is viewed as an increment to this option which solves several other RUS gaps, but also has a number of notable disbenefits. On this basis YS2 has been assessed against a base of YS1 and this analysis is presented in the inter-regional services section towards the end of this chapter.

Finally, analysis suggests that one of two service enhancements is possible during the inter-peak using the spare rolling stock required to deliver the peak options detailed above. Either: the additional Manchester – Leeds service could continue at least as far as Selby; or a new hourly Micklefield – Leeds stopping service could operate, thereby allowing the current Blackpool – York service to run semi-fast between Leeds and York.

Engineering access

At the Leeds end of the corridor, suitable diversionary routes do generally exist so that despite the need to provide for cross-Pennine north services on a 24-hour basis it is normally possible to maintain rail access between main centres during engineering work, although given the nature of the diversionary routes road replacement services may be required to serve intermediate stations.

However, east of Gilberdyke there is no practical diversionary route for traffic between Hull, the East Coast Main Line (ECML) and places to the south and west. Therefore, when the signalling is renewed consideration should be given to provision of bidirectional signalling between Gilberdyke and Hull. The line from Temple Hirst Jn on the ECML to Selby and Hull is normally closed during the night hours and therefore any expansion of services later at night (or earlier in the morning) would have cost implications for signal operations staffing until signalling control can be centralised into a route signalling centre.

Traffic on the line from York to Scarborough is now less seasonal than in the past, due to growing conference and “short break” trade within the town. There is no diversionary option other than a highly circuitous route via Hull and

Bridlington. Therefore the future engineering access strategy will have to recognise the need to maintain weekend train services as a minimum up to the early evening on Saturdays and from the early afternoon on Sundays (mid-morning during holiday periods). Potential options for this include single line working and the provision of bidirectional signalling when renewals become due.

Regional links

Stakeholders believe that the journey times between Hull and Doncaster are too long when compared with other parts of the RUS area. Analysis suggests that work to increase the linespeed may offer high value for money. It is therefore recommended that a scheme is developed to investigate the optimal trade off between journey time, additional station calls and a performance buffer as well as the business case for implementation.

Freight capability

The recently completed enhancements on the Hull Docks branch have delivered a step change in potential freight capacity from this port. Analysis undertaken during the RUS process has demonstrated that the existing infrastructure between Hull and Gilberdyke can accommodate a further six freight train paths per day without material detriment to the performance of other services. A significant amount of freight traffic in addition to these six paths would be required to generate the business case for a further capacity upgrade, and this level is not anticipated during the 10-year RUS period. On this basis no infrastructure enhancements are recommended.

Either of the potential enhancements to passenger services during the inter-peak would mean that freight trains could only operate every second hour when the proposed two-hourly National Express East Coast (NXEC) service via Micklefield is not planned to run. This would have to be taken into account when the inter-peak timetable is developed through the normal industry processes, although this route section is lightly used by freight trains at present.

Barnsley and Pontefract lines

Peak crowding

Currently services to and from Knottingley and Sheffield are overcrowded during the high peak hours with large numbers of passengers standing between Castleford, Woodlesford and Leeds. It is recommended that the frequency of Knottingley – Leeds services is increased during the peak from hourly to half-hourly. The new service would be operated by units in four-car formation, thereby providing an additional 12 vehicle arrivals/departures over three hours. Infrastructure work will be required at Castleford to accommodate the additional traffic.

Despite having an inferior business case this option is preferred to an additional Castleford – Leeds service, as some overcrowding occurs east of Castleford and it is not thought that train lengthening within the constraints of existing platform lengths will provide sufficient capacity in the high peak. Furthermore, the additional service from Knottingley will partially alleviate the regional links gap described below. Overall the scheme has a medium value for money indicated by a BCR of 1.6. Under this option services will call at Pontefract Monkhill and Glasshoughton, which is a requirement of WYPTE.

In the Barnsley – Sheffield corridor, most trains are overcrowded during the high peak hours with standing occurring from as far as Wombwell. Approximately four additional vehicles arrivals/departures are required to alleviate this and accommodate future growth, and it is recommended that these are included in the fleet with the busiest peak services lengthened to operate in four-car formation. The option offers high value for money indicated by a BCR of 3.3.

For the purpose of the RUS the proposed tram-train trial between Huddersfield and Sheffield has been treated as a temporary measure which does not affect the peak capacity requirement for the lines. If the tram-train vehicles and service are retained on a permanent basis it will be necessary for stakeholders to re-examine the level of peak capacity that is required.

Engineering access

The largest centre within this corridor is Barnsley. For travel to Leeds, options exist via both Wakefield and Huddersfield, so that even if one route is blocked generally a through journey by rail is possible. Similarly, Manchester can be reached via Huddersfield or via Sheffield. However, in the case of Barnsley – Sheffield (giving access to Doncaster, the East Midlands and London), there is only one route available via Elsecar and Meadowhall. To provide consistent seven-day access consideration will need to be given to provision of bidirectional signalling when renewal becomes due.

Regional links

The currently hourly passenger service to Knottingley is infrequent relative to the size of the town, and local stakeholders believe that more frequent services are required to support regeneration in the area. Analysis suggests that increasing the frequency of the Knottingley – Leeds services to run twice an hour for most of the day would have a low value for money business case if it were implemented currently. However, the regeneration programme in the Pontefract area is likely to significantly increase the size of the catchment population which will in turn increase the number of passengers using the line and improve the business case for the increased frequency. If the programme of house building continues as planned it is anticipated that the scheme will offer medium value for money if it commences in approximately five years' time. On this basis it is recommended that the service frequency is increased during the inter-peak in Control Period 5 (CP5).

Stakeholders believe that that the journey time between Leeds and Sheffield is excessive relative to the size of the cities and the distance between them. Analysis suggests that any potential linespeed improvements may be extremely costly and on this basis it is not clear whether investment would offer sufficient value for money. Despite this it is recommended that linespeed improvements are investigated further, particularly with a view to reinstating calls at Elsecar.

Freight capability

The absence of a suitable route to allow intermodal container traffic to pass on standard wagons from Wakefield Europort northwards has been identified as a constraint to development of this traffic as indeed is the lack of diversionary routes for use during engineering works or perturbation on the ECML. The Wakefield Europort to Colton Jn section of the route is therefore included for development work in the Northern Gauging Project.

The additional infrastructure recommended under option BP1 will provide sufficient capacity for the additional passenger services and the expected number of freight trains. Before passenger services are extended to Knottingley in CP5 it will be necessary to re-examine the impact on freight services using Knottingley West Jn.

Table 5.6 – Barnsley and Pontefract lines options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
BP1	Knottingley – Leeds peak shuttles: ■ 3 x four-car new Knottingley – Leeds services in each peak ■ New track infrastructure at Castleford.	Peak crowding, regional links	Include in strategy	1.6
BP2	Castleford – Leeds peak shuttles: ■ 3 x four-car new Castleford – Leeds services in each peak ■ New track infrastructure at Castleford.	Peak crowding, regional links	Do not include in strategy, although it may represent a short-term solution – see chapter 6	2.9
BP3	Operate BP1 all day.	Regional links	Include in the strategy for implementation in CP5	1.6
BP4	Barnsley – Sheffield train lengthening: ■ four additional vehicles spread across busiest peak arrivals/ departures.	Peak crowding	Include in strategy	3.3
BP5	Loading gauge for intermodal freight traffic.	Freight capability	Wakefield Europort to Colton Jn is included in development work for the Northern Gauging Project	
BP6	Linespeed enhancement.	Regional links	Investigate further	n/a

Wakefield line

Peak crowding

Considerable growth in peak demand has occurred in recent years and a number of trains in the high peak and shoulder peaks have some standing into and out of Leeds. Overcrowding predominantly occurs over a short distance on-trains which call at Outwood and Sandal & Agbrigg, as these stations are not served by the long distance high speed services. Given the characteristics of this overcrowding it is recommended that one additional peak stopping service is operated between Doncaster and Leeds In each peak period, and that five vehicles are added to the fleet such that Sheffield – Leeds services can operate in up to five-car formation. It is also recommended that during the rolling stock cascade to deliver HLOS capacity requirements the current Class 321 rolling stock is replaced with higher capacity vehicles. The scheme offers high value for money, indicated by a BCR of 3.3.

The initial preferred option from the Draft for Consultation (WF1) cannot be delivered as the planned infrastructure enhancement at Wakefield Westgate will not allow operation of additional shuttle services between Wakefield Westgate and Leeds, and the business case for this option cannot support the cost of the additional work that is required.

Regional links and inter peak crowding

Stakeholders believe that that the journey time between Leeds and Sheffield is excessive relative to the size of these cities and the distance between them and analysis suggests that a relatively modest linespeed enhancement may offer high value for money. It is therefore recommended that the optimal trade off between journey time, additional station calls, and a performance buffer, as well as the business case for implementation, is investigated further.

Freight capability

The Freight RUS identified a gap in terms of lack of adequate freight paths over the South Kirkby Jn – Hare Park Jn section. The Shaftholme Jn scheme which is due to be implemented in Control Period 4 (CP4) will provide an alternative route for a greater proportion of freight traffic, and based on current freight growth trends it is very unlikely traffic demands will exceed capacity in the South Kirkby Jn – Hare Park Jn corridor during CP4. It is anticipated however that this section of the line will come under increasing pressure in CP5, and it is recommended freight growth projections are continually monitored, and that an infrastructure scheme is developed for implementation in CP5 if required. If option YS2 were implemented an additional hourly passenger service would use this line section and the Shaftholme Jn scheme helps accommodate expected freight growth in CP5.

Reactionary delays

South Kirkby and Hare Park Jns have been identified as significant locations for reactionary delay, arising from the fact that the section of line between them is already close to capacity and therefore any service perturbation will have a significant impact, particularly given the diversity of origins and destinations of the trains. With the implementation of the Shaftholme Jn scheme in CP4 the situation is expected to improve in the short/medium term, but looking to CP5 and beyond proposals for improvement will need to be developed based on the work mentioned above to assess future solutions.

Table 5.7 – Wakefield line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
WF1	Wakefield – Leeds and Doncaster – Leeds peak shuttles: ■ 2 x three-car Wakefield Westgate – Leeds services in each high peak hour ■ 1 x four-car new Doncaster – Leeds service in each peak ■ change Doncaster – Leeds rolling stock to higher capacity vehicles.	Peak crowding	Do not include in strategy as Wakefield scheme will not support the option	<2.0
WF2	Sheffield – Leeds via Moorthorpe train lengthening or a further Doncaster – Leeds Peak shuttle: ■ 1 x four-car new Doncaster – Leeds service in each peak ■ five additional vehicles spread across five services in each peak ■ change Doncaster – Leeds rolling stock to higher capacity vehicles ■ platform lengthening.	Peak crowding	Include in strategy	3.3
WF3	Timetabling work to examine provision of extra freight paths.	Freight capability (capacity)	The Shaftholme Jn Remodelling scheme would allow a number of services to be rerouted away from the Doncaster – Hare Park corridor thereby freeing up some freight capacity	n/a
WF4	Linespeed enhancement.	Regional links	Develop further	>2.0

Huddersfield line

Peak crowding

The number of commuters using the line has been increasing steadily for several years. During the high peak in particular overcrowding occurs between Huddersfield and Leeds, and between Huddersfield and Manchester on both Northern Rail and TransPennine Express (TPE) services. Whilst the North-West RUS included a strategy for alleviating crowding on Northern Rail services between Stalybridge and Manchester – and recommended provision of an additional bay platform at Stalybridge – it was remitted to the Yorkshire and Humber RUS to examine the Huddersfield route as a whole.

Greater Manchester Integrated Transport Authority (GMITA) has an aspiration for 2tph in the off-peak and a third service in the peak hour between Huddersfield and Manchester that would call at all or most intermediate stations.

Options that are currently being considered to deliver additional capacity between local stations and Manchester through the HLOS process involve an additional service between Stalybridge and Manchester. This is consistent with the recommendations of the North West RUS.

The mixed rolling stock type and varied calling pattern of services mean that it is not possible to increase the frequency of the local services to and from Leeds operated by Northern Rail. It is therefore recommended that Northern Rail services are lengthened to alleviate overcrowding between Leeds and stations which are only served by these trains. It is anticipated that around nine additional vehicles are required, with the longest trains increasing to operate in up to six-car formation.[2] The service pattern would be based around a Leeds to Huddersfield stopping service and another between Manchester Victoria and Huddersfield/Stalybridge. This option has a medium value for money case, indicated by a BCR of 2.0. Infrastructure development work at Huddersfield will consider the relative merits of a new platform and development of Platform 5.

It is also recommended that the frequency of cross-Pennine services between Manchester and Leeds via Huddersfield is increased from four to five trains per hour, which will bring significant benefits in terms of relief of overcrowding to both TPE and local stopping services. It is envisaged that four of the five trains would call at the minimum number of TPE served stations between Leeds, Huddersfield and Manchester that is required to provide adequate capacity, with the fifth service calling at Dewsbury, Huddersfield and Stalybridge. This would minimise the Leeds – Manchester journey time for the majority of passengers who are likely to use the services whilst ensuring that the total capacity provided by both local and cross-Pennine operators is sufficient at the stations currently served by TPE. In the longer term it is expected to be possible to include an additional stop in the fifth train subject to the business case. As discussed above, the additional service would start/terminate at Selby or Hull in the peaks to relieve overcrowding east of Leeds on existing services. At other times the service could terminate at Leeds or continue to Selby or Hull. Overall it is recommended that around 15 additional vehicle arrivals/departures at Leeds are provided in each three-hour peak to alleviate crowding, and whilst it is expected that the majority of these can be provided through the additional service, some train lengthening may be required. When combined with the 14 additional peak vehicle arrivals/departures that are recommended for the section east of Leeds, this scheme will provide significant additional capacity between Selby/York, Leeds, Huddersfield and Manchester, and represents an efficient use of rolling stock as most additional sets of rolling stock will provide more than one additional peak arrival/departure in Leeds or Manchester.

Further work completed during the consultation period shows that five trains per hour can be timetabled on the route at the cost of some

2 In practice this would be four 23-metre long vehicles or up to six shorter pacer vehicles – any longer formation would demand substantial platform lengthening with consequent cost

unevenness of departure times at Manchester and Leeds, as well as some pathing time in other services, and the impact on performance is relatively small. Enhanced freight loops at Marsden and at Diggle would mitigate some of the timetable unevenness and the impact on performance, and although the total cost of these is around £6 million, analysis suggests that there is a sound business case for the loops to be upgraded. As well as ensuring that the timetable is robust, this infrastructure work would also reduce Manchester – Leeds journey times, and as such contributes towards the DfT's published aspiration for a 43-minute Manchester – Leeds journey time. Funding provision for journey time improvements was included in ORR's recently published final determination for CP4. On this basis the enhanced freight loops at Marsden and Diggle are recommended, however they should not be viewed as a prerequisite to the frequency increase given that the timetable can be made to work without a major detrimental impact on performance.

The additional cross-Pennine service also fits with the options to deliver additional peak capacity between local stations and Manchester that are being considered in the HLOS delivery process.

Off-peak crowding

The number of passengers travelling during the weekday inter-peak (10:00 – 15:59) has increased significantly over the last few years, and passenger counts indicate that several cross-Pennine services are operating at or beyond seating capacity between Leeds and Manchester. By 2014 it is anticipated that without additional rolling stock, three out of four services will have passengers standing between Leeds and Manchester.

It is recommended that the additional peak cross-Pennine service is also operated during the inter-peak as this is an extremely efficient way to accommodate demand growth between Manchester and Leeds. When combined with the peak option, the scheme offers a high value for money indicated by a BCR of greater than 5.0. It is a GMITA aspiration that the fifth train makes some additional intermediate stops and this is expected to become practical in the medium term. As discussed above, it is envisaged that four of the five services would call at the minimum practicable number of stations between Leeds, Huddersfield and Manchester, with the fifth service calling at Dewsbury, Huddersfield, Stalybridge and potentially one additional station subject to the business case.

Engineering access

This section of route is one of the most critical in terms of continuous access, given the existence not only of various freight operations but also of cross-Pennine passenger services throughout the night to maintain a link with Manchester Airport. The need can generally be accommodated by the fact that a number of alternative routes exist so that in most cases rail access between the principal centres can be maintained. The primary solution will therefore continue to be based around careful possession planning, coupled with progression of schemes to improve the loading gauge profile of diversionary routes for freight traffic. Heaton Lodge Jn to Thornhill LNW Jn is a key section for TPE services as it is not efficient to maintain TPE train crew route knowledge via Bradford Interchange for diversionary purposes and the increase in journey time in any case is significant. Consideration will need to be given to bidirectional signalling and a flexible layout over this section when renewals become necessary.

Regional links

Stakeholders believe that the current journey times and frequency of services between Manchester and Leeds are inadequate to meet the requirements of steadily increasing numbers of passengers.

Operation of the fifth cross-Pennine service between Manchester and Leeds, along with the potential associated infrastructure works will provide a significant improvement over the current situation.

Freight capability

The present loading gauge of W8 is not conducive to development of the intermodal container market, where the increasing requirement is to convey 9'6" containers on standard height wagons. As a result, the Leeds – Huddersfield – Manchester route is included within the development work for the Northern Gauging Project.

