

December 2010

West Coast Main Line
Route Utilisation Strategy
Draft for Consultation

NetworkRail





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Foreword

As Britain's busiest long distance rail route, connecting passenger and freight services between London and the West Midlands, Manchester, the North West and Scotland, the West Coast Main Line is an integral part of the British transport system.

The line is vital to economic growth and productivity; millions of people rely on the route to get to work, visit friends and family and transport goods across the country. This Route Utilisation Strategy (RUS) finds that despite the difficult economic climate, passenger and freight demand continues to grow. This demand is driven by a number of factors, including the poor reliability of the road network, spiralling cost of road congestion, changing commuting patterns and the popularity of rail travel.

A continued programme of investment is essential to deal with the expected increase in passenger numbers.

The RUS shows that the West Coast Main Line is nearly full to capacity. The market for travel between London and Manchester is expected to grow at the fastest rate, with passenger demand expected to increase by as much as 61 per cent. A continued programme of investment is essential to deal with the expected increase in passenger numbers and to help create a climate that allows the economy to grow and flourish.

Recent improvements to performance on the West Coast Main Line are in part a result of a significant programme of investment, with the introduction of high frequency services in 2008 a key factor. The new timetable, together with plans for additional carriages on the route, provides more trains with more space for passengers going to more destinations on faster services.

The dominant issue, similar to other RUSs, and even after high levels of investment, will be the need to address severe levels of overcrowding on both commuter and long distance services out of London Euston and between the West Midlands, the North West and Scotland. In the short to medium term, this RUS advises increasing the number of long distance high speed services during off-peak times and exploring the potential to operate a small number of additional fast commuter services during the peak. However, this will not in itself address the capacity gap.

This RUS therefore supports the development and implementation of a high speed network initially between London and the West Midlands, but also

to Manchester and beyond. We believe that this is the best way to free up capacity on the West Coast Main Line and are delighted the Government is committed to the project. With the nation's finances severely constrained there are tough choices to be made. Increasingly, the country will need to prioritise investment in infrastructure based on the contribution which it can make to economic growth, jobs and private sector investment, as well as on people's quality of life and the environment.

Other opportunities considered by the RUS include faster services between Birmingham and Manchester, the optimisation of the long distance high speed train fleet and potential train lengthening to address crowding between the West Midlands and Scotland, and direct trains from Derby and Stoke-on-Trent to Manchester Airport.

Network Rail and its industry partners believe the RUS provides a robust strategy for the West Coast Main Line in the coming years and I would like to take this opportunity to thank industry colleagues who have worked with us to develop this strategy.

This RUS will have a formal consultation period of 90 days and the date for receiving responses is Friday 11 March 2011. We welcome your comments and feedback on our analysis and the options we have recommended. Specific consultation questions have not been set as we welcome comments on the document as a whole. Earlier responses would be very much appreciated. We expect to publish the final RUS in summer 2011.

Paul Plummer
Director, Planning and Development

Executive summary

Introduction

The West Coast Main Line Route Utilisation Strategy is published following almost a decade of major investment to upgrade the route from London Euston to Scotland, culminating with the implementation of the December 2008 timetable. This resulted in a considerable increase in the number of long distance high speed services and a significant reduction in journey times.

This is the last of the geographic Route Utilisation Strategies (RUSs) that Network Rail is required to publish under the Network Licence to establish a strategy for the most effective and efficient use of the network. The RUS has been formulated in consultation with industry colleagues through a Stakeholder Management Group (SMG), and is timed to inform the next High Level Output Specification (HLOS) by feeding into Network Rail's Initial Strategic Business Plan in 2011.

The London to Manchester market is forecast to be the fastest growing long distance London market with passenger demand predicted to increase by between 56 and 61 per cent.

stock and an ongoing delivery plan for capability changes, examples of which include capacity and performance schemes in the Stafford area and the electrification of additional routes in the North West.

Also, concurrent with the RUS workstream, there are a number of franchises being renewed prior to 2014, the first of which is the inter-city West Coast franchise which is scheduled to be renewed during 2012.

The RUS is therefore intended to address issues from a base year of 2014, considering gaps and options in detail through to 2024, then to comment on a higher level strategy for the period beyond, including the impact of the Government's preferred high speed network.

The RUS uses a reference timetable, provided by the Department for Transport (DfT) outlining the minimum level of service expected to be provided by the new franchise using the resources of the long distance rolling stock fleet. This timetable has been used as a basis for assessing gaps and resultant options to address these gaps in the RUS.

Scope and planning context

The study considers the geographic route from London Euston to Carstairs (Carstairs to Glasgow having been considered in the Scotland RUS and the Scotland Generation Two RUS¹), together with branch lines and diverging routes as shown in Chapter 2.

The RUS recognises that the recent significant infrastructure upgrade, the new timetable pattern and the recent recession have all had an impact on the level of passenger demand to the extent that the market is still developing. In addition, the periodic review process has established a defined and funded strategy for the current control period to 2014. This includes investment in additional rolling

Forecast changes in demand

Passenger

Two growth scenarios have been used in the RUS to mitigate against the uncertainty resulting from a developing market. Growth is forecast to continue in both scenarios, with a considerable increase in the long distance market. The London to Manchester market is forecast to be the fastest growing long distance London market with passenger demand predicted to increase by between 56 and 61 per cent. For non London long distance markets, flows to and from Scotland are forecast to grow the fastest with services between Birmingham and Scotland predicted to grow by between 34 and 107 per cent depending on the scenario being used.

1. Found at www.networkrail.co.uk

There is also strong growth forecast for the shorter distance commuter flows to London from the stations on the Northampton to Euston corridor.

Where options depend on levels of passenger growth that are unclear, recommendations in this Draft for Consultation are subject to further development work during the consultation period.