Table 5.8 – Huddersfield line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
HD1	Huddersfield/Brighouse – Leeds lengthen stopping services: ■ nine additional vehicles spread across approximately five services ■ new platform at Huddersfield ■ platform lengthening at other stations.	Peak crowding, off-peak crowding	Include in strategy	2.0
HD2	Manchester – Leeds – (Selby) additional all day hourly semi-fast service: ■ additional hourly service in each direction ■ additional vehicle arrivals In the high peak delivered through train lengthening to provide 15 vehicle arrivals/departures west of Leeds and 14 vehicle arrivals/departures east of Leeds over the three hour peak when combined with the additional hourly services ■ enhanced freight loops at Marsden and at Diggle.	Peak crowding, off-peak crowding	Include in strategy	>5.0
HD3	Manchester – Leeds inter-urban train lengthening: ■ 12 additional vehicles spread across approximately six services ■ platform lengthening.	Peak crowding	Do not include in strategy	1.4
HD4	Restrictive loading gauge for freight trains.	Freight capability	Included in development work for Northern Gauging Project	n/a

Calder Valley line

Peak crowding

During the high peak hours and parts of the shoulder peaks the eastern end of the route is one of the most overcrowded in the RUS area with passengers on some trains standing into Leeds from as far as Halifax. It is recommended that five additional four-car Halifax – Leeds services are operated during each peak period. If option YS1 is implemented east of Leeds then between three and all five of these services would continue to Micklefield (and occasionally beyond), whereas if option YS2 is implemented a practical maximum of three services could continue through. Linking a new Calder Valley service with local trains to/from the east of Leeds is an efficient way to deliver additional peak capacity on both lines and is an operationally attractive way to reduce the number of potential future platforming constraints at Leeds. Despite possibly requiring an additional crossover at Bradford Interchange, this option offers high value for money indicated by a BCR of 2.2. It is also more cost effective than train lengthening, which would involve the operation of longer trains throughout the length of the route with low occupancy for much of the journey.

A similar option is recommended to meet the HLOS capacity metric into Manchester by making most efficient use of additional vehicles with up to six additional Rochdale – Manchester Victoria three-car services operating during each peak period, calling at all stations, rather than train lengthening on the longer-distance services to/from Leeds. Given current and expected future passenger loads between Todmorden and Rochdale it is not expected that any more than two Rochdale – Manchester services in each peak would be required to continue to/from Todmorden or beyond to meet passenger demand. One am peak service already starts from Todmorden in the December 2008 timetable and uses the existing crossover facility to turn around. Use of the crossover would not work on a regular basis however there is scope for one or two trains to turn around there in each peak period, and pm peak trains calling at Todmorden also have the potential to terminate there and proceed empty to existing or new stabling facilities. As such a new turnback facility is not required to provide peak capacity and the inter-peak requirements are discussed in the following section.

It is anticipated that the additional passengers that would be generated by a potential new station at Low Moor can be accommodated by the recommended option. This will subject to review during the development of the scheme.

Regional links

The journey time between West Yorkshire and Manchester via the Calder Valley is significantly greater than via Huddersfield, and local stakeholders believe this has a detrimental impact on the connectivity of places served by the Calder Valley line, particularly Bradford. Analysis suggests that the most efficient way to do this is through a series of small scale linespeed enhancements along the length of the line, which will reduce the Bradford – Manchester journey time by up to five minutes for the fastest services, and will also benefit trains to and from Pennine Lancashire which use the line via Blackburn. It is recommended that this infrastructure work is included in the scope for the option detailed above.

It is possible to improve Bradford to Manchester journey times further by removing intermediate calls between Todmorden and Rochdale from some of the stopping services during the inter-peak. Northern Rail has already made this change to one service per hour in the December 2008 timetable, which was introduced during the consultation period. This means that once the recommended option has been implemented the fastest journey time will be approximately 10 minutes faster than in the previous timetable, giving a minimum Bradford – Manchester journey time of around 55 minutes.

Analysis suggests that there is no business case to remove the intermediate calls from either of the other two services in the hour as the cost of replacing these calls with a shuttle service is significantly greater than the incremental benefit of the scheme. On this basis there is no inter-peak requirement for a new turnback facility on the Calder Valley line, and given the absence of a requirement to meet peak demand it is not possible to recommend construction of infrastructure of this type.

For completeness Table 5.9 illustrates variants of the recommended option (CV3), which have the intermediate calls between Todmorden and Rochdale removed from two of the three inter-peak services, and replaced with an hourly shuttle service between Manchester Victoria and a new turnback facility at either Todmorden or Hebden Bridge (CV3a and CV3b respectively). There is a similar business case for both options although given the current and post RUS service pattern Hebden Bridge may be a more convenient place for interchange between services to and from Pennine Lancashire and to and from Manchester Victoria.

The Lancashire and Cumbria RUS identified the set of circumstances where provision of direct services between Manchester and Burnley via a reinstated Todmorden Curve could offer a value for money that is sufficient to secure DfT funding. These are:

– if the missing section to the south of the curve were reinstated as part of the recommended scheme to provide additional peak capacity between the Calder Valley and Manchester
– if the additional rolling stock is available, either through a capacity requirement to have more frequent Todmorden – Manchester services, or from the existing fleet.

Given that the preferred solution for the Calder Valley does not require the infrastructure at Todmorden, direct services between Burnley, Todmorden and Manchester can only be recommended if the rolling stock and infrastructure is funded by a third party.

Engineering access

The largest conurbation primarily dependent on this route is Bradford. The city benefits from the fact that it has two main stations and two separate routes to Leeds, so that in normal circumstances at least one route between Bradford and Leeds is always available and in turn Leeds connections are almost invariably available to key destinations such as Doncaster, York, Sheffield and London. For travel in a south-westerly direction towards Halifax and Manchester, the position is less favourable, since if the line between Bradford Interchange and Halifax is blocked the only alternative lies in a lengthy diversion via Leeds. When signalling renewals become due, it will therefore be appropriate to consider bidirectional facilities in this area.

Reactionary delays

Rochdale station has been identified as a very significant cause of reactionary delays, though this appears to be a technical anomaly due to the fact that Oldham loop services terminate and almost immediately restart as another service. Transfer of the Oldham loop to Manchester Metrolink may overcome the problem, however, stakeholders have raised concerns that the heavy rail facility at Rochdale may not be adequate to accommodate the likely future service pattern and it is recommended that as the Metrolink conversion scheme is developed it takes these issues into account.

Freight capability

No specific gaps have been identified on this line, and it is not anticipated that the proposed options will materially affect freight operations.

Table 5.9 – Calder Valley line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
CV1	Halifax – Leeds (and beyond) additional peak services: ■ 5 x four-car additional service in each direction ■ additional crossover at Bradford Interchange (as part of planned scheme).	Peak crowding	Include in the strategy, subject to further work on option CV3	2.2
CV2	Manchester Victoria – Leeds train lengthening: ■ 20 additional vehicles spread across the majority of peak arrivals into Leeds ■ platform lengthening.	Peak crowding	Do not include in the strategy	1.3
CV3	West Yorkshire – Manchester Victoria improved journey times and additional services: ■ six additional Rochdale – Manchester three-car peak stopping services ■ linespeed enhancement.	Peak crowding, regional links	Include in the strategy	2.9
CV3a	West Yorkshire – Manchester Victoria improved journey times and additional services: ■ six additional Rochdale – Manchester three-car peak stopping services ■ linespeed enhancement ■ two-thirds of inter-peak services run fast between Todmorden and Rochdale rather than one-third as currently ■ hourly inter-peak Todmorden – Manchester Victoria shuttles ■ new turnback facility at Todmorden.	Peak crowding, regional links	Do not include in the strategy	2.1
CV3b	West Yorkshire – Manchester Victoria improved journey times and additional services: ■ six additional Rochdale – Manchester three-car peak stopping services ■ linespeed enhancement ■ two-thirds of inter-peak services run fast between Todmorden and Rochdale rather than one-third as currently ■ hourly inter-peak Hebden Bridge – Manchester Victoria shuttles ■ new turnback facility at Hebden Bridge.	Peak crowding, regional links	Do not include in the strategy	2.1

Hope Valley line

Peak crowding

There is an increasing problem of peak period crowding on all operators' services into Sheffield, which is anticipated to deteriorate over CP4 as a consequence of expected passenger growth on the route. The preferred option to alleviate this is an additional hourly peak-busting Manchester – Sheffield service during the three-hour am and pm peaks. This is likely to be an extension of an existing Manchester – New Mills Central service and peak services would be increased from the current two cars to three-car formations. This option would require a redoubling scheme at Dore Jn at an estimated capital cost of £15 million. Including the cost of redoubling Dore Jn, the BCR of the additional service is estimated at approximately 2.0, which is indicative of high value for money. Evidence from further analysis conducted during the consultation period suggests that train performance will be broadly equivalent to present levels.

Lengthening some existing peak Sheffield – Manchester services from three-car to four-car operation has a similar value for money case; however, in contrast to the previous option it does not address the regional linkage gap discussed below. For this reason it is viewed as a fall-back option for delivering more peak capacity on the route.

It is recognised that some recasting of local services in the Manchester area would be necessary to allow the recommended changes, and this will probably involve the Marple and New Mills services.

Regional links and off-peak crowding

Stakeholders believe that the frequency of fast services between Sheffield and Manchester is insufficient relative to the size and proximity of these major UK cities, and despite East Midlands Trains' changes to the fleet used to operate the Liverpool – Norwich services, it is anticipated that a number of services on the route will become overcrowded during the inter-peak. It is therefore recommended that the peak additional Sheffield – Manchester service is extended to operate during the off-peak. Analysis conducted during the consultation period has confirmed that additional freight loops in the Hope Valley will be required to accommodate the new passenger services and the freight trains which operate outside of peak periods, and it is recommended that these are constructed during planned renewals in CP5. This option is an extremely efficient way to provide extra capacity during the inter-peak and has a high value for money case as indicated by a BCR of 2.8.

This option has been assessed against the existing train fleet and service pattern, but also has a number of potential options to improve the Liverpool – Norwich service group which are currently being examined by the East Midlands RUS.

Stakeholders believe that the journey time between Sheffield and Manchester is excessive relative to the size of these cities and the distance between them and analysis suggests that a relatively modest linespeed enhancement may offer high value for money. It is therefore recommended that a scheme is developed to GRIP stage 3 which will investigate the optimal trade off between journey time, additional station calls, and a performance buffer, as well as how to mitigate the significantly different speed between trains on the route, and the business case for implementation. Any resultant scheme would be implemented during planned renewals in CP5.

Freight capability

If freight traffic does increase further, the additional freight loops in the Hope Valley and the Dore redoubling scheme will increase the resilience of future timetables in the area, and it is recommended that development of the scheme should include a more detailed understanding of future freight growth.

Reactionary delays

Significant reactionary delays have been identified as occurring at Dore Station Jn and Totley Tunnel East, one cause being the short section of single track through Dore & Totley station. The Dore redoubling scheme will mitigate this problem.

Table 5.10 – Hope Valley line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
HV1	Additional peak Manchester – Sheffield services: ■ three-car additional hourly service via New Mills ■ double tracking through Dore station.	Peak crowding, regional links	Recommend in the strategy subject to performance modelling work	2.1
HV2	Manchester – Sheffield peak train lengthening: ■ at least four additional vehicles spread across four services ■ platform lengthening.	Peak crowding	Alternative to HV1, however do not include in strategy	1.5
HV3	Additional inter-peak Manchester – Sheffield services: ■ additional hourly service via New Mills ■ additional freight loops in Hope/ Grindleford area ■ double tracking through Dore station (completed with HV1).	Regional links, freight capability	Recommend in the strategy	2.8
HV4	Linespeed enhancement.	Regional links	Develop to GRIP stage 3	>2.0

■ Sheffield – Doncaster/Moorthorpe line

Peak crowding

A number of services are overcrowded during the high peak hour in the morning and particularly the evening, with standing typically occurring from as far as Conisbrough on the Doncaster line and from Bolton-upon-Dearne on the Moorthorpe line. It is recommended that an additional six vehicles are spread across two peak Doncaster – Sheffield services and one peak Leeds – Sheffield via Moorthorpe service. The options for both lines have a high value for money case, indicated by BCRs of 3.4 and 2.2 respectively.

If option YS2 were implemented there would be one fewer service per hour operating between Sheffield and Doncaster. Based on the most recently available set of passenger counts at least two additional vehicles in traffic would be required to accommodate displaced passengers on the busiest alternative services. This would have to be examined in more detail if the option were implemented to provide that the resultant passenger loads are properly balanced at the busiest times. It is important to emphasise that these vehicles are in addition to the previous recommendation.

Regional links

Rotherham has a service frequency of three trains per hour, and a number of stakeholders believe this is insufficient given the size of the rail catchment area and the proximity of the town to Sheffield. An assessment of the options to increase the service frequency to five trains per hour has been undertaken on behalf of South Yorkshire Passenger Transport Executive (SYPTE) by consultancy firm Arup.

This work has identified a strong business case, based exclusively on the economic benefit and revenue generated by the improved connectivity between Rotherham, Sheffield and beyond. Network Rail and representatives of the RUS Stakeholder Management Group have examined this work and are satisfied that an increased frequency of five trains per hour via a redoubled Holmes Chord is likely to have high value for money, particularly as the current work does not include the potential for a reduction in the delay to services caused by the current infrastructure.

On this basis the scheme is recommended, however because it is unlikely to contribute significantly to the HLOS capacity metrics delivery of the scheme will be planned for CP5. Given that the cost of the infrastructure is likely to be around £15 million, the scheme will be subject to further rigorous appraisal as it progresses through the GRIP stages.

Engineering access

Diversionary opportunities exist for many journeys (although there are limitations in terms of capacity and linespeed), but there are no suitable alternatives between Mexborough and Doncaster and as such this section should be considered for bidirectional signalling when signalling renewals become due. Rotherham Central station, being located on a loop, can be adversely affected by engineering work, but effectively mitigation could only be provided by re-opening Rotherham Masborough station. There are, however, no plans to open this former station.

Reactionary delays

Swinton has been identified as a location at which very substantial reactionary delays occur in respect of both passenger and freight trains. It forms a hub at which several lines converge and the services passing through it originate and terminate over a very wide area and as such it is likely that as traffic continues to grow consideration will have to be given to capacity improvement, which could include additional tracks and grade separation.

Rotherham Central and Aldwarke Jn at a somewhat lower level are also significant reactionary delay locations. One cause is the single line section between Rotherham Central and Holmes Jn over which all passenger trains serving Rotherham must pass and which can readily become a source of congestion in the event of out-of-course running. The Holmes Chord doubling scheme is likely to reduce the reactionary delays in this area.

Freight capability

The line forms an important component in the overall freight network and its current limited loading gauge if not improved would form an increasing constraint to development of the growing intermodal container market. As a result this route is included within the development work for the Northern Gauging Project.

It is anticipated that the Holmes Chord doubling scheme will make the route more robust as a freight artery as it provides a higher frequency alternative route for passenger services.

Table 5.11 – Sheffield – Doncaster/Moorthorpe line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
SD1	Doncaster – Sheffield peak train lengthening: ■ four additional vehicles spread across two services.	Peak crowding	Include in strategy	3.4
SD2	Leeds – Sheffield via Moorthorpe peak train lengthening: ■ two additional vehicles on one service.	Peak crowding	Include in strategy	2.2
SD3	Increase train service frequency from three to five per hour via doubled Holmes Chord.	Regional links	Include in the strategy	>2.0
SD4	Improve loading gauge for intermodal freight trains.	Freight capability	Lines included in development work for Northern Gauging Project	n/a

Immingham/Cleethorpes line

Engineering access

The key flows in this corridor are freight traffic to and from Immingham and also for the Corus plant at Scunthorpe. Given its criticality for freight traffic, the south Humber corridor forms part of the current national Seven Day Railway workstream and as part of this exercise the issues and opportunities have been examined. The recent upgrading of the Barnetby – Gainsborough via Brigg line has given improved diversionary opportunities, so that the most critical areas remaining are the three-track section between Brocklesby and Barnetby and the two-track section between Brocklesby and Immingham. As part of Seven Day Railway, consideration is being given to the provision of additional facing crossovers between Doncaster and Scunthorpe to facilitate single line working, whilst possible layouts in relation to a fourth line between Brocklesby and Barnetby are being looked at in a Seven Day Railway context for both freight and passenger traffic. At the time signalling renewal falls due, it will certainly be appropriate to consider either four-tracking or the installation of bidirectional working over the latter section.

A cyclical maintenance pattern is currently being finalised as a further contribution to the implementation of Seven Day Railway principles.

Against a background of continued freight growth, in the longer term the above may not be sufficient and it could then become appropriate to pursue further measures. As such, double-tracking of some or all of the current single track sections of the recently upgraded Barnetby – Brigg – Gainsborough line is being looked at and is currently under discussion with freight operators.

Regional links

Stakeholders have expressed a concern that linespeeds are too low between Cleethorpes and Doncaster, and it is recommended that the potential to raise these is investigated.

Freight capability

The lines in this corridor are heavily used by freight for which capacity has recently been substantially improved by the upgrade of the Brigg line. Against this background, the restricted loading gauge would handicap development of the intermodal market.

Early stage analysis completed to support the RUS suggested that Thorne Jn will require remodelling to allow predicted additional freight traffic to use the route. A Network Rail Discretionary Fund (NRDF) scheme is currently being developed to implement this remodelling.

Network Rail is currently developing a scheme to four-track the line section between Brocklesby and Barnetby and if there is an acceptable business case Transport Innovation Funding (TIF) might be accessible.

Reactionary delays

Wrawby and Brocklesby Jns are both significant sources of delay and for freight trains they are the highest source of reactionary delay within the RUS area. This is to some extent an inevitable consequence of the sheer volume of freight movements in the area, coupled with the number of conflicting moves and the diverse origins and destinations of the traffic causing delay to be imported from a wide area of the network. It is expected that the recently completed upgrade of the Brigg line will to some extent ease the position. Beyond this, it is likely that quadrupling of the track mentioned under engineering access would bring further benefit.

Table 5.12 – Immingham/Cleethorpes line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
IC1	Improved loading gauge for freight trains Doncaster – Immingham via Scunthorpe and via Brigg.	Freight capability	Included in development work for Northern Gauging Project	n/a
IC2	Improved loading gauge for freight trains Gainsborough – Lincoln – Wrawby.	Freight capability	As above	n/a
IC3	Cleethorpes – Doncaster linespeed improvements.	Regional links	Develop further	n/a

Penistone line

The Barnsley – Penistone – Huddersfield line is a Community Rail route and is also proposed for the tram-train trial project. It is expected that development of the route will be led by those initiatives. See also Barnsley and Pontefract line for options to alleviate crowding at the Sheffield end of the line. There will be a need for provision within any tram-train trial to accommodate crowding and growth south of Barnsley and for similar provision on completion of the trial.