Freight

Freight forecasts were produced for 2019 and 2030 as part of the Strategic Freight Network (SFN). Freight demand is forecast to grow on the route which is driven by expansion of the containerised market. A contributing factor to the growth in container traffic is the development of freight facilities in the North West and the West Midlands. Coal flows are forecast to decrease as generating plants close.

Gaps

The Stakeholder Management Group identified seven generic gaps between the capabilities of the infrastructure in the baseline year of 2014, the services assumed to be operating on it and that required to accommodate the forecast demand for passenger and freight services. The generic gaps identified are:

- on-train capacity
- freight capacity/capability
- journey times
- regional links
- reactionary delay
- network availability
- station capacity.

Options

Options were generated against each gap. Options considered to address freight capacity and capability, reactionary delay, network availability and station capacity are considered below. The options leading to RUS recommendations to address on-train capacity, journey times and regional links are summarised in the medium and longer-term strategies.

Options to address freight capacity and capability

Analysis of the industry freight forecasts suggests that there is sufficient capacity to cater for expected freight growth on the route in the medium term. The RUS recognises that these forecasts make a number of assumptions including efficiencies, routeing and a view on future terminal strategy, which are fundamental to the outcome of the RUS analysis. If these assumptions do not materialise, or if the

growth in domestic intermodal traffic increases the requirement for daytime traffic, then the RUS suggests the likely areas where infrastructure intervention would provide the greatest capacity gain. Specifically the RUS recommends that Daventry International Rail Freight Terminal be expanded in such a way as to accommodate the anticipated growth in domestic intermodal traffic.

Reactionary delay

Analysis of the route since the implementation of the December 2008 timetable shows that despite an initial period of poor performance, there has been a steady rise in performance and reliability to the point where good levels have been achieved in the year to October 2010. Stakeholders agreed that the levels of reactionary delay were not at a level requiring strategic intervention, but recommend improvements in performance continue to be achieved with particular focus given to the long distance service groups between London, Birmingham, Manchester and Scotland.

Network availability

Stakeholders advised that the levels of weekend access did not meet their requirements to operate a consistent level of service. It was agreed that the improvements detailed in Network Rail's Control Period 4 (CP4) Network Availability Plan are a sufficient step towards seven day railway operation.

Station capacity

Stakeholders identified two stations on the route where significant levels of platform and concourse crowding occur, although these generally relate to the layout of information, announcements and retail activity which are not issues that geographic RUSs would generally consider. The Network RUS: Stations due for publication as a Draft for Consultation in early 2011 will consider a toolkit of options to address crowding issues at stations.

Emerging strategy

Introduction

Although the end of CP4 is the baseline for this RUS, an overview of the strategy to 2014 is included here as the period covers a number of committed interventions and the refranchising of the LDHS operator. An overview of the strategy for the medium term (2014 to 2024) is then listed, followed by consideration of the main issues affecting the longer term beyond 2024.

Short-term

The short-term strategy from 2011 to 2014 delivers either in full or in part, many of the baseline assumptions on which the analysis for the longer term has been completed.

Franchising

The franchise for the long distance high speed (LDHS) services to and from London is scheduled to be renewed in 2012. The franchise for the long distance services between Manchester and Scotland also runs to 2012 with a potential extension of up to five years.

Infrastructure

There are no specific schemes developed by this RUS, however the schemes outlined in Network Rail's CP4 Delivery Plan form part of the 2014 baseline against which demand is measured. These include:

- platform lengthening for longer Class 390 trains
- West Coast Main Line power supply upgrade
- Bletchley remodelling delivering 12-car length slow line platforms and a 775-metre bi-directional freight loop
- Stafford area capacity and performance schemes
- electrification of additional routes in the North West.

Train services

The reference case timetable used for analysis in the RUS assumes that the London Euston to Lancaster trains are extended to Glasgow forming an hourly service between London and Scotland and that the North West electrification scheme will result in the provision of electric trains on the Manchester to Scotland services.

Crowding issues are most acute for commuter and interurban services between Northampton, Milton Keynes Central and London Euston.

Rolling stock

The RUS assumes that the additional Class 390 vehicles will have been delivered by 2014.

Medium-term strategy (2014–2024)

This period of the strategy centres on the gaps identified by the RUS and presents the interventions recommended to alleviate them.

Train services

Despite the recent high levels of investment in infrastructure and increases in rolling stock during CP4, crowding is evident on some services and is forecast to grow significantly worse throughout the period to 2024.

Crowding issues are most acute for commuter and interurban services between Northampton, Milton Keynes Central and London Euston. Analysis shows there is demand for an additional 40 vehicles (including the proposed CP4 allocation) by 2024 and that these should be progressively introduced as rolling stock becomes available. By 2024, in the high-peak hour, there is a need for 1500 seats to be provided to alleviate crowding, however, most of the services arriving into London Euston in the morning high-peak hour are already at their maximum length. Lengthening beyond the current maximum 12 cars would require large scale infrastructure changes to platforms along the route.

A short-term measure to provide limited additional train capacity at London Euston in the high-peak hour is to reduce the speed differential for services operating on the fast lines to/from London Euston. This is where the route permits the operation of 125mph rolling stock, but some of the current operation is at 100mph. A small number of additional services could be accommodated on the fast lines but this is not seen as a viable option due to the potential performance disbenefit, the cost of implementation arising from all services on the fast line having to run formed of rolling stock with 125mph enhanced permissible speed characteristics and the fact that platform constraints at Euston mean a significant number of the vehicles required to address the crowding gap could not be accommodated. The RUS recommends further evaluation of capacity at London Euston to establish the number of additional services that can be accommodated to increase on-train capacity on this corridor.

Ultimately, the provision of a high speed line between London Euston, the West Midlands and beyond towards the end of the RUS period will enable significant amounts of extra capacity on the fast lines to be utilised by commuter services at the south end of the West Coast Main Line (WCML).

There is a significant peak capacity gap on Milton Keynes Central to East Croydon services between Watford Junction and Clapham Junction during the three-hour peak. The option to lengthen these services from four to eight cars has been developed in the London and South East RUS and is recommended for implementation as soon as rolling stock becomes available.

The RUS notes that crowding on these services is exacerbated by an unbalanced timetable frequency and there is a high level of suppressed demand on the route which will require additional capacity. Further work will be undertaken by the RUS during the consultation period to identify an operationally viable frequency of two trains per hour during the peak hours.

The increase in Class 390 rolling stock in CP4 can accommodate the majority of the anticipated

crowding on LDHS services, however, analysis shows that by 2024 on average, around 12 per cent of all LDHS services to or from London Euston will carry passengers above seated capacity during some part of their journey. As with all operations it is firstly recommended that the longest train sets are deployed to the busiest services. The strategy to alleviate the remaining crowding is centred on optimising the rolling stock to provide capacity for an additional hourly off-peak service between London Euston and the North West and three scenarios have been developed and appraised.

Two of these scenarios propose to reduce the number of stops in the London Euston to Glasgow services in the off-peak hours and use the spare capacity identified in the fleet to run an additional hourly service from London Euston to the North West with a calling pattern to suit demand and compensate for the loss of stops from the Glasgow service. The options are differentiated by different calling patterns both in the revised London Euston to Glasgow service and in the additional service from London to the North West with one of the two scenarios described above having a high value for money business case.

The third scenario, also with a high value for money business case, increases the frequency of service between London Euston and Manchester Piccadilly to four trains per hour, providing significant additional capacity to the busiest LDHS services on the route, however this scenario would require a total recast of the timetable. This scenario is better able to meet the capacity gap, where as those described in the previous paragraph have been developed to meet reduced journey time aspirations to Scotland and a number of other regional links gaps.

As well as addressing crowding, the business case for all of the options is strengthened significantly by the reduction in journey times between London, Preston and Glasgow in the case of the first two scenarios and generalised journey times between London and Manchester in the third. The strategy to address crowding will be developed in more detail during the consultation period and presented in the final RUS.

There is overcrowding on the LDHS service between Birmingham and Scotland at present and the existing crowding becomes more severe during the period to 2024. The RUS recommends that in the short term the allocation of the rolling stock fleet should be optimised to operate the nine-car Class 390 rolling stock on the most crowded services between Birmingham and Edinburgh, but notes that should this not be possible there is a case for lengthening a number of services on this route. As demand grows, an additional 16 vehicles become necessary and it is proposed that consideration be given to procuring vehicles which will allow the Class 221 trains currently utilised to become capable of being electrically or diesel hauled (bi-mode operation).

The strategy also notes that although the analysis does not warrant any capacity intervention for the Manchester to Scotland services during the weekdays once the existing rolling stock is replaced by four-car electric units, further work is required to understand whether there are crowding issues on these services over the weekend. This work will be undertaken during the consultation period and the analysis and strategy discussed in the final RUS.

Development of the Manchester to Scotland services to provide a consistent hourly service is recommended once the required rolling stock becomes available. Similarly, as rolling stock becomes available there is a case to develop a direct Liverpool to Edinburgh service on a two hourly basis by attaching at Preston to the Manchester to Edinburgh services. As demand and affordability improves this service could be developed to an hourly pattern.

To improve the journey time between Birmingham and Manchester, the slowest of the long distance interurban services between these cities should be diverted to run from Stafford to Manchester Piccadilly via Wilmslow. The strategy includes a number of other train service changes to compensate for the loss of capacity along the Stoke-on-Trent route and more work is necessary to understand the impacts of the proposed service changes on capacity along the Birmingham to Wolverhampton corridor.

A number of other service alterations are proposed for timetable development including extension of the Derby to Crewe service on to Manchester Airport to link the East Midlands and the Potteries communities directly with the airport.

The introduction of the December 2008 timetable severed a number of regional links that were previously served by direct rail services. The RUS has considered the case for addressing these gaps and recommends that the existing interurban service between London and Crewe is extended to Liverpool Lime Street via Runcorn subject to sufficient capacity being identified at Liverpool Lime Street in the capacity study scheduled to be undertaken during the consultation period. The study will consider all of the additional services proposed in this and the Northern RUS.

The RUS also notes that the package of measures to address the journey time and on train capacity gaps detailed above will improve connectivity between regional centres.

Freight

If the assumptions behind the SFN forecasts do not materialise or passenger service numbers increase, it may be necessary to consider interventions to provide additional freight capacity. Taking advantage of the opportunities presented by signalling renewals the industry will need to identify opportunities to lengthen loops to allow 775-metre

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freight trains to recess, and to consider other infrastructure solutions particularly in the Carlisle area where trains currently often recess but where trains of this length cannot be accommodated without delaying other services.

The RUS supports the development of the proposed high speed line, initially between London and the West Midlands and then onwards to Manchester and beyond.

Long term (beyond 2024)

As previously identified, the crowding issues worsen to 2024 and whilst there is the potential to run an additional off-peak LDHS service and potentially a small number of very fast commuter services during the peak, thereafter the WCML, particularly at the south end of the route, is effectively full and any interventions will be disproportionately expensive compared with the benefits gained. The RUS supports the development of the proposed high speed line, initially between London and the West Midlands and then onwards to Manchester and beyond.

The objectives included with the announcements about both the New Lines programme and the high speed line explicitly include the creation of capacity on the WCML for commuter and freight operations by switching the majority of LDHS services to the new infrastructure.

The strategy for dealing with this period is still under discussion between industry partners and the final RUS will seek to report a high level view of the opportunities available as a consequence of the capacity created by the preferred Government strategy for a high speed network.