Retford/Lincoln line

Regional links

Stakeholders believe that that the journey times between Lincoln and Sheffield are excessive when compared with other parts of the RUS area. Analysis suggests that a standalone linespeed enhancement scheme may not offer sufficient value for money to justify the expenditure. Despite this, there may be the opportunity to increase the speed of passenger services through the planned GN/GE Joint Line project.

Robin Hood Airport Doncaster Sheffield (RHADS) does not have any rail services, despite being adjacent to the line from Doncaster. Local stakeholders believe that the accessibility of the airport and the local area suffers as a result, and view provision of direct services to and from Doncaster as a solution to this. The airport owners have already committed to finance the cost of a new station at the airport.

The simplest way to serve the airport would be for current Lincoln – Doncaster services to call there. This would be extremely low cost and could be accommodated within the existing timetable. Unfortunately only five services per day are currently routed via the site of the proposed airport station and this would not be that attractive. It is estimated that up to 5,000 passengers per annum would use the service and it is unclear whether this would offset the disbenefit through the slightly increased journey times caused by the addition of the airport call. It is recommended that the incumbent Train Operating Company should decide as to whether there is a commercial case for a service on this basis.

It is likely that if a new hourly or half-hourly service from Doncaster were introduced, sufficient passengers would be attracted to cover the cost of operation. An hourly or better service frequency cannot be operated however, without significant infrastructure work at Doncaster station. This infrastructure work may be required to deliver additional capacity on the ECML; however, it is not likely that this will be known by the end of the consultation period. Based on an analysis of the likely mode share that rail could capture, the total number of airport passengers would be required to grow approximately in line with the airport's official growth projection of around 16 percent per annum to 2016 to offer high value for money.

A third party funder with an aspiration for hourly or better services would need to be satisfied that the total scheme benefit is at least twice the estimated £9 million cost of the infrastructure work as well as the estimated operating cost of at least £700,000 per annum.

Freight capability

This line has considerable potential for freight which, so far as intermodal traffic is concerned, is limited by restricted loading gauge. The GN/GE Joint Line project will deliver a substantial improvement on the section of the line between Lincoln and Gainsborough.

Table 5.13 – Retford/Lincoln line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
LN1	Gainsborough – Lincoln – Wrawby loading gauge for freight trains.	Freight capability	Included in development work for Northern Gauging Project	n/a
LN2	Airport calls in existing services ■ five trains per day in each direction ■ airport station funded by private sector.	Regional links	Commercial decision for Train Operating Company	n/a
LN3	New airport service ■ new hourly or half-hourly service ■ requires Doncaster infrastructure scheme ■ airport station funded by private sector.	Regional links	Local stakeholders to develop further	n/a

Chesterfield line

Peak crowding

Growth in commuting demand in this corridor has led to overcrowding on a number of peak services, particularly where these are formed of two-car or three-car trains. Introduction of the new hourly Leeds – Sheffield – Nottingham service in December 2008 has provided some additional capacity to relieve overcrowding. Also, East Midlands Trains is planning to extend its London – Derby services to/from Sheffield from December 2009 giving two trains an hour between London and Sheffield which, if implemented, will provide further additional capacity between Chesterfield and Sheffield.

Table 5.14 – Chesterfield line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
CH1	Peak growth and crowding between Chesterfield, Dronfield and Sheffield has been partly addressed by the Nottingham – Leeds service introduced in December 2008. Further improvement can be expected from a planned increase in Sheffield – Chesterfield – London services in December 2009.	Peak crowding, off-peak crowding	n/a	n/a

Hull – Bridlington – Scarborough line

No significant gaps had been identified prior to consultation, beyond the fact that overcrowding can occur during the high summer. Despite this a number of consultation responses have suggested that the 90-minute off-pattern service frequency between Bridlington and Scarborough is insufficient given the catchment population. Most responses have advocated that at least an hourly service would be more appropriate, which would increase the frequency to the same level on the rest of the line to Hull.

Network Rail has investigated the business case for increasing the service frequency between Bridlington and Scarborough to hourly, by extending some more of the existing Hull – Bridlington services to Scarborough and replacing some of the resultant gaps in the Bridlington – Hull timetable with additional shuttle services. This work suggests the scheme value for money would only be sufficient to meet DfT funding criteria if it were possible to operate the service with no additional train crew or rolling stock. It is unlikely that this could be achieved even outside peak times, and on this basis it is not possible to recommend the option in the RUS as a regular all year round service. However, opportunities may exist to operate an improved service from the existing fleet and train crew resources to match seasonal demand.

Table 5.15 – Hull – Bridlington – Scarborough line options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
HS1	Increased Bridlington – Scarborough frequency scheme ■ hourly service frequency by extending some Hull – Bridlington services.	Regional links	Do not include in the strategy unless train crew and rolling stock can be found within existing resources	1.0

Miscellaneous

Engineering access

The Swinton – Church Fenton line forms a key artery for freight traffic and at its southern end for long distance high speed and local passenger services. For many purposes, possession planning based around diversion via Doncaster and the ECML provides a practical alternative, but it would be unrealistic not to recognise that the potential may be limited by increasing pressure on the Swinton – Doncaster line and the ECML. As such development of these routes will need to take into account the ability to handle diverted traffic especially at weekends. Options may include the provision of bidirectional signalling when renewals become due.

Leeds station area

Peak crowding

Services from the Airedale, Wharfedale and Harrogate lines almost exclusively use Platforms 1 – 5 at the far north of Leeds station, and trains are often accommodated during the peak by double stacking at each platform. This practice means that the full length of these platforms is utilised at the busiest times and it is unlikely that there is sufficient peak capacity at these platforms for additional or longer trains. It is therefore recommended that one or two additional bay platforms with associated track and signalling work are constructed at the north of Leeds station to accommodate additional and longer peak trains. Detailed work is currently underway to understand the scope of the infrastructure requirements. However, the combined business case for the three lines is robust against the likely capital cost. It is estimated that the combined capacity options for the three lines will offer at least a medium value for money providing the cost of infrastructure works remains below £24 million as expected.

The analysis presented in previous sections suggests that the most efficient way to deliver additional peak capacity on the Calder Valley line and east of Leeds is by linking the recommended Halifax – Leeds shuttle services with local services east of Leeds, although if the cross country franchise services were rerouted via Leeds, the number of trains that could do this would reduce by one per hour, and platform occupation times would increase. Given the current infrastructure, the only suitable locations for a number of services to start/terminate east of Leeds would be York or Selby. However, this is not an efficient use of rolling stock or train crew resources since the local services are typically lightly loaded until they are nearer Leeds, and analysis suggests that it would be more efficient to construct a turnback facility in the Micklefield area and start/terminate services there.

This would also reduce the number of conflicting movements at Micklefield Jn. Overall, the increased length and quantum of trains at peak periods on other routes into Leeds will mean that the current platform space will be quickly used up and accommodating further growth will require expansion of platform capacity in the centre and/or south of the station. These large changes would be extremely costly, and the facility in the Micklefield area reduces the amount of capacity required for terminating trains, and also aligns with WYPTE's aspiration for a strategic park and ride site east of Leeds. For these reasons the turnback facility at Micklefield is recommended.

The additional cross-Pennine and Knottingley/ Castleford – Leeds services mean that there will be considerable pressure on a section of E and particularly F line to the south west of Leeds station in the busiest peak hour. This is around the limit of what can be accommodated by the infrastructure and it is not possible to significantly reduce this without a major recast of the timetable. On this basis it is recommended that additional infrastructure is constructed to alleviate this capacity constraint. There are a number of potential options to provide additional platform capacity; the precise scope of this infrastructure will be defined during the project development process.

The business case for the recommended package of train lengthening and additional services for Leeds can support the additional infrastructure at the south of Leeds station as well as the new turnback facility east of Leeds.

Engineering access

As explained earlier in this chapter, for many of the major passenger and freight destinations suitable diversionary routes exist from Leeds or with some upgrading could be made available. However, with most rolling stock stabling and maintenance in the area centred on Neville Hill Depot, the route between Leeds station and Neville Hill is of vital importance to passenger train operations. No practical alternative route exists and with ongoing growth in traffic its usage will continue to increase. It is therefore recommended that the Seven Day Railway workstream will need to examine as a priority means of maximising access on a continuous basis. Options for this include bidirectional signalling and single line working.

Reactionary delays

Analysis has shown that Whitehall Jn is the largest source of reactionary delay at any single location within the RUS area. This arises as a result of the very intensive operations in the area, coupled with congestion related to a rail infrastructure which, despite interventions in the relatively recent past, is becoming increasingly constrained as train services continue to grow in response to demand. It is therefore recommended that options are developed to mitigate the impact of congestion at this key junction.

It is also noted that Leeds station is rapidly reaching the ceiling of its existing capacity and it is therefore recommended that as options are developed for further enhancing capacity at Leeds station performance implications are fully taken into account and mitigation measures proposed.

A depot performance improvement scheme is looking at improving access/egress at Neville Hill depot to provide an output change in terms of improved performance and regulation of trains in the Leeds Neville Hill area. The scheme has been developed to GRIP stage 3 using NRDF and is currently being held pending a better understanding of Infrastructure changes to accommodate IEP In this area.

Table 5.16 – Leeds station area options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
LD1	Combined Leeds north-west option with additional infrastructure at Leeds station: ■ options AI1, WH1, HA1 ■ Leeds station north end bay platforms.	Peak crowding	Include in strategy providing infrastructure cost below £24 million	>1.5
LD2	Construct new infrastructure to the south of Leeds station to alleviate congestion on F line.	Peak crowding	Include in strategy	>2.0
LD3	Construct new turnback facility in Micklefield area for trains from/to Leeds direction and develop options to make best use of the constrained infrastructure between Micklefield and Leeds.	Peak crowding	Include in strategy	>2.0
LD4	24-hour access between Leeds station and Neville Hill depot for which no diversionary route exists.	Engineering access	The Seven Day Railway workstream will need to examine the scope for bidirectional signalling on all tracks or other mitigation measures	n/a
LD5	Leeds Whitehall Jn has the highest level of reactionary delay within the RUS area.	Reactionary delays	Development of measures to improve capacity at Leeds will need to take this into account	n/a

■ Sheffield station area

Peak crowding and regional links

Analysis conducted during the consultation period has confirmed that the infrastructure at Sheffield station can accommodate all the new and lengthened services that are recommended in the RUS, and there is still a small amount of additional spare capacity for further service enhancements.

Reactionary delays

The Sheffield station area has one of the highest levels of reactionary delay within the RUS area. It arises in part from the very intensive train service operated, coupled with the fact that the station has seen no major resignalling or track remodelling for many years. As a result, the infrastructure has become increasingly inadequate and outdated as train services have grown and patterns have changed in response to demand, whilst “quick win” solutions where available have by now all been taken up.

The situation is not assisted by the fact that not all of the through platforms are signalled reversibly to allow arrivals and departures in both directions, whilst one of the three reversibly signalled platforms is typically occupied for approximately 25 minutes in each hour by the London service, placing a further limitation on flexibility. On the other hand, to achieve maximum utilisation, some Northern Rail local services are scheduled very short turnaround times so that even quite small delays to the incoming service will react onto the next working. With planned train lengthening the situation will become still more difficult, because the opportunity for "double stacking" of trains in bay platforms will be reduced. Since December 2008, most of East Midlands Trains' London to Sheffield services are formed of Class 222 Meridian trains, despite some limitations arising from the fact that not all through platforms at Sheffield are able to handle 10-car trains.

It is therefore recommended that when resignalling is due, consideration is given to reversible working on all through platforms and to the role of the through lines in the station which are lightly used. Additionally, when a major train service change is contemplated a balance will need to be struck between the relatively lengthy turnaround time allowed for long distance high speed services and the very short turnaround applied to some local trains.

Engineering access

The section of line between Sheffield station and Nunnery Main Line Jn is critical to continuity of service between Sheffield and a large number of key destinations as no practical alternative route exists. At present it is a section of double track with conventional Up and Down line signalling. It is recommended that when resignalling is carried out bidirectional working is provided to facilitate engineering access and increase flexibility at times of service perturbation. This is something that needs to be examined through the Seven Day Railway process or when the area is resignalled.

Table 5.17 – Sheffield station options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
SF1	Provide full reversible working on all through platform lines at Sheffield station.	Reactionary delays	To be considered when resignalling takes place	N/A
SF2	Provide bidirectional working Sheffield – Nunnery Main Line Jn.	Engineering access	To be considered when resignalling takes place	N/A
SF3	Capacity scheme to alleviate train lengthening of local and long distance trains at Sheffield.	Peak crowding	To be considered when resignalling takes place	N/A

Doncaster station

Reactionary delays

Doncaster station has been identified as an area in which significant reactionary delays arise, essentially as a result of the fact that numerous north – south and east – west services cross there on flat junctions. The future of the ECML timetable is currently under discussion as part of a detailed industry planning process outside the remit of the RUS. For this reason it has not been possible to conduct a detailed performance analysis of future timetables, however Network Rail has conducted a high-level analysis of how the changes to the ECML and Yorkshire and Humber services recommended in the respective RUSs are likely to impact on reactionary delays.

The ECML RUS recommended an increase in the frequency of main line passenger services from approximately 4.75 trains per hour to 6 trains per hour, and an increase in the frequency of freight services from 0.5 trains per hour to 2 trains per hour. This would increase the maximum number of potential conflicting movements at the station by around 40 percent, and significantly increase reactionary delay as a consequence. An enhanced service to RHADS would add a further 4 percent, whilst the aspiration of SYPTE for reinstatement of a direct rail link between Barnsley and Doncaster if implemented would almost certainly bring further potential conflicts.

A 44 percent increase in the number of conflicting movements would significantly increase the level of reactionary delay, and although some of this could be mitigated through alterations to local services it is likely that an enhancement of the infrastructure at Doncaster will be required to alleviate this.

Analysis suggests that a new bay platform to the west of the station with a new connecting line and additional crossover would have the potential to alleviate the majority of the additional conflicting movements. Furthermore, additional crossovers to the south east end of the station could also reduce the number of conflicts, and these could be implemented as a standalone measure or in addition to the new platform and associated infrastructure. More complex infrastructure solutions such as grade separation at the north end of the station have a limited potential to reduce the number of conflicts and may be less useful as a long-term solution.

Regional links

There is a strong local aspiration for services to a new station at Robin Hood Airport Doncaster Sheffield at Finningley beyond what could be provided by an additional stop in the existing Doncaster – Lincoln service. As with performance, detailed development of proposals will follow creation of the new ECML timetable, which will determine the optimal form for such services and other stakeholder aspirations for this important node.

Table 5.18 – Doncaster station options

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
DR1	Split Scunthorpe – Sheffield service at Doncaster and divert Lincoln services to Platform 2.	Reactionary delays	Not appraised as option requires additional resources	N/A
DR2	Operate above Scunthorpe – Doncaster through to RHADS.	Regional links	Not included in strategy in isolation as poor value for money	N/A
DR3	Identify overall infrastructure requirements for Doncaster station area in order to deliver increased ECML passenger and freight train paths, improved performance and facilitate other aspirations (eg. regular services to RHADS).	Regional links, freight capability, engineering access, and reactionary delays	Develop further once regular internal ECML timetable is known	N/A

- **Inter-regional services between the RUS area and the West Midlands**

Regional links, peak crowding and off-peak crowding

There are currently two services per hour between the North East and the West Midlands, of which approximately half (one per hour) are routed via York, Leeds, Wakefield Westgate and Sheffield, and the other half are routed via York, Doncaster and Sheffield. Both are operated by the CrossCountry franchise. The franchise was re-specified prior to its commencement, such that from December 2008 all services that operate via Leeds start/terminate in the South West, and the fleet was expanded so that some of the busiest services are operated by longer trains than previously.

Some stakeholders believe that an hourly direct service between two cities the size of Leeds and Birmingham is not sufficient. The December 2008 change of route south of Birmingham for the services that call at Leeds has significantly reduced connectivity between Leeds and places such as Oxford, Reading and destinations south thereof. A number of the services via Leeds which have not been lengthened through the re-franchising process are heavily loaded, and it is anticipated that at least four trains per day will have passengers standing for the majority of the route between Birmingham and Leeds. Although well used at certain times of the day, the services via Doncaster are typically less loaded than the services via Leeds.

Option YS2 detailed in the Leeds – York, Selby, Hull section has been identified as a way to provide additional peak capacity at Leeds as an alternative to the do-minimum option YS1. The former option involves rerouteing all CrossCountry franchise services via Leeds and provides the incremental additional benefit of improved connectivity between Leeds, Birmingham, Reading and south thereof, whilst providing additional capacity on the route between Leeds and Birmingham. Option YS2 will therefore alleviate the main connectivity and crowding gaps that have been identified, however it does have significant downsides in that it will remove the direct service between Doncaster, Birmingham and south thereof, thereby requiring passengers to change at Sheffield and will increase journey times to and from

the North East as the route via Leeds is geographically longer.

Given the respective benefits and drawbacks, the assessment of this option has been an extremely contentious issue amongst the RUS Stakeholder Management Group (RUS) and developing a common understanding of the practicalities and the business case for the option has been challenging. For this reason an extensive programme of analysis has been undertaken which is significantly more detailed than the work which is typically undertaken to understand RUS options.