One potential option would be to extend westbound Crossrail services, that are currently proposed to terminate at Ladbroke Grove, onto the WCML via a short stretch of new line in the Old Oak Common area, potentially taking over some of the shorter distance commuter services (ie as far as Tring and Milton Keynes Central) to alleviate congestion at London Euston. This concept would also help with the dispersal of passengers at London Euston once high speed services become operational. In supplementing an enhanced level of potentially higher speed commuter services from the Northampton corridor operating on the fast lines into London Euston, it would also enable operation of direct services from the Milton Keynes area to the City of London and beyond.



1. Background

1.1 Introduction to Route Utilisation Strategies

Following the Rail Review in 2004 and the Railways Act 2005, the Office of Rail Regulation (ORR) modified Network Rail's network licence in June 2005 to require the establishment and maintenance of Route Utilisation Strategies (RUSs) across the network. Simultaneously, the ORR published guidelines on RUSs and both of these documents were then updated and re-issued on 1 April 2009. A RUS is defined in Condition 1 of the network licence as, in respect of the network¹ or a part of the network, a strategy which will "promote the route utilisation objective".

The route utilisation objective is defined as:

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

Extract from ORR Guidelines on Route Utilisation Strategies, April 2009

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. The RUS 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

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

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

RUSs occupy a particular place in the planning activity for the rail industry. They utilise available input from processes such as the DfT's Regional Planning Assessments and for the period to 2014, the 2007 High Level Output Specification (HLOS). The recommendations of a RUS and the evidence of relationships and dependencies revealed in the work to produce them form an input to decisions made by industry funders and suppliers on issues such as franchise specifications and investment plans. In particular, RUSs form an essential building block of Network Rail's Strategic Business Plan, itself a precursor to the 2012 HLOS process which will define the level of expenditure available for rail in the next control period (Control Period 5 2014–2019).

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

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

The RUS process is designed to be inclusive. Joint work is encouraged between industry parties, who share ownership of each RUS through its industry Stakeholder Management Group (SMG). Detailed analysis is undertaken in industry working groups. In order that passenger's interests are represented, the

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. Background

SMG includes representation from Passenger Focus and London Travelwatch.

There is also extensive informal consultation outside the rail industry by means of rail user group workshops and Wider Stakeholder Group briefings.

1.2 Document structure

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

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, including the schemes planned to enhance the routes and services covered by the study. This helps to identify the benefits which will result from these improvements, as well as the potential for synergy

between committed or expected schemes and those developed by the RUS.

Chapter 5 identifies the gaps being considered by the RUS. These gaps are defined in terms of specific elements of supply and demand for the railway system. Options for bridging these gaps are listed, discussed and given an initial appraisal of their likely costs and benefits. In some cases further appraisal work is planned during the consultation period.

Chapter 6 draws together the conclusions into an emerging 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 chapter describes the industry's strategy for meeting predicted demand during Control Period 5 and beyond in the context of likely longer-term developments.

Chapter 7 outlines the consultation process, including its purpose, how stakeholders can contribute and the deadline for responses.



2. Scope and planning context

2.1 Introduction

This chapter describes the dimensions of the West Coast Main Line Route Utilisation Strategy (RUS). It outlines its purpose, geographical scope, stakeholders, and the time horizon which it will consider. It also describes the planning context in which it is set and its relationship to other studies.

2.2 Purpose

The strategies that emerge through the RUS process have a number of purposes. They inform:

- the optimisation of the output specification for rail infrastructure renewals and enhancements
- the identification of ways in which capacity could be utilised more efficiently, in the context of the railway and wider public transport
- the development of the Government's High Level Output Specification (HLOS) for the next control period, as applicable to the West Coast Main Line RUS area
- the development of a future service specification and timetable structure for the West Coast Main Line RUS area
- the establishment of an optimum engineering access strategy, taking into account industry-efficient maintenance and the requirements of passenger and freight operators.

Specifically the West Coast Main Line RUS will therefore:

- propose options to achieve the most efficient and effective use and development of the existing rail network by analysing the demand for both passenger and freight services for the period beyond 2014 identifying cost-effective opportunities to improve the network where appropriate
- enable Network Rail to develop an informed renewals, maintenance and enhancements programme in line with the aspirations of the Department for Transport (DfT) and Transport Scotland (who fund approximately 70 miles of the RUS area in Scotland) and the reasonable requirements of train operators and other key stakeholders

- enable local transport plans and freight plans to reflect a realistic view of the future rail network
- inform future passenger franchises that use the route
- consider and comment on the longer-term use of the route in the light of strategies for high speed rail services across the UK proposed by Network Rail's New Lines Programme and by High Speed Two (HS2) Limited.

2.3 Geographic scope

In geographical terms, the West Coast Main Line RUS will consider the area covered by Network Rail's Strategic Route N (West Coast Main Line) between London Euston and Carstairs. This is depicted in geographical and schematic format in **Figures 2.1** and **2.2** respectively. Further details of the routes covered by the strategy are provided in **Chapter 3**.

2.4 Scope of services

The RUS considers all passenger and freight services that spend all or part of their journey within the RUS area, to the extent necessary to achieve the route utilisation objective regardless of whether or not the physical infrastructure falls within the boundaries of the West Coast Main Line RUS area. The RUS includes appropriate analysis of those traffic generators outside the scope area which have a significant effect on the pattern of demand within the scope area. For example the RUS considers services from the West Coast Main Line (WCML) that operate into Manchester Piccadilly/Trafford Park and north from Carstairs to Glasgow Central and Edinburgh Waverley.