For simplicity, option YS2 has been assessed against the do-minimum option YS1 and the economic appraisal presented below uses incremental costs and benefits associated with option YS2 compared with option YS1. The description of this work is more detailed than for previous line sections as the business case is extremely sensitive to the input assumptions, and it is important that the RUS is explicit about these issues. Network Rail has produced a central scenario which is designed to represent a balanced view of these key sensitivities, and this view is shared by the Department for Transport (DfT). The central scenario assumes that the planned regular interval East Coast Main Line timetable is in existence, providing a regular hourly service between Doncaster and York (and the North East), and that displaced passengers who currently travel between Doncaster and Sheffield are accommodated by existing services but with train lengthening at peak times. These vehicles are in excess of the additional capacity recommended in previous sections of this chapter and have been included as a cost in option YS2. In addition to the basic option three sub-options have also been assessed which involve accommodating displaced passengers through replacement services. These are as follows:

– YS2a Option YS2 plus an additional hourly peak shuttle service between Doncaster and Sheffield
– YS2b Option YS2 plus an additional hourly all day shuttle service between Doncaster and Sheffield
– YS2c Option YS2 plus an additional hourly all day shuttle service between York and Sheffield.

There are a number of other key sensitivities that members of the SMG have outlined during the development of the RUS. These sensitivities have not been included in the central scenario but would be likely to affect the assessment of the rerouteing option if they became reality. For this reason they are discussed at the end of this section.

Demand forecast

It is anticipated that option YS2 would attract an additional 112,000 passenger trips per annum. The largest increases as a result of the rerouteing would be on flows between Leeds and other cities such as York, Sheffield and Birmingham, and the largest decreases would be on the corridor between York, Doncaster and Sheffield. It is estimated that at least 23,000 of the additional trips would be generated through reduced crowding between West Yorkshire and the West Midlands. Table 5.19 overleaf details the 15 largest increases and decreases by flow.

Table 5.19 – Change in annual passenger trips by key flow

Rank	Key flows	Change in annual trips
1	Leeds – York	70000
2	Leeds – Sheffield	33000
3	West Yorks – West Midlands Crowding Relief	23000
4	Leeds – Wakefield	16000
5	Garforth – Leeds	10000
6	Leeds – Birmingham	8000
7	Leeds – Newcastle	7000
8	Sheffield – Wakefield	7000
9	Leeds – Oxford	5000
10	Derby – Leeds	5000
11	Wakefield – York	4000
12	Leeds – Reading	4000
13	Darlington – Leeds	3000
14	Durham – Leeds	3000
15	Leeds – Leamington Spa	2000
	Other increases	**43000**
	Total increases	**243000**
15	Darlington – Durham	-1000
14	Derby – York	-2000
13	Newcastle – Birmingham	-2000
12	Oxford – Reading	-2000
11	Derby – Doncaster	-3000
10	Birmingham – York	-3000
9	Darlington – Newcastle	-3000
8	Newcastle – Sheffield	-3000
7	Doncaster – Birmingham	-4000
6	Chester-le-Street – Newcastle	-5000
5	Leamington Spa – Birmingham	-5000
4	Durham – Newcastle	-10000
3	Doncaster – Sheffield	-10000
2	Sheffield – York	-14000
1	Doncaster – York	-22000
	Other reductions	**-43000**
	Total reductions	**-132000**
	Total change in passenger trips	**112000**

Financial assessment

Table 5.20 below shows the annual revenue and cost projection for option YS2 and the three sub-options with varying levels of replacement services in South Yorkshire as described above. The increase in passenger numbers generated by the basic option would be expected to grow industry revenue by around £490,000 per annum.

It is estimated that in the short term existing contractual arrangements mean that the majority of the additional resources such as train crew, rolling stock, and maintenance that the cross country franchise would require to implement the rerouteing could be provided for zero additional cost. As a result the only short-term incremental cost would be the provision of additional capacity for local peak passengers in the Leeds and Sheffield areas. It is anticipated that these arrangements would cease in 2018 when the current fleet is likely to be restructured, and on this basis it is estimated that the incremental additional operating cost will be around £330,000 per annum until around 2018, and around £1.6 million beyond that. This means that option YS2 would be likely to generate a small operating surplus over the first eight years of implementation, and require a subsidy thereafter, although revenue is expected to grow more quickly than cost inflation.

Analysis suggests that each of the sub-options (YS2a, YS2b and YS2c) with mitigation between Sheffield and at least as far as Doncaster provided by replacement services, are likely to produce only a small increase in revenue but cost at least twice as much to operate in the short term and significantly more in the long term as the requirement for additional vehicles and particularly train crew is far greater. Consequently a significant increase in subsidy would be required immediately.

Table 5.20 – Incremental annual revenue and cost estimates (£m)

	Option YS2	Option YS2a	Option YS2b	Option YS2c
Increased industry revenue	0.49	0.51	0.52	0.66
Increased short-term operating cost	0.33	0.72	0.96	1.55
Increased long-term operating cost	1.59	2.05	2.21	2.87

Table 5.21 details the economic appraisal of option YS2 and the associated sub-options over a 30-year appraisal period. All values have been discounted to 2002 prices, which is common to all the options presented in this chapter.

Option YS2 is anticipated to generate nearly £28 million in economic benefits over the 30-year appraisal period. Around two-thirds of this is the benefit from reduced crowding between Leeds and Birmingham on services operated by the CrossCountry franchise, with the remaining benefit produced by the overall improvement in connectivity.

Over the 30-year appraisal period option YS2 would cost the government an additional £12.4 million as the increased operating cost of £18 million and loss of taxation revenue through a modal switch from road to rail of £4.9 million is greater than the additional revenue of £10.5 million.

Overall, the incremental economic benefit generated by option YS2 is over twice the cost to government, indicated by a Benefit Cost Ratio (BCR) of 2.3. This means that the scheme is likely to offer high value for money based on current DfT appraisal criteria, and is in excess of the minimum threshold of 1.5 for a scheme which does not require infrastructure investment. This assessment is based on a number of modelling assumptions which have been subject to the scrutiny of the Option Appraisal Sub Group (OASG). Crucially, all these modelling assumptions are required to be met for the option to meet the minimum value for money criteria, and are as follows:

– the proposed East Coast Main Line regular interval timetable must provide an hourly service between Doncaster and York (and the North East); otherwise the cost of an alternative means of accommodating displaced passengers will be extremely high relative to the incremental benefit of the option

– the reduced requirement for Northern Rail services east of Leeds during peak periods must save approximately two unit diagrams and in particular the associated crew costs (estimated at eight and seven full time equivalent drivers and guards respectively), thereby allowing deployment of these resources elsewhere in the franchise. Any significant reduction in this resource saving will mean that, all other things being equal as modelled, the long-term costs from rerouteing the longer distance services will increase the overall cost to a level that cannot be sustained by the benefit of the option. Equally two of the three CrossCountry services rerouted via Leeds East must be formed of five vehicles and not four as operates presently via Doncaster

– there must not be a more cost effective way to relieve crowding between Leeds and Birmingham. Train lengthening and an additional hourly service without diversion of the existing service via Doncaster have been tested and are both more expensive than the rerouteing option once the saving in Northern Rail resources has been taken into account

– the mitigation required to accommodate displaced passengers between Doncaster and Sheffield cannot be greater than a basic lengthening of a few selected peak services, over and above the train lengthening that will delivered through HLOS

– the committed Shaftholme grade separation scheme scheduled for delivery during CP4 so as to allow the diversion of some freight trains so that the Leeds – Sheffield/ Doncaster route can accommodate anticipated future freight growth along with two CrossCountry services per hour and the expected (current plus recommended) quantum of other passenger services operating via this route.

Although these criteria are reasonable assumptions based on the current situation, it is not possible to predict whether they are likely to be met. This is because they are dependent on other industry planning activities including the development of HLOS and a regular interval East Coast Main Line timetable, which are in progress and not yet concluded.

Table 5.21 – 30-year incremental economic appraisal, £m discounted to 2002

	Option YS2	Option YS2a	Option YS2b	Option YS2c
User benefits (Timetable)	8.8	9.8	10.3	16.3
User benefits (Performance)	-3.8	-3.8	-3.8	-3.8
User & non-user benefits (Crowding)	21.1	21.1	21.1	21.1
Non-user benefits	1.9	2.0	2.1	3.1
Total benefits	**27.9**	**29.1**	**29.6**	**36.7**
Operating costs	18.0	30.2	36.1	50.6
Other government impacts	4.9	5.0	5.1	6.0
Revenue	-11.4	-11.9	-12.1	-15.3
Revenue loss (Performance)	0.9	0.9	0.9	0.9
Total costs	**12.4**	**24.3**	**30.1**	**42.2**
Net present value	**15.5**	**4.8**	**-0.4**	**-5.6**
BCR	**2.3**	**1.2**	**1.0**	**0.9**

Each of the sub-options (YS2a, YS2b and YS2c) with additional mitigation moderately increase the economic benefit of the option but have at least twice the whole-life cost of the basic option. As a consequence of this all the sub-options represent low or poor value for money based on the current DfT funding criteria and cannot be recommended.

There are however a number of other risks and opportunities which are listed below, and include a number of wider issues that are not considered in the RUS process.

Risks (all have the potential to reduce the business case unless stated otherwise)

1) Faster journey times between Manchester and Leeds via Diggle, which is an aspiration published in the 2007 White Paper may be more difficult to achieve with an additional through service occupying platform space at Leeds station. This could mean that additional resources are required on this route, which would significantly increase the cost of the option. In addition to this if the detailed development of option YS2 placed an overwhelming operating constraint on the recommended fifth Manchester – Huddersfield – Leeds cross-Pennine service, the economic disbenefit from having to implement a resultant second-best option to provide additional capacity on the route would severely reduce the business case for option YS2.
2) Delays to implementation of option YS2 will reduce the cost savings due to existing contractual arrangements. This will reduce the value for money to medium, with a Benefit Cost Ratio of 1.6 which is marginally above the DfT threshold.
3) The analysis has not taken into account the benefit that could be gained from alternative uses of spare resources that can be provided through existing contractual arrangements.
4) The minimum level of mitigation required to accommodate displaced passengers in South Yorkshire may be more expensive than anticipated as train strengthening may also be required in the shoulder peaks, and on longer-distance services.

5) As option YS2 relies on the rerouted CrossCountry service to provide some capacity at local stations east of Leeds, timetable perturbation at any point on the CrossCountry route that affects this area will make it more difficult to provide adequate capacity east of Leeds. This means that spare rolling stock may be required as cover for such instances.

6) The removal of some through running between the Calder Valley and Micklefield may result in a lower rolling stock saving than anticipated.

7) The geographical boundaries of the model used to understand the performance implications of the proposed rerouteing do not include the infrastructure at Holmes Chord or Aldwarke Junction, meaning that the analysis of this infrastructure is based on a combination of historical data and the quantified impact of the rerouteing within the modelled area. This is not expected to have a material impact on the business case unless any resultant under prediction of the delay were significantly greater than the overall increased level of delay that has been estimated for the whole option. This is extremely unlikely.

8) Train load factors are likely to be higher at Cross Gates under option YS2; however these are still lower than in the absence of any capacity interventions. This down side is unlikely to affect the business case for option YS2 under RUS appraisal criteria.

9) The economic disbenefit from reduced connectivity, including reductions in service frequency, speed, and quality between York, Doncaster and Sheffield, would be concentrated around Doncaster, which along with the rest of South Yorkshire is designated as an Objective 1 European Funding area.

10) There is likely to be a limited reduction in the off-peak frequency of services between smaller local stations east of Leeds, particularly Church Fenton, South Milford and other stations east of Leeds. This risk is unlikely to affect the business case for option YS2 under RUS appraisal criteria.

11) Aspirations for the current Nottingham – Leeds service to operate via Wakefield Westgate will be limited which also means that it would be difficult to provide a faster journey time between Leeds and Nottingham which diversion of this service from the current routing via Barnsley to the faster and more direct route via Moorthorpe would achieve. This risk is unlikely to affect the business case for option YS2 under RUS appraisal criteria.

12) The rerouteing will reduce maintenance access time between Hare Park Jn and South Kirkby Jn. This risk is unlikely to affect the business case for option YS2 under RUS appraisal criteria.

Opportunities (all have the potential to improve the business case unless stated otherwise)

1) The approach used by the MOIRA forecasting tool typically understates the increase in demand for a step change increase in service provision, and it seems likely that a doubling of the service frequency between Leeds and Birmingham would fall into this category of improvement. The counter argument could be made for the reduction in direct services at Doncaster, although given that the basic option is expected to produce an overall net increase in demand, the current assessment is likely to underestimate this increase.

2) The economic benefit and revenue generated by option YS1 would be significantly greater if it were not possible to achieve a clean path via the East Coast Main Line, as the relative increase in overall journey time between Sheffield and York would be lower. This increase in revenue and benefits would mean that some of the sub-options with replacement services in South Yorkshire would be likely to offer an overall value for money in excess of the minimum DfT criteria.

3) The revenue and economic benefit of option YS2 could be optimised by targeting the routeing and calling pattern south of Birmingham.

4) If both CrossCountry franchise services operated via the same route, between Sheffield and York it would be possible to achieve a more even service interval than currently north of York.

5) The economic benefit from improved connectivity, including improvements in service frequency, speed, and quality between Sheffield and Leeds, would be concentrated around the largest centres of population in the RUS area.

6) The removal of one train per hour in each direction between Sheffield and Doncaster may provide the opportunity to reduce the journey time of local services between Sheffield, Doncaster and destinations towards and including Hull.

7) The analysis of train performance did not assess the benefit from fewer trains using Doncaster station and fewer crossing moves at the station. This is because the regular interval East Coast Main Line timetable has yet to be fixed, and is a simplifying approach given the time constraints and sub-group members were made aware of it prior to the performance work commencing.

8) The performance analysis did not include a reduction in performance through removal of the pathing time in the services via Doncaster in option YS1, which is the base for the analysis. However, the central scenario has been produced on the basis of clean paths via each route.

9) The provision of a direct service between West Yorkshire and Reading will reduce the need for interchange at Birmingham New Street, which is a gap identified by the West Midlands and Chilterns RUS. This risk is unlikely to affect the business case for option YS2 under RUS appraisal criteria.

10) The rerouteing would increase the maintenance access time on the East Coast Main Line and between Doncaster and Swinton. This up side is unlikely to affect the business case for option YS2 under RUS appraisal criteria.

Conclusion

In conclusion, one of the two options has to be implemented in order to meet the capacity gap.

The incremental option has a high value for money business case based on the current assessment and has no unusual practicality or funding issues. On this basis it would normally be recommended for inclusion in the strategy. However, the option is heavily dependent on other industry processes including HLOS and the development of the East Coast Main Line regular interval timetable, and the wider socio-economic impacts that are not assessed under the RUS process. Therefore, the incremental option will need to be developed in more detail through other industry processes. The RUS has highlighted a number of issues that these processes should take into account in reaching a conclusion.

Table 5.22 – Options for inter-regional services between the RUS area and the West Midlands

Option	Description	Gap(s) addressed	Recommendation in RUS?	BCR
YS1	Extend Recommended 5th Manchester – Huddersfield – Leeds Service to Selby (or Hull) during the peak Link recommended peak Halifax – Leeds services with local services east of Leeds (up to two trains per hour).	Peak crowding	Do-minimum option	N/A
YS2	As per option YS1, but replace one all day hourly local service east of Leeds with a rerouted CrossCountry franchise service.	Regional links, inter-peak crowding, (Leeds-Sheffield peak crowding)	Potential increment to YS1	2.3

Car parking in the RUS area

The majority of car parks in the PTE areas in particular are free of charge, which means that improved or expanded facilities usually offer low or poor value for money when assessed using standard DfT appraisal criteria.

Despite this a number of stakeholders have suggested that a lack of available parking space is a problem in the Yorkshire and Humber RUS area, and Passenger Focus has conducted a study into the suitability of the current facilities, to assist Network Rail and the industry to assess the strategic issues and potential solutions to any gaps that are identified. The study itself largely confirmed the industry's understanding that car parks on most commuter routes are generally at or near capacity by the end of the morning peak; however some of the evidence that was produced did suggest that a lack of available parking may suppress future passenger numbers.

Network Rail has therefore conducted an analysis of where a lack of available car parking at stations has the potential to constrain the RUS demand forecasts and consequently undermine the business case for the options that are recommended.

Even with the additional data supplied by Passenger Focus, estimating the likely level of suppression is far from straightforward.

Survey data indicates that the average share of passengers who access stations in the RUS area by car is around 39 percent. This means that up to 39 percent of the new passenger forecast may be suppressed by a lack of station car parking, whereas in reality this proportion will be much lower if there are alternative parking opportunities available on street or at other local car parks.

Table 5.23 below shows the impact that suppressed demand due to a lack of parking at the stations identified in the Passenger Focus study may have on the business case for the recommended RUS options for each line, based on a maximum (39 percent) and minimum level of suppression at the stations that have been identified as problematic. Even assuming the maximum potential loss of passengers at each station, the value for money of the RUS options does not alter materially and on this basis it is not possible to recommend investment in additional car parking infrastructure in any of the options to alleviate the strategic gaps identified at the start of this chapter.

Although it is not possible to recommend investment through the RUS process, improved station car parking is key to the strategy of a number of potential funders, and other industry processes have been established to facilitate investment of this type.

Outside of the RUS process, SYPTE and WYPTE have taken a lead role in the development of car parking strategy in South and West Yorkshire respectively, and have aspirations for improved facilities in a number of locations.

SYPTE has included proposals for improving car parking at local stations as part of their South Yorkshire Rail Strategy and are developing schemes at:

- Conisbrough
- Darnall
- Dore & Totley
- Elsecar
- Hatfield & Stainforth
- Kiveton Bridge
- Kiveton Park
- Meadowhall
- Penistone
- Rotherham Central
- Thorne South
- Woodhouse.

WYPTE has Regional Funding support for car park extensions at:

- Crossflatts
- Sowerby Bridge
- Mirfield
- Todmorden
- Pontefract Monkhill
- as well as new stations at Apperley Bridge and Kirkstall Forge.

Network Rail in partnership with other organisations is investigating car park expansion at Huddersfield and Selby, and if Micklefield is developed as a Park & Ride station it is likely to relieve the onus on the car parks at stations in the nearby vicinity.

Table 5.23 – Business case for RUS options with demand suppressed by station car parking

	Current value for money	New value for money	
Line		**Minimum**	**Maximum**
Harrogate	Medium	Medium	Medium
Leeds – York/Scarborough, Selby/Hull	High	High	High
Huddersfield	High	High	High
Airedale	Medium	Medium	Medium
Wharfedale	High	High	High
Wakefield	High	High	High
Barnsley and Pontefract	High	High	High
Calder Valley	High	High	High
Hope Valley	High	High	High
Sheffield – Doncaster/ Moorthorpe	High	High	High
Immingham/Cleethorpes	N/A	N/A	N/A
Penistone line	N/A	N/A	N/A
Retford/Lincoln	N/A	N/A	N/A
Chesterfield	N/A	N/A	N/A
Hull – Bridlington – Scarborough	N/A	N/A	N/A

6. Consultation process and overview

6.1 The Draft for Consultation

The Yorkshire and Humber Route Utilisation Strategy (RUS) Draft for Consultation was published in September 2008, along with a press release announcing its publication. The document outlined a number of gaps between the present capability of the rail routes throughout the study area (in terms of capacity and performance), and the predicted demand for both freight and passenger traffic up to 2019. A set of options was proposed for bridging those gaps.

In line with the Government White Paper "Delivering a Sustainable Railway", the RUS also looks in more general terms towards a 30-year horizon.

The Draft for Consultation was distributed to a wide range of stakeholders and a period of 12 weeks was given to allow stakeholders to respond. The consultation period ended on 18 December 2008.

During the consultation period, stakeholders were invited, either collectively or individually, to briefing sessions at which specific issues were discussed.

This section explains how responses shaped the development of this strategy.

6.2 Consultation responses

A total of 130 consultation responses were received and these are broken down as follows:

Train Operating Companies	7
Government and local authorities	48
Businesses	14
User groups	31
MPs	6
Members of the public	24

Copies of the various responses can be found on the Network Rail website at **www.networkrail.co.uk**

6.3 Key themes in the consultation responses

The responses which Network Rail received were varied and, in many cases, comprehensive. Therefore, only the key and recurring themes are summarised below.

6.3.1 Positive reaction

General reaction from most respondents was positive, welcoming the fact that the Yorkshire and Humber area was the subject of detailed study following attention to the adjoining North West, East Coast Main Line (ECML) and Lancashire and Cumbria lines. Responses were generally supportive of the gaps identified, the overall direction of the RUS, and the work being done, recognising the considerable challenge of the large and varied geographical area covered by this RUS.

6.3.2 Further analysis

As a result of the consultation responses further analysis was carried out on a number of options. This further work is detailed within the RUS document and **Appendices 3 and 4** which can be found on the Network Rail website at **www.networkrail.co.uk**

This analysis resulted in some adjustments to the overall recommendations. The themes of the responses and, where appropriate, the results of this further analysis are shown below, split as necessary by geographical section.

6.3.3 Performance

It was suggested that the section on location and causes of delay needed to show greater analysis and reach a clear conclusion setting out opportunities for improvement. It was also felt that there was a requirement to identify

the scale of performance benefit that could be expected from each option, and to set out what viable remedial actions might exist for any significant remaining performance constraints. The impact of passenger growth on performance needed in terms of extended dwell times should be considered and options addressing crowding must consider the possible impact on performance.

A more detailed assessment of the main locations where reactionary delays occur on the network has since been produced. Based on this work it has been possible to identify the trade-offs between increasing peak capacity provision and improving train punctuality; both of which are requirements of HLOS.

The delay caused to Freight Operating Companies (FOCs) should be addressed, together with the delay for freight operators arising from interaction with other operators.

The RUS should make clear recommendations to improve performance robustness at key route sections, for example, immediately north of Sheffield.

6.3.4 Growth

Concern was expressed that in some areas growth was occurring at a more rapid rate than could be forecast by any of the models normally used, and that if the trend continued the actions proposed in the RUS might be overtaken by events. For example, freight traffic from the Peak District had already exceeded the Freight RUS forecast for 2014. This is considered in **Chapter 7**. Whilst it was accepted the present economic climate implied some diminution, this could be expected to represent no more than a short-term levelling off, after which previous patterns of growth could be expected to resume.

6.3.5 Airedale/Wharfedale lines

Concerns were raised by several stakeholders that there was a risk that in order to improve services overall, some trains would cease to stop at Shipley reducing its role as a local transport hub. This is not expected to be the case.

Strong support was expressed for the provision of new stations at Apperley Bridge and Kirkstall Forge, with appropriate levels of train service and car parking. Whilst the provision of these stations is a matter beyond the scope of the RUS, it is confirmed that the train services proposed are compatible with the additional stops the opening of these stations would entail.

Some stakeholders suggested that it was important that consideration was given to improvements in off-peak frequency as well as to augmenting peak services to relieve overcrowding.

The established Lancashire and Cumbria RUS recommended an increased inter-peak frequency of services between Leeds and Carlisle via Skipton; however it is not thought that there is a business case to increase inter-peak services beyond this.

6.3.6 Harrogate line

It was felt that with the present proposals from Train Operating Companies (TOCs) for expanded services from the Harrogate line to London, the RUS should consider the ability to handle these services alongside growth in demand for local travel. Support was expressed for the concept of a Leeds – Horsforth peak busting service although further work was required (which has since been undertaken) to demonstrate provision of a new turnback facility was unavoidable.

6.3.7 Leeds – York – Scarborough/Selby – Hull lines

General support was expressed for the concept of an east Leeds turnback facility in the Micklefield area. It was felt that the RUS should demonstrate that the service pattern envisaged was feasible with existing infrastructure and show how adequate overall capacity can be provided in the context of aspirations for additional services in the area. **Chapter 5** of the RUS details this analysis. Several respondents raised the question of increased operating hours for the Doncaster – Selby – Hull line which would facilitate freight growth and allow passenger operation later in the evening. However, this was not identified as a gap within the RUS process and the position remains that Network Rail is working actively with the train operators to find the best solution within the context of the limited funds available. It is recognised that the optimal long-term solution is likely to be resignalling between Hull and Gilberdyke, but in the meantime the condition of signalling systems elsewhere implies these will need to be prioritised.

6.3.8 Barnsley and Pontefract lines

Stakeholders requested that the dependancy of the prefered option for Leeds on planned regeneration activities is examined in more detail. This assessment has been undertaken and is detailed in **Chapter 5**.

Stakeholders also commented that the prefered option for Leeds should not impede freight operations in the area, and analysis has demonstrated that no conflicts of this nature exist.

6.3.9 Wakefield line

Some respondents wanted clarification on whether the proposed enhancements of Shaftholme and Joan Croft Jns would allow a sufficient number of freight movements to be diverted via Askern or whether viable options were required to increase capacity on the Hare Park Jn to South Kirkby Jn route. This is confirmed in **Chapter 5**. Clarity was also requested on the impact of extending the Knottingley – Wakefield Kirkgate service into Wakefield Westgate and of proposals to create a bay platform for this and the Wakefield – Huddersfield service. Of the options considered, option YS2 places the biggest constraint on this aspiration.

6.3.10 Huddersfield line

Introduction of a fifth cross-Pennine train per hour would need to be complementary to train lengthening to meet the Government's High Level Output Specification (HLOS). The RUS needed to demonstrate the total number of vehicles required to alleviate cross-Pennine overcrowding.

Stakeholders suggested that the recommendations for the Huddersfield line should align with the requirements for additional peak capacity at local stations on the route into Manchester via Stalybridge. Further analysis has suggested that the recommendation for a fifth north cross-Pennine service between Leeds and Manchester per hour is compatable with the proposed additional local service on this route into Manchester.

6.3.11 Calder Valley line

Some stakeholders felt the best means of providing additional capacity at the Manchester end required further evaluation, and questioned whether any additional peak capacity was necessary on long-distance services, which would indicate a need for train lengthening. There were also requests to evaluate the need for peak period and all-day services between Manchester and Todmorden as an alternative means of providing adequate capacity. The additional work undertaken is detailed in **Chapter 5**.

There was a large number of responses from local authorities and other stakeholders in the area seeking provision of a reinstated curve at Todmorden to allow a regular service between Manchester – Todmorden – Burnley/ Accrington. It was also suggested that the service could usefully be extended to Salford Central and Salford Crescent, to improve

connectivity with Manchester Airport. The proposed Todmorden curve is discussed in **Chapter 5** and in the established Lancashire and Cumbria RUS.

General support was expressed for the need to reduce journey times, particularly from the standpoint of offering a more competitive journey time between Bradford and Manchester. The RUS recommends linespeed improvements on this route, described in detail in **Chapter 5**.

Respondents noted that congestion/capacity in Leeds station might be eased by the extension of Calder Valley service through to a turnback facility in the Micklefield area – see **Chapter 5**.

6.3.12 Hope Valley line

Strong general support was expressed for increasing capacity for both passenger and freight services and to make improvements to the frequency of both the fast and the stopping passenger services. Clear recommendations were sought in respect of:

- whether providing improved loops in the Hope Valley and doubling of the single track sections at Dore have an adequate business case
- whether a viable incremental case exists for additional off-peak services to improve Sheffield – Manchester connectivity
- whether additional peak capacity is provided by more or longer trains.

Freight needs must be taken fully into account, particularly in respect of the train lengths required and the fact that the loading gauge is restrictive.

The RUS finds peak hour additional passenger trains possible with the existing infrastructure although, doubling at Dore would become necessary to provide an additional hourly passenger train through the day.

There was feedback that congestion in the Hope Valley is currently a problem and that the stakeholder aspirations for improved journey times and accessibility are not achievable without early interventions.

6.3.13 Sheffield – Doncaster/Moorthorpe line

Some stakeholders felt it was unclear whether as many as six additional vehicles would be required to deal with peak overcrowding and that further work was required. Analysis based on the most recently available passenger count data suggests that this is still the case.

Support was expressed for the recommendation to include the line in the Northern Gauging Project. Several respondents commented on the need for double-tracking the Holmes Chord (or provision of an equivalent) as this would unlock the prospect of improved train services at Rotherham Central, considered to be urgently required. This option is included in **Chapter 5**.

6.3.14 Immingham/Cleethorpes line

General support was expressed for the options put forward. The RUS would usefully describe the development of a fourth track or bidirectional signalling between Barnetby and Brocklesby (see **Chapter 5**). Loading gauge and engineering access restrictions were a concern for freight operators on this route whilst others felt that passenger services would benefit from linespeeds above 55mph which ought to be possible given the relatively straight and flat track alignment.

Some respondents expressed the need for station improvements on the Barton-upon-Humber to Cleethorpes route to improve its overall attractiveness to passengers. The possibility of development of both housing and a sports stadium adjacent to Great Coates station was identified, which if it proceeds suggests some enhancement of both the station and train service may become appropriate.

6.3.15 Penistone line

Several stakeholders felt that the RUS should look beyond the tram-train trial towards 2012 and beyond. Account should be taken of passenger growth and the need to increase the capacity of trains in the peaks regardless of the type of rolling stock that would be used.

6.3.16 Retford/Lincoln line

There was an aspiration expressed by Lincolnshire County Council and City of Lincoln Council for a faster journey time between Lincoln and Sheffield. This had not been identified by the RUS process as a gap and is likely to be dependent on a related aspiration by South Yorkshire Passenger Transport Executive (SYPTE) for service improvements at the Sheffield end which would potentially allow a reduction in the number of station stops in the overall service.

6.3.17 Hull – Bridlington – Scarborough line

A large number of responses were received from local authorities, organisations and individual members of the public regarding the need for an improved service between Bridlington and Scarborough in the form of a regular hourly frequency on weekdays and provision of a Sunday service throughout the year. This had not been identified as a gap through the RUS process and initial analysis suggests that a reasonable business case could exist only if rolling stock were readily available which is currently not the case Monday to Friday. Therefore, the matter is left to be further explored and developed as part of normal day-to-day dialogue between Northern and the local community.

6.3.18 Leeds station area

Concern was expressed by several respondents as to whether Leeds station would be able to deliver adequate capacity against the background of current strong growth and the Office of Rail Regulation's (ORR) final determination. This was coupled with the proposed enhanced service in both the Huddersfield and Castleford corridors and the possible need by the end of Control Period 4 for an all-day service of three trains per hour between Leeds and London. It was felt that enhancement schemes should not be postponed to future control periods. Taking into account the likely inconvenient location of the proposed Platform 18, it was suggested other options should be looked at, such as making more use of other platforms, lengthening Platform 17 or providing an additional through line. Additional analysis completed during the consultation period suggests that the main constraint is an overcrowded section of E, and particularly F, line to the south west of Leeds station in the busiest peak hour. Infrastructure solutions will be tailored to alleviate this constraint – see **Chapters 5** and **7** for further details.

Some respondents considered that if a new station were to be provided adjacent to a new turnback facility in the Micklefield area, this station should be able to accommodate Intercity Express Programme (IEP) trains.

6.3.19 Sheffield station area

SYPTE expressed the view that a scheme to address platform capacity should be implemented at the earliest opportunity. It was recognised that work carried out as part of the RUS process indicated that during the RUS period additional/longer trains could be accomodated but that infrastructure enhancements aimed at performance improvement should be considered when resignalling took place. The recomendations of the RUS concur with this view, see **Chapter 5**.

6.3.20 Doncaster station area

It was suggested that a revised ECML timetable would not give rise to a need for additional infrastructure although subsequent developments might well do so. Some respondents felt there was a need to clarify what engineering and signalling works were thought to be necessary, the timescales and the mechanism that would be used to consult principal stakeholders. Analysis has demonstrated that the development of the ECML service in the longer term is constrained by the track layout at Doncaster. On this basis it is recommended that a capacity and performance study is undertaken, however this cannot happen until the shape of the future ECML timetable in the shorter term is known in sufficient details.

6.3.21 Freight

There was a perception within the freight community that the RUS did not sufficiently highlight the significance of the study area as one in which many of the largest flows of bulk rail freight traffic in the UK operate. Concern was expressed that the RUS should recognise the need for clearance of all major freight routes to a loading gauge of W9 and W10 and later to W12 as an essential prerequisite for continued development of intermodal traffic. Similarly, it was felt that the aim should be for regular RA10 loads to be able to be conveyed without restrictions or a need for special authority, especially in the key Immingham to Aire Valley power stations corridor.

6.3.22 Depots and stabling

Some of the options in the Draft for Consultation required lengthening services or increasing the number of trains. Some respondents wanted to see a clear strategy for improving stabling facilities, including whether the current facilities are able to cater for the additional vehicles, and if not, what options are preferred and the likely cost implications. However, at the present time the size of the requirement for additional local service vehicles to accommodate the HLOS is the subject of further discussion between Northern Rail and DfT. Similarly, the depot requirement for long distance high speed services will only become clear as IEP develops.

6.3.23 Station strategy

Some consultation responses expressed concern that there was no clear strategy in the RUS for access to stations and integration with other transport modes. The RUS should look at synergies with other initiatives such as Access for All and the National Stations Improvement Programme – see **Chapter 4**. As there is currently believed to be insufficient car parking in the area, some felt that this should have been further addressed in the RUS, there being a feeling that it had not been dealt with as comprehensively as in other RUSs. Further work on car parking has been completed during the RUS consultation period – see **Chapter 5**. Some respondents also expressed concern that there was insufficient attention given to the impact of provision (or absence) of rail capacity, stations and car parks on the surrounding road network, although this is really an area of public policy in the widest sense, well beyond the scope of the RUS. It was suggested there was insufficient coverage of how the question of low footfall stations would be handled.

6.4 Responses outside the RUS scope

Several responses called for the RUS to consider the re-opening or construction of new stations and lines. Whilst these points were welcomed, the scope of the RUS dictates that such options should only be considered where they address a gap that was identified through the RUS process. There was particular support for the concept of re-opening the former Woodhead route as a means of providing increased cross-Pennine capacity. However, this is a matter that would fall most naturally within the scope of a comprehensive multi-modal study of total east-west transport needs and a 30-year time horizon all of which is well beyond the context of this RUS. Apart from the remaining operational railway such as between Sheffield and Deepcar, virtually none of the alignment of the Woodhead route is within the ownership of Network Rail and the implications of returning it to railway use should not be underestimated. There were also a number of responses which suggested the re-opening of disused railways such as the Barnsley – Doncaster direct line, the Menston – Otley line, the Skipton – Colne line and the York – Beverley via Pocklington line.

A number of responses proposed improvement of services for individual stations or lines where no gap had been identified by the RUS process. Such proposals fall more naturally to be developed within the normal dialogue between the local authorities and train operators concerned. Responses which propose options identified as being outside the RUS remit will be passed to railway specifiers and funders for their consideration. Meanwhile, the RUS has sought as far as possible to incorporate the views of stakeholders commensurate with the resources and aspirations of funders.

6.5 Further Wider Stakeholder Group

The RUS Draft for Consultation was published in September 2008 and consultation closed on 18 December 2008, with the final RUS planned to be published in late February 2009. However, two issues caused the need for further analysis and the industry Stakeholder Management Group (SMG) agreed that full consideration must be given to these issues, accepting a consequent increase in the RUS timescales with publication envisaged for July 2009:

(a) On 27 February 2009 ORR invited formal submission of additional ECML access rights

- NXEC were granted firm rights for two-hourly King's Cross – Leeds services via Hambleton Jn (with contingent rights forward to Harrogate)
- Grand Northern were granted firm rights for three new services per day King's Cross – Bradford Interchange via Askern, Wakefield Kirkgate and Halifax.

These new services had to be incorporated into the RUS baseline and a check made that they did not alter the strategy.