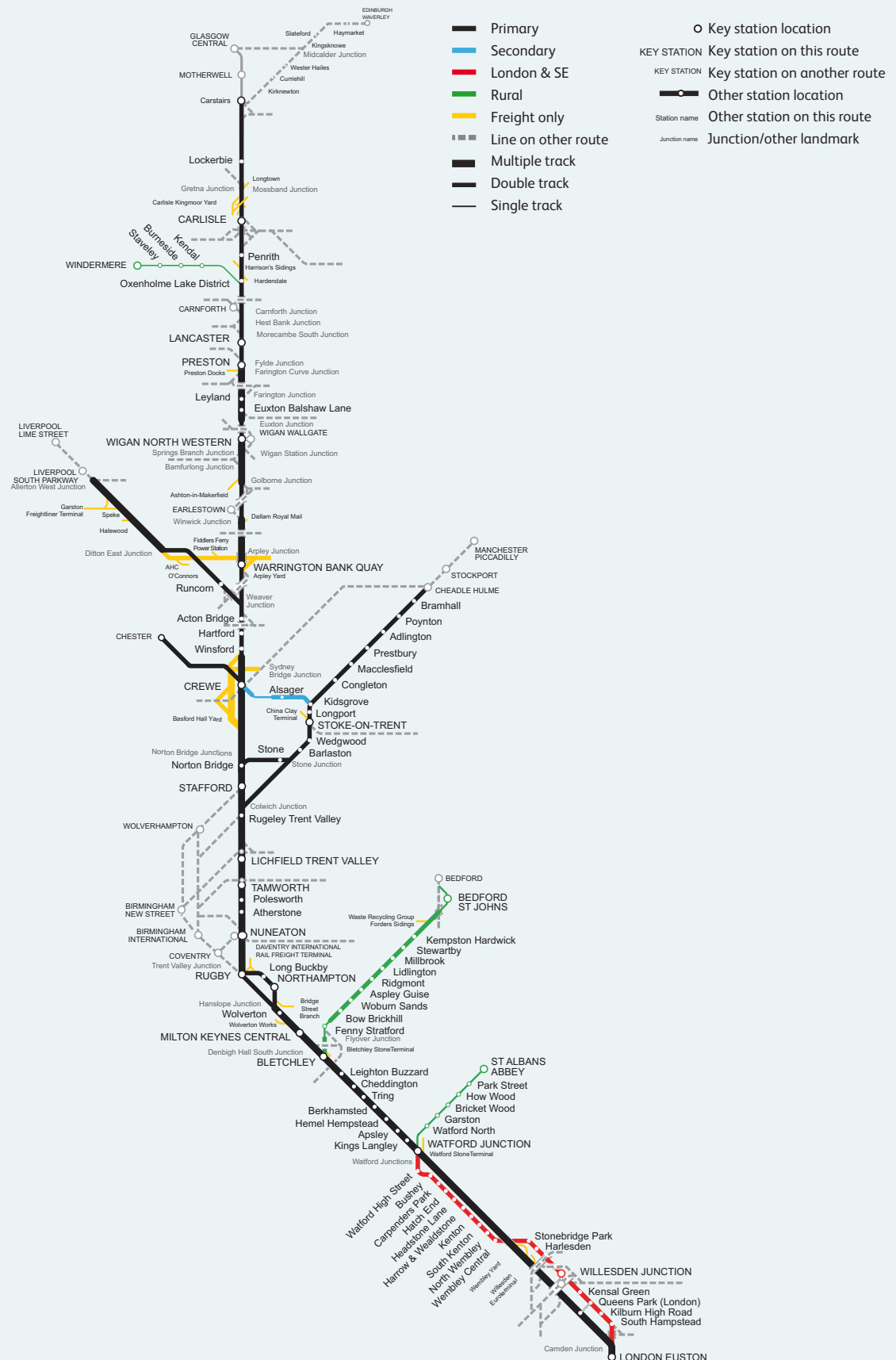
The RUS considers all passenger and freight markets across the RUS area. Passenger markets served include long distance high speed and interurban journeys between the key urban centres both on and off the route with significant commuter (shorter distance flows) flows into London, Manchester, Birmingham, Liverpool and Glasgow. The WCML serves a significant number of freight and passenger markets. Freight markets include domestic and deep sea intermodal traffic along with a considerable amount of bulk flows.

2. Scope and planning context

Figure 2.1 – geographic map of West Coast Main Line RUS area



Figure 2.2 – schematic map of West Coast Main Line RUS area



2. Scope and planning context

2.5 Linkage to other Route Utilisation Strategies

Network Rail continues to publish a programme of RUSs which, once complete, will cover the rail network of mainland Britain. The West Coast Main Line RUS is the last of the original programme of geographic RUSs and interfaces with other parts of the network which have been covered in other RUSs, including the East Midlands, West Midlands and Chilterns, Merseyside, Scotland, Cross London and Wales RUSs. The relationship between them is outlined below. The West Coast Main Line RUS also interfaces with all three of the second generation RUSs (see section 2.6).

The East Midlands RUS, established in April 2010, covers the lines on the Midland Main Line strategic route not assessed by the West Midlands and Chilterns or Yorkshire and Humber RUSs. This interacts with the West Coast Main Line RUS area at Nuneaton and between Stoke-on-Trent and Crewe and the two RUSs interface on the routes from Derby to Crewe and between the West Midlands and Stansted Airport via Nuneaton and Leicester.

The West Midlands and Chilterns RUS Draft for Consultation was published in November 2010 and considers freight and passenger flows principally across the West Midlands conurbation and along the Chilterns route between Birmingham and London Marylebone. It draws together the conclusions from other RUSs in respect of long distance interurban services between the South West, South Coast, and North East, North West. The West Midlands and Chilterns RUS interacts with the West Coast Main Line RUS at Rugeley Trent Valley, Stafford and Rugby. Both RUSs consider options on the Birmingham to Stafford corridor via Wolverhampton.

The Cross London RUS established in October 2006 interacts with the West Coast Main Line RUS in the Willesden area. The two RUSs interface on the

route to and from the West London Line between Willesden and Clapham Junction via Kensington Olympia. Since the publication of the Cross London RUS, there have been significant increases in demand for services operating over the West London Line and both the West Coast Main Line RUS and the second generation London and South East RUS consider this increase in demand.

The Wales RUS, established in January 2009, interfaces with the West Coast Main Line RUS on the lines from Crewe to the north Wales coast via Chester.