(b) CrossCountry believed a good business case could be made for both hourly North East – West Midlands trains to operate via Leeds, on the basis that:

- this would meet some of the connectivity gaps arising from the December 2008 timetable
- it would also address residual crowding problems identified in the consultation draft.

During the formal consultation period a relatively small number of stakeholders made reference to the rerouteing proposition, and these responses were largely supportive.

In recognition of the fact that the option had been developed further since the publication of the Draft for Consultation, an additional Wider Stakeholder briefing was held on 6 April 2009 to explain the background and the analysis that was required, and to allow an opportunity for comment. Invitations to this briefing were sent to all the organisations that were invited to the other Wider Stakeholder events that have taken place during production of the RUS. These include representatives of local authorities and rail user organisations throughout the RUS area, South Yorkshire PTE (who represented councils and interest groups in South Yorkshire), Railfuture and Travelwatch. The briefing did not include stakeholders from outside the RUS area who would be affected by the proposal.

During the briefing, a number of organisations expressed concerns about the proposed rerouteing of CrossCountry services via Leeds, focussing on the reduction of connectivity from Doncaster, the difficulties associated with pathing through Leeds, the possible effects on the proposed fifth cross-Pennine service between Leeds and Manchester and the additional journey time incurred by passengers travelling on the re-routed service between York and Sheffield and beyond. Conversely, one group welcomed the prospect of a half-hourly service between Leeds and Birmingham.

A total of 10 additional written responses were received from South Yorkshire PTE, Councils, Rail User Groups and one MP, all of which were opposed to the proposed change in routeing of CrossCountry services on the basis that it would have an adverse effect particularly on Doncaster and rail routes radiating from it. A synopsis of the specific issues raised is detailed below, and the majority of these are reflected in the list of risks presented in **Chapter 5**:

- Doncaster would lose connectivity through the loss of a direct inter-regional service, forcing passengers travelling to and from stations on the ECML, and stations in the West Midlands and North East to interchange. Although difficult to quantify, this loss of connectivity would adversely affect the economy of Doncaster, and reduce modal shift from road to rail

- the remaining trains on the Doncaster – Sheffield corridor would become overcrowded
- replacement services should be provided to maintain connectivity between Doncaster and the rest of the East Coast Main Line – York in particular – as well as to mitigate potential overcrowding between Doncaster and Sheffield
- it would be more difficult to travel to and from Robin Hood Airport Doncaster Sheffield by rail if a CrossCountry franchise service does not call at Doncaster
- the pressure on the Leeds – South Kirkby Jn corridor would increase and may lead to an adverse performance impact
- the diverted trains may duplicate and compete with the existing Sheffield – Leeds fast services, including the recently introduced Nottingham – Sheffield – Leeds services.

7. Strategy

7.1 Introduction

The work conducted to complete the Yorkshire and Humber Route Utilisation Strategy (RUS), has shown that generally the routes are very well used by both passenger and freight traffic. The most acute issues are accommodating the growth in commuter journeys and certain interurban flows and in providing additional capacity for freight traffic. The strategy therefore primarily seeks to address the question of growth progressively over time.

The RUS process has considered the current and future freight and passenger markets and assessed the future growth in each. It has then sought to accommodate this growth effectively and efficiently, in accordance with the route utilisation objective specified in Licence Condition 1. The measures proposed range from lengthening services to provision of additional infrastructure.

The RUS has considered Regional Planning Assessment (RPA) conclusions and has taken into account other potentially fundable stakeholder aspirations, particularly those of the Department for Transport (DfT), Passenger Transport Executives (PTE), local authorities and regional bodies. In the course of this investigation, options were developed, tested, sifted and modified until feasible solutions were identified with acceptable performance and meeting value for money criteria, which are consistent with anticipated funding and acceptable to all key stakeholders.

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

A number of the key recommendations are reliant upon there being increased amounts of rolling stock available to the Train Operating Companies (TOCs). Consequently, timescales and final capacity interventions will be dependent on the DfT's 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 parallel but linked process that is seeking to meet the Government's High Level Output Specification (HLOS) requirements through the Network Rail Strategic Business Plan. This process aims to address peak crowding using the options proposed for recommendations in the RUS subject to the affordability of infrastructure solutions that allow the efficient use of the rolling stock that becomes available via the DfT's Rolling Stock Plan.

7.2 Principles

7.2.1 Dealing with growth

The general principle adopted throughout the RUS 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 has been 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 where heavy demand exists to the maximum practical size 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 more far-reaching measures such as signalling and power supply upgrades, or capability works

for longer freight trains, or increased gauge for intermodal traffic, to more comprehensive investment in a particular line of route. In many cases, the provision of additional services may offer a solution to peak and inter-peak overcrowding, which offers passengers a better service than 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 assume improved capacity per train and to consider the part that increased use of electric traction might play.

Ultimately, continued and sustained passenger growth means that an increasing number of enhancement projects have the potential to deliver tangible economic benefits for the Yorkshire and Humber region and the UK as a whole.

7.2.2 Performance

As with many other parts of the country, issues affecting performance on the rail network in the Yorkshire and Humber RUS area are complex, given its diversity of routes and the wide range of services operating over it, with many of the 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. The RUS focuses on these types of delay (reactionary delay) that are caused by trains previously delayed elsewhere on the network by primary delays then being delayed further as they have lost their timetable slot or cause delay 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.

7.2.3 Access to stations

Access to the network was also highlighted as a gap in the RUS. Some measures are proposed to improve access to the railway such as improved interchange and Park & Ride facilities at a number of stations and work under the Access for All initiative – for which funding will be available until 2015. There will be a continuing need to work with train operators, the PTEs, local authorities and other stakeholders to maximise access opportunities both within the Network Rail property portfolio and beyond it.

7.2.4 Rolling stock

DfT published its Rolling Stock Plan on 30 January 2008. The plan sets out how rolling stock will 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 Yorkshire and Humber RUS throughout its development. Therefore, the strategy set out in this chapter takes account of the key provisions of the Rolling Stock Plan, some aspects of which are still under discussion between DfT and, particularly, Northern Rail. The Northern Rail, TransPennine Express (TPE) and East Midlands Trains (EMT) fleet increases will contribute significantly to this strategy up to 2014.

Given that the detail of the Rolling Stock Plan is still evolving, the infrastructure funding for CP4 aims as far as possible to accommodate the rolling stock necessary to meet the HLOS. Should further rolling stock become available then work will be necessary to utilise that rolling stock in the most efficient manner. Joint work by the Train Operating Companies, DfT and Network Rail is ongoing and is expected to continue beyond the publication of this RUS.

Beyond 2014 a further injection of vehicles will be necessary both to meet further growth and replace the Sprinter/Pacer diesel fleet, and further infrastructure enhancements may be necessary to continue to make best use of this new rolling stock.

Further benefits might be achieved by introduction of a new generation of diesel trains, with better acceleration characteristics than the Sprinter fleet, 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 electric multiple unit 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 expected to be trialled in South Yorkshire starting in 2010 for two years, may also provide opportunities to deal with some issues in the RUS area.

For long distance high speed services operating into the RUS area, benefits in terms of capacity, fleet flexibility and destinations served can be expected from the introduction of Intercity Express Programme (IEP) rolling stock.

7.2.5 Depots and stabling

A strategic solution to provision of adequate rolling stock facilities is a network-wide issue and will be considered as part of the Network RUS. However, so far as West and South Yorkshire commuter services are concerned the strategy to accommodate the additional vehicles required during CP4 is to concentrate the use of Neville Hill depot at Leeds and Newton Heath in Manchester on maintaining vehicles. In order to do this, provision of additional servicing and stabling facilities will be necessary at a number of locations around Yorkshire. Those currently under consideration by Network Rail and Northern Rail are around Huddersfield, at Skipton and in the Sheffield area.

Until IEP introduction commences for East Coast Main Line (ECML) services to/from London and for inter-regional long distance high speed routes, it is considered that vehicles for long distance services can largely be handled within existing facilities. The programme will consider in depth the depot facilities required to allow successful implementation and as the programme is still in its early stages, it is not possible as yet to indicate the likely implications.

7.2.6 Power supplies

Only a relatively small part of the network within the RUS area is electrified (all at 25kv). However, traction power supply is potentially critical to service developments such as the operation of more frequent and longer trains, especially in the Airedale and Wharfedale corridors. It is anticipated that there is sufficient power supply for the proposed six-car operation on these routes. However, this is being tested as part of the power supply modelling for the introduction of IEP.

The Network RUS notes that electrification of the North Cross-Pennine route has a low business case. However if the costs for the electrification between Leeds and Colton Junction are allowed to the cross country scheme, the business case is significantly improved without ruining the business case for the cross country scheme.

7.2.7 Electrification

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 IEP vehicles and whether they will operate services in electric mode beyond Leeds, details of which will not become known until the programme has reached a more advanced stage. This issue will be investigated once detailed service patterns of all IEP services are known.

The proposal put forward by the former Great North Eastern Railway (GNER) for an “electric horseshoe” providing a circuit whereby London – Leeds services could return to London without reversal via a continuous circuit of electrified lines is not currently being pursued by any party. The wider issue of electrification strategy has been addressed in the Consultation Draft of the Network RUS Electrification Strategy, published in May 2009. It is likely that a policy of infill electrification, such as between Leeds and York and between Sheffield and Doncaster/Leeds would bring benefits in terms of additional opportunities for electric operation of local services in the RUS area as well as increased flexibility and improved diversionary capability for both local and ECML services. If combined with electrification west of Leeds, such as to Halifax, then there would be scope for cross Leeds local services to be operated with electric traction, with benefit to capacity in the congested area around Leeds and to performance. Additionally, the electrification of the Midland Main Line between Bedford and Sheffield forms, subject to affordability, part of the core strategy in the Network RUS Electrification Strategy, Draft for Consultation.

The Network RUS, Draft for Consultation goes on to note that on the basis of high level cost estimates electrification of the North Cross-Pennine route would have a benefit/cost ratio of greater than 2 if the section between Leeds and Colton Jn is electrified as part of a wider cross country scheme to electrify routes between Birmingham and the North East.

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.

7.2.8 Engineering access

Most of the RUS recommendations relating to additional services concern either 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 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.

Most of the key towns and cities in the Yorkshire and Humber region can be accessed by more than one route so when more major engineering work is necessary reasonable continuity of service can be provided, albeit with some extension of journey time. The same is largely true of the key freight arteries and inter-regional passenger links where in many cases there are reasonable diversionary routes. However, a key issue is that comparable capability is provided wherever possible on the relevant diversionary routes, particularly in relation to gauge clearance.

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 bidirectional signalling. A particular example being developed is Barnetby – Brocklesby.

7.3 Short-term strategy 2009 – 2014 (Control Period 4)

7.3.1 Background

In July 2007, the Government's HLOS was published. The HLOS set out the improvements in the safety, reliability and capacity of the railway system which the Secretary of State for Transport wishes to secure during CP4.

The strategy for CP4 is set out below, but primarily consists of measures to increase capacity on peak passenger services into Leeds, Sheffield and Manchester, to increase and improve cross-Pennine passenger services throughout the day and to provide capacity for freight growth.

Anticipated dates for delivery are set out in the Network Rail Delivery Plan and Route Plans dated March 2009. In addition, work will commence on the development of measures expected to be required in later years.

7.3.2 Train services

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

- in the short term, the most crowded local services will increasingly be lengthened as additional rolling stock becomes available
- subject to affordability, additional rolling stock, and provision of turnback facilities, additional peak shuttles will be run between Leeds and Horsforth, Halifax, and possibly Castleford - and Manchester to/from Rochdale, as an alternative to train lengthening
- some peak services will be extended through Leeds to a turnback facility east of Leeds in the Micklefield area. This would be up to a maximum of one train every half hour if option YS1 is implemented, or up to a maximum of one train every hour if YS2 is implemented, with the second train replaced by a service operated by the CrossCountry franchise which would be rerouted via Leeds and Wakefield Westgate. See **Chapter 5** for details
- an additional all-day hourly service will be operated between Selby or Hull and Manchester via Huddersfield with a timetable recast
- cross-Pennine services will be accelerated to move towards the Government's target journey time of 43 minutes between Leeds and Manchester via Huddersfield
- possible journey time improvements on other key corridors
- additional freight services as forecast in the Freight RUS will be accommodated, with rerouteing where appropriate to take advantage of new freight routes such as the recently upgraded Brigg line and the Shaftholme Jn remodelling
- existing Doncaster to Lincoln trains may include a stop at a new station at Robin Hood Airport Doncaster Sheffield (RHADS)
- performance improvement through reduction in reactionary delay, either in conjunction with other interventions in the CP4 strategy or where separate value for money and affordable projects are achievable.

During CP4 there would be the need to undertake development of options for delivery of the medium-term strategy set out in section 7.4.

7.3.3 Infrastructure

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

- platform lengthening on a number of lines to accommodate increased train length[1]
- new and increased passenger train servicing and stabling facilities[2]
- new or improved turnback facilities[1]
  - at Horsforth
  - in the Micklefield area
  - and possibly at Castleford
- at Leeds, one or two additional bay platforms beside Platform 1 and additional track or platform infrastructure at the south west of the station, subject to further development work[1]

1 The ORR Final Determination for Control Period 4 provided allowances to meet the HLOS on Strategic Routes 10 and 11, which encompass the Yorkshire and Humber area.

2 Scheme specifically shown as funded in ORR Final Determination

- linespeed improvements between Leeds and Manchester via Huddersfield
- various small scale capacity enhancements between Leeds and Manchester, notably upgrading and lengthening of Diggle loop and upgrading of Marsden loop[2]
- IEP infrastructure works[2]
- some W9/W10 gauge enhancements, funded by Hutchison Ports UK (HPUK) (Peterborough to Doncaster – via ECML and via Lincoln/Gainsborough – Leeds Stourton, Selby and Wakefield Europort) and possibly others identified through the Strategic Freight Network mechanism
- remodelling of Shaftholme Jn[3]
- a fourth running line between Holgate Jn and York and associated enhancements, providing improved capacity for trains to and from Leeds and addressing reactionary delay to these services caused by congestion at York[3]
- small scale projects to enhance performance, provide marginal capacity improvements and/or journey time improvements funded via the Network Rail Discretionary Fund which are expected to include work in the Calder Valley, at Conisbrough tunnel, between Grimsby and Barnetby, in the Hope Valley, between Hull and Selby, at Market Rasen, at Methley Jn and at Shipley.

7.3.4 Implications of other potential service changes

As discussed earlier, the Office of Rail Regulation (ORR) has granted access rights for National Express East Coast (NXEC) to operate new two-hourly services between London King's Cross, Leeds (via Micklefield) and a possible extension to Harrogate. The timetable for these services is still under development. However, based on the most recently available draft working timetable it is not envisaged that any of the strategy detailed above will be materially affected.

7.4 Medium-term strategy 2014 – 2019 (Control Period 5)

7.4.1 Background

The general approach will be to continue and further develop initiatives commenced in CP4 in line with the predicted continuing growth in demand. In addition, by this time a number of existing rolling stock fleets will be reaching life-expiry and commencement of a replacement programme will create opportunities for improvements in capacity, performance, fuel efficiency and attractiveness to passengers.

7.4.2 Train services

The following recommended changes to train services form the proposed strategy for Control Period 5 (CP5):

- continued progressive train lengthening of local and interurban services, including the shuttles introduced during CP4
- lengthening of London and possibly other long distance high speed services, mainly as a result of the IEP programme
- develop opportunities that the increased flexibility provided by the IEP dual fuel sub-fleet offers to improve services between places on the electrified network and towns/cities elsewhere
- possible increased use of electric trains within the RUS area (extension of electric train operation is a specific area that the recently published Consultation Draft Electrification Strategy of the Network RUS examines)
- progressive introduction of new generation Diesel Multiple Units (DMUs) to replace Pacer/Sprinter vehicles
- further increases in train paths on those routes highlighted in the Freight RUS plus routes where further growth is driven by gauge enhancement
- further improvements to train performance through reduction in reactionary delays
- provide a 43-minute journey time between Leeds and Manchester for many of the interurban services via Huddersfield

3 ECML scheme specifically shown as funded in ORR Final Determination

- a further recast of cross-Pennine services via Huddersfield to make best use of route capacity and minimise interurban journey times
- improved journey times between Leeds and Sheffield via Barnsley, Sheffield and Manchester, and Bradford and Manchester
- increased frequency of services between Rotherham and Sheffield from three trains per hour to five trains per hour
- half-hourly service between Knottingley and Leeds (replacing Castleford shuttles in the peaks)
- three fast trains per hour between Sheffield and Manchester for most of the day
- improved capacity, performance, linespeeds and engineering access between Immingham and Wrawby Jn
- improved capacity, performance, linespeeds and engineering access between Hessle Road Jn and Gilberdyke
- enhanced service to Robin Hood Airport Doncaster Sheffield (RHADS).

As with CP4, during CP5 there would be the need to undertake development of options for continued delivery of the strategy beyond the control period.

7.4.3 Infrastructure

It is envisaged that the following projects will be needed during CP5 to deliver the above strategy:

- further platform lengthening
- possible extension of electrified network within the RUS area
- any further W9/W10/W12 loading gauge works identified through the Strategic Freight Network mechanism
- schemes identified as representing value for money to reduce reactionary delay and/or improve the balance between engineering access and continuity of service operation
- capacity and linespeed enhancements between Leeds and Manchester via Huddersfield
- enhanced turnback facilities at Castleford
- doubling of the Dore & Totley station curve and new loops in the Hope Valley[4]
- doubling Holmes Chord to allow additional services between Rotherham and Sheffield
- additional crossover at Bradford Interchange and some bidirectional signalling[4]
- enhancements between Wrawby Jn and Brocklesby in connection with signalling renewals[4]
- enhancements between Ulceby and the Immingham dock complex in association with signalling renewals
- 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.

Furthermore, both of the potential strategies for the Leeds – York/Selby line will use up the last of the remaining capacity during peak periods by the end of CP4, and 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 for CP5. Analysis completed during the production of the RUS suggests electrification of the line and future station development would only provide a small 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.

4 In association with renewal schemes

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, and although there is no economic case for these services currently, Network Rail will continue to develop a holistic view during CP5 of the key cross boundary rail passenger markets through the geographical RUS programme and other industry processes.

Delivery of the strategy for the route during CP4 and CP5 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.

7.5 Long-term context (Control Period 6 and beyond)

The Government's 2007 White Paper "Delivering a Sustainable Railway" aspires to a doubling of both passenger and freight traffic nationally over a 30-year period; however it is recognised there may be wide variations on individual routes or parts of routes according to local circumstances. In the event of very rapid growth there is little doubt 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 for re-opening currently disused lines where feasible or construction of some completely new sections of railway, although the practical difficulties of doing so must not be underestimated. However, a benefit of such 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 trains during construction.

This section of the document examines what a doubling of passenger and freight traffic over the 30-year period 2007 to 2037 could mean for the RUS area. It is assumed that all passenger markets would generally double. However, for freight it is assumed that the majority contribution to a national doubling of freight traffic would be intermodal traffic. This would operate over the key freight arteries connecting the ports, the Channel Tunnel and regional distribution centres and would require typically an additional two or three paths per hour on those arteries.

The rate of increase in passenger demand over the last few years, particularly on cross-Pennine services, has been well above the national average. Projected forward (including the impact of the increased passenger trains proposed above) this could well mean that this route would see more than a doubling of passenger numbers and that would suggest that by Control Period 6 (CP6) when all practical options on longer and more frequent trains have been taken up, the cross-Pennine route via Huddersfield will be operating at capacity. At that stage, at least six trains per hour between Manchester and Leeds would be required, of which four would operate 15 minutes apart and need to serve the same major station in Manchester. The only practical option would appear to centre on four-tracking much more of that corridor unless a section of completely new railway was constructed.

Four-tracking would almost certainly entail the renovation and re-opening of the former Down and Up slow line tunnels at Standedge. Additionally, with the restrictions posed by Scout Tunnel and Stalybridge Old Tunnel one way forward might be to reopen sections of the former railway on the opposite side of the valley with some new alignments. Between Huddersfield and Standedge generally sufficient space already exists to accommodate a four-track railway – this section having consisted of four tracks in the past – but there is a risk to linespeeds as the current two-track railway makes best use of the old four-track

formation to maximise speeds. This risk could be ameliorated by the use of rolling stock with tilt technology. Equally electrification of this route would bring benefits in terms of faster acceleration from stations and would significantly improve the performance of services over the hilly sections of the route.

Beyond Manchester, it is likely that four fast or semi-fast trains per hour will be required between Liverpool and a single Manchester station, two of which would be services to Leeds and beyond. This is consistent with the recommendations in the North West RUS and the strategic intent of the Manchester Hub Study and Northern Way approach to public transport provision in Manchester. It is likely that additional infrastructure will be required to deliver this. The Manchester Hub Study will examine the implications of this in more detail.

The Hope Valley route is another corridor where further increases to passenger service levels are a possibility given that it links the Sheffield and Manchester city regions as well as providing longer-distance links. Delivering this on the existing route would entail significant four-tracking; it has only ever been a two-track railway for most of its length although the provision of freight loops (as recommended in option HV3, detailed in **Chapter 5**) would allow some improvement to the number of services using the route. An alternative would be to reinstate the Buxton to Matlock route, which would allow much of the eastbound aggregates traffic from the Peak District to be taken off the Hope Valley line, thereby freeing up capacity for an improved passenger timetable offer between Sheffield and Manchester. This option could also provide improvements between the East Midlands and North West.

An alternative option to relieve cross-Pennine capacity put forward by various stakeholders is the re-opening of the former Woodhead route, involving reinstatement of a two-track railway between Deepcar, Penistone and Hadfield coupled with upgrading of the existing railway between Sheffield and Deepcar and in the Hadfield area. It is recognised that, unlike the four-tracking of the Huddersfield route, this offers an additional benefit in providing greatly improved connectivity for the Barnsley, Penistone and Hadfield areas however it would do little to relieve the key capacity shortage between Leeds and Manchester. In addition, there are several significant practical limitations. In summary, these are the lack of ready access to Sheffield station, density of existing rail traffic at the Manchester end and the fact that almost none of the disused sections are owned by Network Rail. The size of the project and the existence of less costly short- to medium-term solutions to cross-Pennine rail capacity imply any development would be well into Control Period 6 (CP6) or beyond.

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 shuttle services together with service frequency increases on one or two lines.

Sheffield station has adequate capacity to deal with all the proposed additional peak services that are recommended by the end of CP5. Thereafter, there is an opportunity provided by Sheffield area resignalling to deliver further capacity and improved train performance and engineering access. It is likely that an improved layout at the north end of the station will be required. Based on present trends in growth in demand, capacity at Leeds station and its surrounding area is expected to become increasingly critical even with the interventions proposed for CP4 and CP5. The obvious solution is a further major rebuild of the Leeds station area but there are significant engineering complexities associated with this and the potential for a long period of disruption should not be underestimated. Alternatively,

consideration will need to be given to the possibility of four-tracking all or part of the route between Leeds and Micklefield to maximise the number of trains from the west and south running through Leeds rather than terminating there.

Initial high-level appraisal published in the Electrification Strategy of the Network RUS Draft for Consultation indicates that there would be a high value for money business case to electrify the north cross-Pennine route between Liverpool and York. In particular, electrification of this corridor, either in CP5 or the longer term, would allow:

- cross-Pennine services to be operated by electric traction throughout the majority of the route between Liverpool and the North East
- cross Leeds local services to the proposed turnback facility at Micklefield to be operated by electric traction, releasing some capacity by their improved acceleration from intermediate stations
- some London – Newcastle (or beyond) services to operate via Leeds, either for diversionary purposes or as a regular arrangement.

Electrification may allow a number of other lines in the RUS area to accommodate additional services at peak times and some of these corridors will be investigated by the Network RUS as part of a national programme.

The need to commence renewal of the existing Sprinter/Pacer fleet during CP5, into CP6 and perhaps beyond might offer particular opportunities to build a case for electrification, based around the premise that new designs of electric train could be lighter in weight with the numerous benefits that brings. Furthermore, electric traction is generally simpler to maintain than diesel giving potentially more intensive utilisation and lower maintenance costs.

The operation of more London – Leeds services through to other destinations would free up some further through-platform capacity at Leeds.

Another opportunity to mitigate capacity issues at Leeds station could be by the deployment of tram-train vehicles on certain local corridors. Tram-train vehicles would be able to leave the heavy rail network close to Leeds city centre and then use street running, both freeing up capacity in Leeds station and offering improved connectivity to city centre destinations.

Similar opportunities may also be identified at Sheffield, building on experience gained during the planned tram-train trial between Sheffield, Penistone and Huddersfield.

More widely, steps might be taken to encourage staggering of working hours in Leeds and other major centres – perhaps incentivised by fares policy. This would do much 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 would certainly contribute markedly to a reduction in crowding and more economic 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.

As far as freight growth is concerned, as described above, accommodating a significant increase in intermodal growth is necessary. This requires 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
- cross-Pennine
- 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 second is discussed earlier in this section. The third 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 Jn 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 King's Cross to the RUS area, the North-East and Scotland, and for other service improvement aspirations in the Yorkshire and Humber Region. This could lead to a major upgrade of the network in this area when signalling renewals become due.

Changes to signalling technology such as the proposed introduction of modular signalling may provide further capacity and the ability to change engineering access arrangements.

Work will continue on further development of schemes to address the medium- to long-term aspirations in the Government White Paper during CP5. It is clear that if significant modal shift is to be achieved during CP5 it will be essential to implement a number of the initiatives described above.

7.6 Seven-day timetable

Looking to the longer term, 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.

The Doncaster – Cleethorpes/Immingham line is currently one of eight routes nationally designated as a Seven Day Railway route, under which the overall vision is to deliver the working timetable in full, alongside cyclical 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 bidirectional signalling when renewal opportunities 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. Particularly for freight, a key issue is that comparable capability exists on diversionary routes, notably in relation to gauge clearance. Work in this area continues to be developed. It will also be important in any changes of the maintenance regime or the infrastructure to see that users of local passenger services – which make up a significant proportion of operations in the RUS area – are not disproportionately affected in the interest of longer-distance services.

In order to maximise the opportunities, close collaborative working between Network Rail and the train operators will be necessary in the years ahead.

7.7 Alternative growth scenarios

The 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 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 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.

The RUS strategy is expected to cater adequately for forecast growth in passenger and freight demand in 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.

7.8 Contribution to HLOS metrics

Background

Alongside "Delivering a Sustainable Railway", the Government published in July 2007 its HLOS to define the outputs it wished to buy from the rail industry during CP4 (ie. 2009 – 2014). This HLOS and an accompanying Statement of Funds Available (SoFA) has been used by ORR to set the funding requirements of Network Rail over that period, taking into account other obligations and funders' reasonable requirements. Network Rail prepared its Strategic Business Plan (SBP) in conjunction with industry stakeholders to present the industry's response to the HLOS, a key element of which has been to set down requirements for additional capacity to handle peak passenger demand.

Whilst the RUS is a 10-year strategy, it is important to emphasise that this strategy is aligned with the delivery of the key outputs specified within HLOS.

Peak capacity

Tables 7.1 and 7.2 below compare the level of additional peak capacity recommended by the RUS with the additional demand to be met for CP4 specified in HLOS.

For Leeds, the RUS recommends that by 2019 additional capacity will be required for approximately 4,050 and 8,150 additional passenger arrivals/departures in the one hour high peak and three hour peak respectively. This is 50 percent and 60 percent greater than HLOS (2,700 and 5,100) has specified as required by 2013/14. The rationale for this additional capacity requirement is as follows:

RUS passenger demand forecasts are very close to HLOS and indicate that capacity for an additional 2,700 passenger arrivals/departures in the high peak hour will be required by 2013/14. This is identical to HLOS.

Between 2013/14 and 2018/19 it is anticipated that overall passenger growth will be around half of the total for 2007/08 – 2013/14. This means that approximately 50 percent more capacity (1,350 passenger arrivals/departures) will be required by 2019, giving a total for the whole RUS period of 4,050 additional arrivals/ departures.

Analysis completed during the RUS process suggests that it is not possible to provide the additional high peak hour capacity required when services are most heavily loaded without slightly overproviding capacity over the three-hour peak. This is partly because it is not always possible to attach and decouple lengthened units immediately prior to and after the high peak hour. In addition, it is not always possible to operate extra peak-busting services in only one hour of the peak operation, and some of these services have been deliberately retained to alleviate inter-peak crowding.

It is not possible to directly compare the recommendations for Sheffield with the HLOS specification, as Sheffield is included in the "other urban" category which comprises several other conurbations, although for completeness Table 7.2 details these figures.

Table 7.1 – Leeds peak capacity recommendations

Route section	RUS: additional capacity/demand met by 2019	
	Peak three hours	High peak hour
Airedale line	1150	700
Wharfedale line	510	280
Harrogate line	1280	560
Leeds – York/Scarborough, Selby – Hull line	1020	420
Barnsley/Pontefract line	770	280
Wakefield line	800	550
Huddersfield line	1340	700
Calder Valley line	1280	560
Total	**8150**	**4050**

Table 7.2 – Sheffield peak capacity recommendations

Route section	RUS: additional capacity/demand met by 2019	
	Peak three hours	High peak hour
Barnsley/Pontefract line	260	140
Hope Valley line	580	210
Sheffield – Doncaster/Moorthorpe	380	350
Chesterfield line	N/A	N/A
Retford/Lincoln line	N/A	N/A
Total	**1220**	**700**

Relationship between capacity and performance

On the basis of the evidence presented in **Chapters 3** and **4**, significant passenger growth is expected on all routes into Leeds and Sheffield over the 10-year RUS period and services simply cannot accommodate this, as most trains in the high peak and around half of trains in the three-hour peak already have significant numbers of passengers standing. For this reason the primary focus of the RUS has been to develop a set of options that will deliver the capacity that is required to accommodate this growth. This is entirely consistent with HLOS which set a challenging capacity metric for Leeds and Sheffield, as well as the ORR's final determination, which allocated the majority of funding that is specific to routes 10 and 11 (West Yorkshire and South Yorkshire), to schemes which will deliver this capacity metric.

On this basis the RUS has taken the following approach to delivering the HLOS performance targets (Public Performance Measure (PPM), and Cancellations and Significant Lateness (CaSL)):

- develop a set of options that can deliver the HLOS capacity metric without significantly worsening train performance
- identify a set of timetabling and infrastructure intervention measures for these options which can improve performance at key locations identified in **Appendix 3** in CP4, within the affordability of funding made available through ORR's final determination
- identify where other schemes funded through the final determination can improve performance at the key locations identified in **Appendix 3**. For example named infrastructure schemes at Holgate and Shaftholme Jn which have been explicitly funded in the final determination, have been included in Network Rail's plan to meet the national HLOS performance metric
- identify the potential for major improvements in performance through schemes that are not affordable in CP4, therefore prioritising investment for CP5.

The Stakeholder Management Group requested detailed performance analysis for all the recommended options with the potential to increase delay at the key locations in the RUS area, and this analysis has been completed prior to the completion of the RUS.

As the Leeds station area is the location with most reactionary delay, there is always likely to be risk in a set of recommendations which significantly increase the number of train arrivals and departures in the peak when the station is most heavily used. Despite this it is anticipated that the package of recommendations is appropriate.

The overall package of train lengthening and peak additional services will reduce the concentration of boarding and alighting passengers and reduce the level of delay caused by excessive station dwell times. This will be of particular benefit at key capacity pinch points such as Shipley and Whitehall Jn, as well as at Leeds station itself on service groups which have tight turn round times. This performance benefit will occur in CP4 as train loads will be significantly lower than currently, upon implementation of the additional rolling stock, and the number of cancellations that are required to recover from perturbation in the peak will reduce as a result.

The combination of proposals for the Airedale and Wharfedale lines are likely to provide that the timetable is robust in times of perturbation, and there is the opportunity for the final timetable that is produced through development of the HLOS rolling stock plan to reduce delay at Leeds and also at Shipley which is one of the other major locations where reactionary delay occurs. The recommended new bay platforms at the north west of Leeds station will further increase the level of operation flexibility and also has the potential to reduce overall delay.

The enhanced signalling on the Harrogate line is a step change improvement over the current infrastructure and it is anticipated that delay will reduce, even with the additional services from Horsforth.

Linking local services from the Calder Valley line with local services from east of Leeds is likely to mitigate any reduction in performance from the additional services on each line, as it will minimise the requirement for trains to terminate at Leeds and occupy platforms for long periods of time.

The recommended infrastructure to the south east of the station and the turnback facility in the Micklefield area will remove some of the existing short-term constraints at Leeds station and provide greater operational flexibility for some of the longer-term services aspirations.

Beyond CP4 it is likely that some further infrastructure at Leeds station will be required to provide robust performance as by the end of CP4 it is likely that the number of peak services using the station will be close to the maximum that can be reasonably accommodated without causing a significant reduction in performance. These requirements are discussed further in the strategy section.

The Sheffield station area has also been identified as a location where a sizeable amount of reactionary delay occurs. The peak strategy for CP4 is predominantly based on-train lengthening and this will reduce the number of excessive station dwell times and prevent the delay caused by this as a result.

The line section to the north of Sheffield station and the Hope Valley line will both require significant infrastructure investment to alleviate the significant level of delay that occurs at this location, and within the constraints of the funding made available within ORR's final determination, it is likely that these interventions will commence in CP5:

- it has already been identified that the recommended redoubling of Holmes Chord will reduce the number of delays caused by trains waiting to enter this section
- four-tracking is likely to be required between Aldwarke Jn and Swinton Jn to alleviate delay
- the recommended redoubling of Dore-Curve will provide greater operational flexibility for Hope Valley services as well as trains that use the Chesterfield line.

Performance analysis completed during the RUS process has demonstrated that the recommendations for a fifth Leeds – Manchester service are robust. Furthermore, there is no likely deterioration in performance at Huddersfield which is also a major location of delay as there is no obvious increase in the number of potential conflicts between local and semi-fast services, and the recommended infrastructure upgrade at Marsden and Diggle will increase the level of flexibility for freight operators.

8. Next steps

8.1 Introduction

The Yorkshire and Humber Route Utilisation Strategy (RUS) will become established 60 days after publication unless the Office of Rail Regulation (ORR) issues a notice of objection within this period.

The recommendations of a RUS form an input to decisions made by industry funders and suppliers on, for example, franchise specifications and the Government's High Level Output Specification (HLOS).

8.2 Network Rail Route Plans

For planning purposes the Great Britain rail network is divided into 26 strategic routes. Network Rail publishes a plan for each strategic route, listing all significant planned investment on the route including the larger scheduled renewals as well as committed and aspirational enhancements. The plans for Strategic Routes 10 (North Cross-Pennine, North and West Yorkshire) and 11 (South Cross-Pennine, South Yorkshire and Lincolnshire) together cover the scope of this RUS and the neighbouring routes which are referred to in this document. The recommendations of the RUS will be incorporated in these plans, as will the conclusions of work started by this RUS but to be completed through other industry processes. The Route Plans are updated regularly and support the Control Period 4 (CP4) Delivery Plan. The next edition (April 2010) will incorporate the RUS conclusions as well as the Delivery Plan recommendations. The latest plans are available at **www.networkrail.co.uk**

8.3 Access charges review

The ORR review of Network Rail's funding requirements and access charges for the period 2009 – 2014 concluded on 30 October 2008. Development work on this RUS informed Network Rail's input to the review.