The Scotland RUS established in May 2007 considers all passenger and freight services north of the Scottish border.

The North West RUS, established in the summer of 2007 covers an area which is crossed by the West Coast Main Line. The two RUSs interface on various routes radiating from Greater Manchester and Merseyside and these interfaces are most evident at the stations and junctions between Crewe and Preston.

The Lancashire and Cumbria RUS, established in October 2009, covers the largely rural area north of Preston and like the North West RUS, is crossed by the WCML. The RUS referred several timetable connectivity issues to be considered by the West Coast Main Line RUS, at Oxenholme with the Windermere branch, and at Carlisle for connectivity with the Cumbrian coast, Glasgow and South West route to Dumfries and Kilmarnock and the Carlisle to Settle and Leeds line.

The West Coast Main Line RUS also considers input and analysis from the Freight RUS, established in May 2007, and the Strategic Freight Network, as well as emerging conclusions from the Network RUS strategies assessing national electrification issues, rolling stock and depots, station capacity and scenarios and long distance forecasts.



2.6 Generation Two Route Utilisation Strategies

The original programme of RUSs is scheduled to be completed in 2011. Network Rail is obliged under its Network Licence to maintain established RUSs to enable each recommended strategy to remain valid and fit for purpose. A number of factors can affect RUS recommendations over time, including changed Government policy, economic circumstance and franchise change and remapping. The existing RUS programme commenced in December 2004 and in July 2007 the publication of the Government White Paper 'Delivering a Sustainable Railway' required Network Rail to consider a 30-year planning horizon in its development of RUSs. A number of the earlier RUS recommendations have therefore needed to be reassessed to consider this longer-term planning framework. Equally a number of assumptions made in early recommendations have changed in the light of the current economic climate. The publication of the HLOS and Network Rail's Control Period 4 (CP4) Delivery Plan in 2008/09 has also changed the way in which a number of recommendations will be delivered.

Network Rail is therefore addressing these changes through a second generation of RUSs. These strategies will adopt a more strategic viewpoint than undertaken in the established RUSs and, through analysis of the changes that have occurred, identify the strategic gaps that require further appraisal. The strategies will not seek to confine themselves to a particular geographic area and will also not re-appraise the recommendations made in established RUSs where these remain valid.

This second generation of RUSs has identified three workstreams that will consider strategic gaps in London and the South East, the north of England and Scotland. The West Coast Main Line RUS interfaces with all three of these second generation RUSs:

The London and South East RUS, currently in development and due to be published as a draft for consultation in December 2010, considers central London economic growth until 2031 and the effect that this growth may have on demand across all corridors into London terminal stations. The London and South East RUS interacts with the West Coast Main Line RUS at London Euston. The London and South East RUS is also considering demand to the West London Line (primarily from Clapham Junction and south thereof) and options to increase supply to match this demand from both directions.

The Northern RUS, published as a draft for consultation in October 2010, analyses the effects that the announced programme of electrification of certain routes in the Manchester and Liverpool areas will have on travel patterns into these urban

centres. The Northern RUS therefore interfaces with the West Coast Main Line RUS in the Preston area and both RUSs consider services between Manchester and Scotland.

The Scotland RUS Generation Two, published as a draft for consultation in October 2010, builds on the work of the established Scotland RUS taking cognisance of Scottish Ministers' priorities for transport across Scotland. The Scotland RUS Generation Two interfaces with the West Coast Main Line RUS at Carstairs and considers the implications of revised and additional services on the WCML in so far as they affect terminal capacity at Glasgow Central and Edinburgh Waverley.

2.7 Linkage to other studies and workstreams

In order to successfully fulfil its role in industry planning, the RUS should fit into a wider planning framework, relating not only to rail schemes but also extending to other major strategies and policies covering key issues such as housing, economic development, social inclusion and environmental awareness. For it to be an effective strategy it should be broadly aligned and consistent with these.

During the development of this RUS a number of changes have taken place in the way that local and regional planning is administered in the UK. Following the establishment of the Coalition Government in May 2010, the approach to public spending and local planning has been reviewed, with the aim of reviving and developing the UK economy. A key policy has been to free local government from central and regional control and devolve greater powers to councils and local communities. Associated with this has been the abolition of the former Regional Development Agencies and the formal documents which they produced, such as the Regional Spatial Strategies (RSS). The new guidance is for local authorities to take collective responsibility for determining the appropriate level of growth anticipated in their areas.

Following the abolition of the former Regional Development Agencies in May 2010, the RUS is no longer able to draw directly on their recommendations. In these circumstances the representation of local councils and governing bodies in the Wider Stakeholder Group has been essential for understanding the changes as they have evolved. Whilst the key themes and outputs of the former regional documents are still considered to have some relevance for understanding the local planning context, the RUS has looked directly to the local authorities for guidance on key issues such as travel behaviour and anticipated housing growth in the regions they cover.

2. Scope and planning context

The following regional and local planning documents (some of which have now been formally withdrawn) have provided supporting information during the development of the RUS:

- Delivering a Sustainable Railway (White Paper, Department for Transport (DfT) 2007)
- The Eddington Transport Study (October 2006)
- The London Plan (February 2004)
- Transport for London's (TfL) Rail Corridor Plans
- Transport for London's Transport 2025 Plan (2007)
- Regional Planning Assessments
- West Coast Main Line Strategy (Strategic Rail Authority June 2003, updated 2006)
- Towards a Sustainable Transport System – Supporting Economic Growth in a Low Carbon World (DfT October 2007)
- Regional Transport Strategies
- Local Transport Plans (see section below)
- Scotland's Railways: developed as part of the National (Scottish) Transport Strategy (December 2006)
- Scotland Strategic Transport Projects Review (Transport Scotland 2008–2009)
- Manchester Transport Innovation Funding Programme (Greater Manchester Passenger Transport Executive July 2008)
- London Mayor's Transport Strategy (May 2010)
- Network Rail's Northern Hub study (2010)
- High Speed Rail London to the West Midlands and Beyond: A Report to Government by High Speed Two (HS2) Limited (March 2010).

New Lines Programme

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

The previous Government's proposed strategy for high speed rail was established in a Command Paper presented to Parliament and published in March 2010. The Command Paper sets out the case for a new core British high speed rail network. The core strategy comprises a 335-mile core Y-shaped

high speed rail network between London and Birmingham/Manchester/Leeds capable of carrying trains at speeds of up to 250mph. The Command Paper states that a London to West Midlands route would be the first stage of the new high speed rail network.

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

Local transport plans

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

2.8 Time horizon

In 2003 the Strategic Rail Authority published its strategy for the WCML. Updated in 2006, this strategy culminated in the West Coast Main Line Route Modernisation Programme which delivered a step change in capability and capacity on the route between 2003 and 2008. The December 2008 timetable provided faster journeys and significantly increased on-train capacity between London and key urban centres on the route. In 2010 the DfT announced the procurement of an additional 106 Class 390 vehicles to provide further on-train capacity.

As a result of the significant recent changes to both the infrastructure and services on the route, and the unquantifiable effect that this would have on changes to immediate travel patterns, the RUS has taken 2014 as the baseline timetable year. By 2014 the demand profile for much of the long distance passenger services is expected to have stabilised and the additional Class 390 vehicles will be providing further capacity. The enhancement programme detailed in Network Rail's CP4 Delivery Plan is also included in the baseline.

The West Coast Main Line RUS takes a 30-year perspective to be consistent with the long-term vision adopted in recent UK Government transport planning strategy documents, notably the DfT's Rail White Paper and Rail Technical Strategy (2007). The RUS therefore covers the 10-year period from 2014 to 2024 in detail and then describes broad, high level strategic issues in the longer term. The outputs will form the rail industry's preferred strategy for Control Period 5 (2014–2019) and 6 (2019–2024).

3. Current capacity, demand and delivery

3.1 Introduction

This chapter describes the current function and capability of the rail network in the West Coast Main Line Route Utilisation Strategy (RUS). Information is provided about the current infrastructure, capacity and capability of the route along with details of how it performs and how it is maintained. Profiles are provided for transport bodies and funder, and passenger and freight operators. Demand profiles by market sector for both passenger and freight services are detailed.

The West Coast Main Line connects London to Birmingham and the Midlands, Manchester and the North West and Scotland. The West Coast Main Line Route Modernisation Programme which was completed in 2008, included significant investment in infrastructure across the route.

The RUS baseline considers current passenger and freight demand, infrastructure capability and performance in order to form a reference point for the analysis that the RUS will undertake. The baseline considered is April 2014.

As part of the early development for the West Coast Main Line RUS a series of baseline exhibitions were held in May 2009 in Glasgow, Preston, Birmingham and Watford. This enabled stakeholders to review the results of the baseline exercise, and share their ideas and insights. This provided valuable input into the subsequent gap analysis and optioneering.

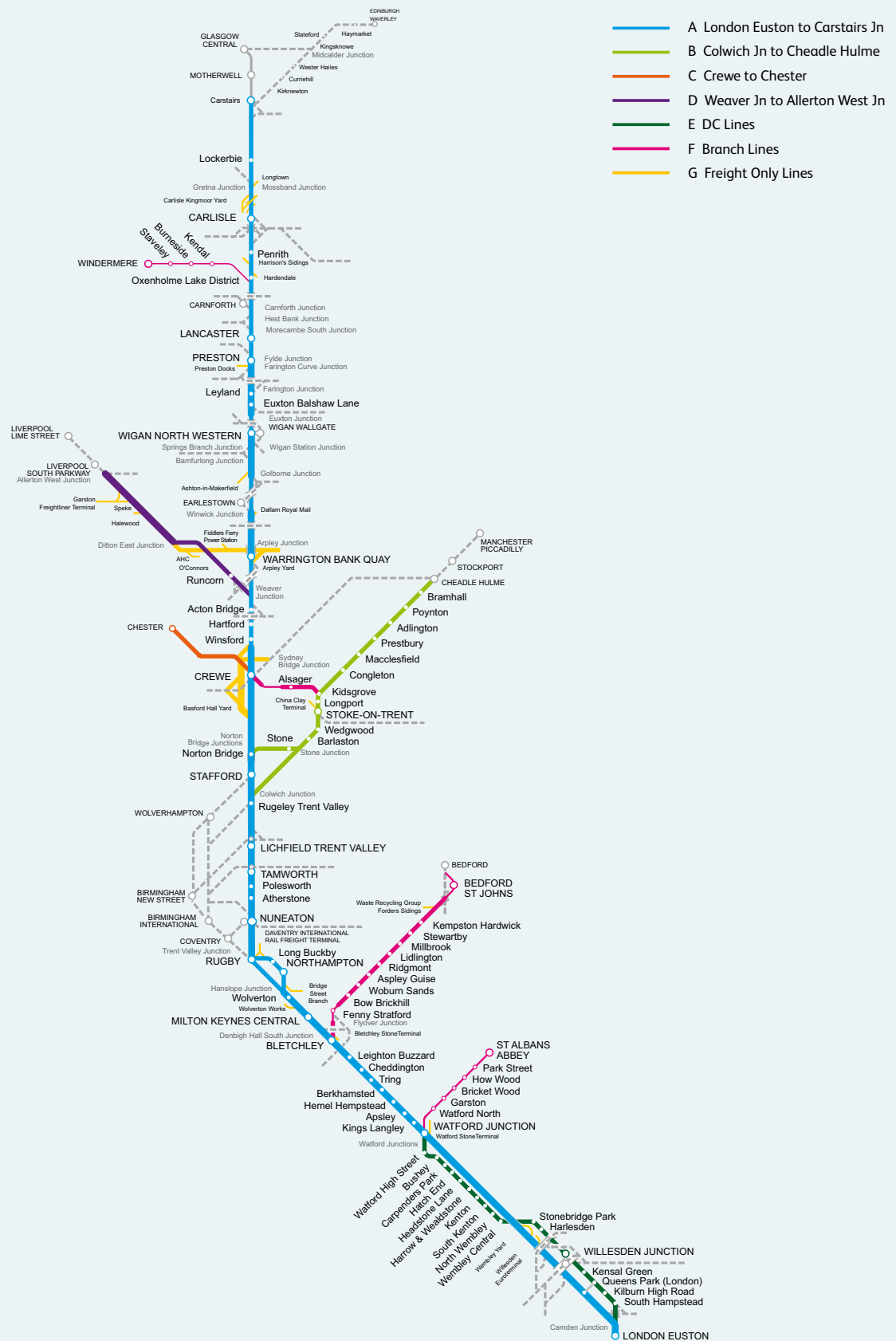
The RUS area is divided into a number of distinct route sections shown in **Table 3.1** and **Figure 3.1**.