8.4 Control Period 4

In July 2007 the DfT published the HLOS for England and Wales, setting the outputs it wished to buy from the rail industry during CP4 (2009 – 2014) and stating what funding it would make available to the industry during this period. The outputs and funding, taking into account other parties' requirements of the industry, were refined through ORR's periodic review of Network Rail's access charges during 2008. Network Rail published its Delivery Plan for CP4 in March 2009. The Delivery Plan sets out Network Rail (and, where applicable, whole industry) outputs for safety, train performance, network capacity, capability and availability and asset performance. It provides a high level summary of train operator actions and a delivery programme for all aspects of Network Rail outputs.

8.5 Control Period 5

The planning cycle for the following control period (2014 – 2019) has recently commenced. The DfT has recently consulted on a process for Developing a Sustainable Transport System (DaSTS). This process will compare interventions between transport modes and will be applied to the development of the HLOS for CP5, which is due to be published in the summer of 2012. RUS conclusions relating to CP5 will form a key input to the rail mode of this analysis.

8.6 Ongoing analysis and recommendations

An issue raised in the East Coast Main Line (ECML) RUS (published in February 2008) has been considered in this RUS, namely the question of capacity and performance in the Doncaster station area. Whilst it has been possible to give further consideration to the issues involved, full analysis and option development could not be concluded for this final strategy for Yorkshire and Humber without delaying publication for a considerable period of time. The options are complex and will be influenced first by the development of the timetable to accommodate the additional ECML access rights granted by the ORR's decision of 27 February 2009, and second by the proposed move to a "standard hour" timetable on the ECML. Only once these proposals have been fully developed will it become possible to consider the interface with services terminating or crossing the ECML at Doncaster and what infrastructure changes may be necessary to optimise service levels and performance. The Stakeholder Management Group (SMG) has agreed that progression of these issues will be managed through normal industry processes with the final recommendations informing the relevant Route Plans as they are periodically revised. The principal cross-industry forum that will oversee progress is the Route Investment Review Group (RIRG) which is the industry body for recommending schemes for investment.

8.7 Ongoing access to the network

The RUS will also help to inform the allocation of capacity on the network through application of the normal Network Code processes.

8.8 Review

Network Rail is obliged to maintain a RUS once it is established. This requires a review using the same principles and methods used to develop the RUS:

- where circumstances have changed
- when so directed by ORR
- when (for whatever reason) the conclusion(s) may no longer be valid.

Appendices

Appendix 1

Freight terminals

The following table highlights the freight terminals located in the RUS area and typical current usage:

Location	Commodities	Origin/Destinations	Volume
Aldwarke	Metals	Handsworth, Scunthorpe, Deepcar, Wolverhampton	24tpw
Attercliffe	Metals, aggregates	Liverpool, Peak Forest	8tpw
Dewsbury	Aggregates	Hope	6tpw
Dowlow	Aggregates	Various	20tpw
Ferriby	Industrial inorganic chemicals	N/A	Nil
Gainsborough	Oil	N/A	Nil
Gascoigne Wood	Gypsum	Drax	6tpw
Goole Dock	Metals	Aldwarke	10tpw
Goole Guardian Industries	Sand	Peterborough	6tpw
Grimsby Docks	N/A	N/A	Nil
Grimsby, Pyewipe, Ti-Oxide Europe	N/A	N/A	Nil
Harworth Colliery	Coal	N/A	Nil
Hatfield Colliery	Coal	Drax/Ratcliffe	12tpw
Healey Mills	N/A	N/A	Nil
Hope (Earle's Sidings)	Aggregates/ cement	Various	80tpw
Hull Docks	Coal, metal	Cottam/Drax	60tpw
Humber Refinery	Oil	Various	30tpw
Hunslet East	Aggregates	Rylstone,Tunstead	8tpw
Immingham	Coal,ore	Various	300tpw
Immingham Railfreight Terminal	N/A	Nil	Nil
Laisterdyke	Metals	Liverpool	3tpw
Leeds Balm Road	Aggregates	Tunstead	6tpw
Leeds Stourton	Containers, aggregates	Felixstowe, Southampton, Tilbury, Thamesport	36tpw
Lindsey Refinery	Oil	Various	30tpw

Location	Commodities	Origin/Destinations	Volume
Maltby Colliery	Coal	Drax/Cottam	12tpw
Manton Colliery	N/A	N/A	Nil
Markham Main	N/A	N/A	Nil
Oxcroft Disposal Point	N/A	N/A	Nil
Peak Forest	Aggregates/ cement	Various	40tpw
Rotherham	Metals	N/A	Nil
Roxby Gullet	Waste	Brindle Heath/Bredbury	18tpw
Scunthorpe Corus	Coal, metals	Immingham/Lackenby	150tpw
Selby Potter Group	Containers	Felixstowe, Doncaster, Peterborough	12tpw
Skellow	Oil	N/A	Nil
Stocksbridge/Deepcar	Metals	Aldwarke	10tpw
Tinsley	Metals	Immingham	10tpw
Topley Pike	Aggregates	Various	15tpw
Wakefield Cobra	N/A	N/A	Nil
Wakefield Europort	Containers	Various	10tpw
Welton	Oil	N/A	Nil
Wintersett	Coal	N/A	Nil

Appendix 2

Summary of DfT/PTE/local authority aspirations

The funder aspirations identified below where appropriate to the development of the RUS have been discussed in the analysis and conclusions in **Chapters 5** and **7**.

Other elements (for example many of the proposals for new stations will be subject to normal industry processes) will be developed in a way that is consistent with these aspirations.

Location	Aspiration	Proposer	RUS Section
Airedale corridor	Link some services to other parts of Leeds City region	WYPTE	7.3.2
Apperley Bridge	New station	WYPTE	6.3.5
Barnsley – Doncaster	Create new rail link	SYPTE	6.4
Barnsley growth corridor	Provide improved local community access by reinstatement of former railway Crofton Jn – Cudworth – Swinton to provide service to Sheffield	SYPTE	
Bilton	New station	NYCC	
Bingley	Improved interchange	WYPTE	7.2.3
Bradford Interchange	Improved interchange facilities	WYPTE	7.2.3
Bradford/Skipton	Additional through trains to London	WYPTE	Chapter 5
Calder Valley	Examine potential to reduce journey times between Bradford and Halifax to Leeds/ Manchester and to run faster services, exploring routeing options via Brighouse	DfT	7.4.2
Calder Valley corridor	Improved journey times between Bradford and Manchester	WYPTE/ GMPTE	7.4.2
Calder Valley corridor	Extend Calder Valley trains to Salford Crescent; extend Victoria – Rochdale trains to Todmorden (or beyond); Speed up Manchester Victoria – Bradford – Leeds services; linespeed improvement between Victoria and Hebden Bridge	GMPTE	Chapter 5
Castleton	Station improvements	GMPTE	7.2.3
Cliffe	New station	NYCC	
Crosshills	New station	NYCC	
Dewsbury	Improved interchange with buses	WYPTE	7.2.3
Doncaster	Capacity improvements within station	SYPTE	5.4
Doncaster	Improve capacity on rail approaches to station	SYPTE	5.4
Doncaster	Freight movements through or avoiding Doncaster	SYPTE	Chapter 5
ECML	Introduction of improved long distance service pattern in line with ECML RUS proposals	DfT	Chapter 5
ECML	Introduction of IEP trains	DfT	7.2.4
Elsecar	Reinstate station stop	SYPTE	5.4

General	Provide additional capacity to meet predicted growth, particularly for commuter flows	DfT	Chapter 5
General	Improve links between the northern city regions through train lengthening or additional peak services	DfT	Chapter 5
General	Make provision for continuing growth in freight traffic	DfT	Chapter 5
General	Examine potential for further gauge clearance to W10 or W12	DfT	7.4.3
General	Deliver improved service punctuality and reliability in line with declared targets	DfT	7.4.2/7.4.3
General	Provide improved opportunity for use of train services by car park enhancement especially on routes into Leeds	DfT	7.2.3
General	Examine opportunities for more efficient engineering access to allow improved evening and weekend services	DfT	7.2.8
General	Improve existing stations including car parking	SYPTE	Chapter 5/7.2.3
General	High-speed line to South Yorkshire	SYPTE	
General	New station car parks or extensions to existing where Park & Ride trips can be generated, improved bus/rail integration	GMPTE	7.2.3
General	Additional rolling stock for train lengthening to reduce overcrowding	GMPTE	7.2.4
Greenfield	Station improvements	GMPTE	7.2.3
Guide Bridge	Park & Ride and higher linespeeds at Guide Bridge West junction	GMPTE	7.2.3
Haxby	Examine potential for a new station	DfT	
Hope Valley	Examine potential for higher frequency Sheffield – Manchester service	DfT	7.4.2
Hope Valley	Freight capacity	SYPTE	Chapter 5
Horsforth Woodside	New station	WYPTE	
Huddersfield	Improved interchange with buses	WYPTE	7.2.3
Huddersfield corridor	Additional capacity on local services and service improvements Leeds – Manchester	WYPTE / GMPTE	Chapter 5
Huddersfield corridor	Additional capacity Manchester – Leeds through train lengthening or additional services	DfT	7.4.2
Huddersfield corridor	Examine potential for reducing journey times between Leeds and Manchester	DfT	7.4.2
Hull and Scunthorpe lines	Optimise the opportunities offered by the Humber ports as international gateways	DfT	
Keighley	Improved interchange and additional parking	WYPTE	7.2.3
Kirkstall Forge	New station	WYPTE	6.3.5
Knaresborough East	New station	NYCC	

Leeds	Examine potential for a new southern entrance to station	DfT	7.2.3/4.3.3
Leeds – Wakefield Westgate – Sheffield	Additional fast trains	WYPTE	Chapter 5
Leeds Bradford Airport	New transport link	WYPTE	
Leeds eastwards	Additional parking at all PTE car parks	WYPTE	Chapter 5/7.2.3
Leeds station approaches and Whitehall Jn	Improve capacity and performance	SYPTE	7.3.3
Leeds/York/Hull/ Scarborough corridor	Examine potential for journey time improvements to strengthen connection between Leeds/York and Hull	DfT	7.4.2
Low Moor	New station	WYPTE	
Manchester Piccadilly	Improved interchange	GMPTE	7.2.3
Manchester Victoria	Improved interchange	GMPTE	7.2.3
Marple corridor	Station improvements, bus/rail integration Longer-term possible tram-train operation	GMPTE	7.2.3
Micklefield	Examine potential for a parkway station east of Leeds	DfT	4.3.3
Mills Hill	Park & Ride, station improvements, bus/rail integration	GMPTE	7.2.3
New Mills Central	Enlarged car park	Derbys CC	7.2.3
Newark	Improve connections between Lincoln services and ECML London services	DfT	
Nottingham – Leeds	Journey time improvements	DfT	7.3.2
Nottingham – Lincoln	Journey time improvements (being addressed in East Midlands RUS)	DfT	
Nottingham – Manchester	Journey time improvements	DfT	7.3.2
Penistone line	Tram-train trial	DfT	Chapter 5
Penistone line	Linespeed improvements	SYPTE	
Pontefract area	Improved access	WYPTE	7.2.3
RHADS	Examine options to serve the proposed new station	DfT	7.4.2
RHADS	Provide new station at airport and associated train service	SYPTE	4.3.3/7.4.2
Rochdale	Park & Ride, station improvements, future Metrolink Interchange	GMPTE	7.2.3
Romiley	Park & Ride, station improvements, bus/rail integration	GMPTE	7.2.3
Rother Valley Park	New station	SYPTE	
Rotherham Central	Upgrade waiting facilities	SYPTE	7.2.3
Rotherham Central	Extend platforms	SYPTE	7.2.3
Rotherham Central	Double-tracking of Holmes Chord	SYPTE	Chapter 5
Rotherham Parkgate	New station on Rotherham Central line	SYPTE	

Sheffield	Capacity improvements within station	SYPTE	Chapter 5
Sheffield	Capacity improvements on northern approach to station	SYPTE	Chapter 5
Sheffield	Capacity improvements on southern approach and Dore Junction capacity	SYPTE	7.4.3
Sheffield – London	Improved journey time to under two hours and increased frequency	SYPTE	
Sheffield – Manchester	Improved speed and frequency through infrastructure measures as required, in the longer-term reinstatement of the Woodhead route	SYPTE / GMPTE	7.3.2/7.5
Shipley	Improved interchange and accessibility	WYPTE	7.2.3
Smithy Bridge	Station improvements	GMPTE	7.2.3
Stalybridge	Park & Ride, increase junction speeds, create north side bay platform to improve punctuality/ reliability	GMPTE	7.2.3
Stocksbridge	Provide new passenger service to Sheffield (support as heritage option in short term)	SYPTE	
Swinton	Improve junction capacity	SYPTE	Chapter 5
Thorpe Willoughby	New station	NYCC	
Various stations	Additional Park & Ride facilities at a number of local stations – principally on the Airedale, Caldervale, Huddersfield, Wakefield, Barnsley and Pontefract lines	WYPTE	7.2.3
Various stations	General station improvements	WYPTE	7.2.3
Various, including Halifax	Electrification of core parts of the local network	WYPTE	7.4.3/7.5
Wakefield	Extend Knottingley – Wakefield Kirkgate trains to Wakefield Westgate	WYPTE	Chapter 5
Wakefield Westgate	Improve capacity and performance	WYPTE	4.3.3
Waverley/Orgreave	New station	SYPTE	

Glossary of terms

Term	Meaning
Absolute Block Signalling	A long established form of signalling mainly, but not necessarily, associated with semaphore signals and one signal box for each signalling section. Its purpose is to prevent more than one train being within a given section of line at a time
AC	Alternating Current
ATOC	Association of Train Operating Companies
BCR	Benefit-Cost Ratio
Capacity	The number of trains that can be run over a given section of route or the number of passengers/volume of freight that a specific train type is designed to carry
CUI	Capacity Utilisation Index
DB	DB Schenker (formerly English Welsh & Scottish Railway, a Freight Operating Company)
DfT	Department for Transport
Down	Where referred to as a direction ie. Down direction, Down peak, Down line, Down train, this generally but not always refers to the direction that leads away from London
DRS	Direct Rail Services
Dwell time	The time a train is stationary at a station
ECML	East Coast Main Line
EMT	East Midlands Trains, a Train Operating Company
FOC	Freight Operating Company
FTA	Freight Transport Association
GBRf	GB Railfreight
GMPTE	Greater Manchester Passenger Transport Executive
GN/GE Joint Line	The line between Peterborough and Doncaster via Spalding and Lincoln, avoiding the ECML
GRIP	Guide to Railway Investment Projects
Headway	The minimum interval possible between trains on a particular section of track
HLOS	High Level Output Specification
HPUK	Hutchison Ports (UK) Limited, operators of the Port of Felixstowe, Harwich International Port and Thamesport
HST	High Speed Train
IEP	Intercity Express Programme, the name given to the project to replace the HST fleet
Intermodal trains	Freight trains which convey traffic which could be moved by road, rail or sea (eg. container trains)
JPIP	Joint Performance Improvement Plans
Junction margin	The minimum interval possible between trains operating over the same junction in conflicting directions
LDHS	Long Distance High Speed
LENNON	An industry database recording ticket sales
Load factor	The number of people on a train service expressed as a percentage of total seats (or seats plus a standing allowance) available
Metro	West Yorkshire Passenger Transport Executive
MML	Midland Main Line

MOIRA	A passenger demand forecasting model
Multiple Unit Trains (DMU and EMU)	Trains comprised of self-contained units, which can be 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 the end of each unit. There are diesel multiple units (DMU) and electric multiple units (EMU)
N/A	Not applicable
NPV	Net Present Value
NXEC	National Express East Coast, a Train Operating Company
NYCC	North Yorkshire County Council
OHL	Overhead Line equipment
ORR	Office of Rail Regulation
PDFH	Passenger Demand Forecasting Handbook. An industry document that summarises the effects of service quality, fares and external factors on rail demand
PLANET	A demand forecasting model
Possession	Where part of the infrastructure is closed to services to carry out maintenance, renewal or enhancement works
PPM	Public Performance Measure
PSB	Power Signal Box
PTE	Passenger Transport Executive
PV	Present Value
Railsys	A computer model used for timetable modelling
RFG	Railfreight Group
RFOA	Railfreight Operators Association
RHADS	Robin Hood Airport Doncaster Sheffield
Route Availability (RA)	The system which determines which types of locomotive and rolling stock can travel over any particular route. The main criteria for establishing RA usually concerns the strength of underline bridges in relation to axle loads and speed. A locomotive of RA8 is not permitted on a route of RA6, for example
RPA	Regional Planning Assessment for the Railways, produced by the Department for Transport
RSS	Regional Spatial Strategy
ROTP	Rules Of The Plan
RUS	Route Utilisation Strategy
S&C	Switches and Crossings
SDO	Selective Door Opening, used where the whole of the train does not fit onto a station platform
Seated load factor	The amount of seats occupied on a train service expressed as a percentage of total seats available
SMG	Stakeholder Management Group
SYPTE	South Yorkshire Passenger Transport Executive
TEMPRO	DfT software containing UK-wide official planning data and projections split by region and local authority
TEU	Twenty-foot Equivalent Unit
TOC	Train Operating Company
TPE	First Keolis TransPennine Express

tpd	trains per day
tph	trains per hour
tpw	trains per week
Train path	A slot in a timetable for running an individual train
Track Circuit Block Signalling (TCB)	A signalling system which requires the entire line to be track circuited. The presence or otherwise of trains is detected automatically by the track circuits. Consequently, many of the signals on TCB lines operate automatically as a result of the passage of trains. The associated equipment ensures that only one train is within a given section of line at a time
Up	Where referred to as a direction ie. Up direction, Up peak, Up line, Up train, this generally but not always refers to the direction that leads towards London
XC	CrossCountry, a Train Operating Company
W10	The loading gauge which enables 9" 6" containers to be conveyed on conventional wagons
WCML	West Coast Main Line
WSG	Wider Stakeholder Group
WTT	Working Timetable
WYPTE	West Yorkshire Passenger Transport Executive (Metro)

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