Table 3.1 – West Coast Main Line RUS route sections

Section name		Details
A	London Euston to Carstairs Junction	London Euston – Carstairs Junction via Rugeley Trent Valley and Stafford including the Northampton loop between Wolverton and Rugby – services to Scotland, the North West and the West Midlands.
B	Colwich Junction to Cheadle Hulme	Colwich Junction (near Rugeley Trent Valley) – Cheadle Hulme via Stoke-on-Trent and Norton Bridge Junction (near Stafford) to Stone – services to Manchester Piccadilly.
C	Crewe to Chester	Crewe to Chester.
D	Weaver Junction to Allerton West Junction	Weaver Junction (near Acton Bridge) – Allerton Junction (near Liverpool) – services to Liverpool Lime Street.
E	DC lines	Camden Junction – Watford Junction DC Lines – local services .
F	Branch lines	St Albans Abbey Branch, Bletchley – Bedford Branch, Crewe – Kidsgrove, Oxenholme Lake District – Windermere.
G	Freight only lines	Harlesden Junction – Sudbury Junction – Wembley Central Junction, Crewe Independent Lines, Manchester Independent Lines, Liverpool Independent Lines, Arpley Junction – Ditton East Junction, Bamfurlong Junction – Springs Branch Junction, Skew Bridge Junction – Preston North Junction, Carnforth South Junction – Carnforth North Junction, Carlisle Goods Lines, Caldew Junction – Kingmoor Junction – Floriston Junction – Mossband Junction.
H	Freight terminals	Willesden Brent Sidings, Wembley European Freight Operating Centre, Willesden Euroterminal, Willesden Princess Royal Distribution Centre (PRDC), Watford Yard, Bletchley Stone Depot, Wolverton Works, Northampton Castle Yard, Daventry International Freight Terminal, Rugby Up Yard, New Bilton, Stafford Royal Mail Terminal, Stoke Marcroft, Basford Hall, Crewe Carriage Shed, Crewe Down Holding Sidings, Warrington Arpley, Warrington Walton Old Yard, Dallam Royal Mail Terminal (RMT), Wigan Springs Branch, Preston Docks, Shap, Hardendale, Harrisons, Carlisle Upperby, Carlisle Kingmoor Yard, Longtown.

3. Current capacity, demand and delivery

Figure 3.1 – West Coast Main Line RUS route sections



3.2 West Coast Main Line RUS rail network – infrastructure capability

Infrastructure capability, combined with the characteristics of rolling stock determines the amount of capacity available on the railway. The RUS considers the following infrastructure capabilities:

- linespeed (Figure 3.2)
- planning headways – a measure of how close trains can travel together (Figure 3.3)
- loading gauge – which defines the size of vehicles and loads of wagons that can be carried (Figure 3.4 and 3.5)
- route availability – which defines the axle weight of vehicles that can be operated (Figure 3.6)
- electrification (Figure 3.7)
- loops – where trains can overtake one another (Figure 3.8).

The RUS also considers the speed of the key junctions along the route, if the junction speed is lower than the prevailing line speed this causes the train to slow down impacting on the capacity of the route.

Linespeed

Figure 3.2 shows the linespeeds across the RUS area, and demonstrates that there is a wide mix of linespeeds depending on the route section. The main route infrastructure allows for two different maximum linespeeds for passenger services, depending on the technology fitted to the trains operating over it. Permissible speed (PS) is the normal maximum speed available to any rolling stock capable of attaining the speed. Enhanced permissible speed (EPS) allows trains equipped with tilt technology to travel at higher speeds specifically round curves, but also on sections of straight track due to the higher speed capability of this type of rolling stock.

The linespeeds from London Euston to Carstairs Junction (section A), were upgraded as part of the West Coast Main Line Route Modernisation Programme, and long sections of the fast lines allow for up to 125mph running in tilt mode (EPS). The slow lines south of Northampton were also upgraded with the majority supporting 100mph speeds, north of Northampton linespeeds on the slow lines are 75mph or slower. Notably slow linespeeds on this section include the Northampton station area, Preston station area and the Carlisle station area.

Between Colwich Junction and Cheadle Hulme (section B), linespeeds range between 50mph and 100mph with short sections of 125mph EPS running. The linespeed between Norton Bridge Junction and Stone is low which is partly due to the tight curve through Stone station. Other notably low speeds include a section south of Stoke-on-Trent station and at Cheadle Hulme.

Between Crewe and Chester (section C) the linespeeds are predominantly between 80 and 90mph with slower speeds on the approaches to both Crewe and Chester stations.

On section D, between Weaver Junction and Runcorn the linespeed is largely 100mph (EPS), with the section between Runcorn and Allerton West Junction ranging between 80mph and 90mph. The slow lines between Ditton East Junction and Allerton West Junction have speeds between 60 and 75mph.

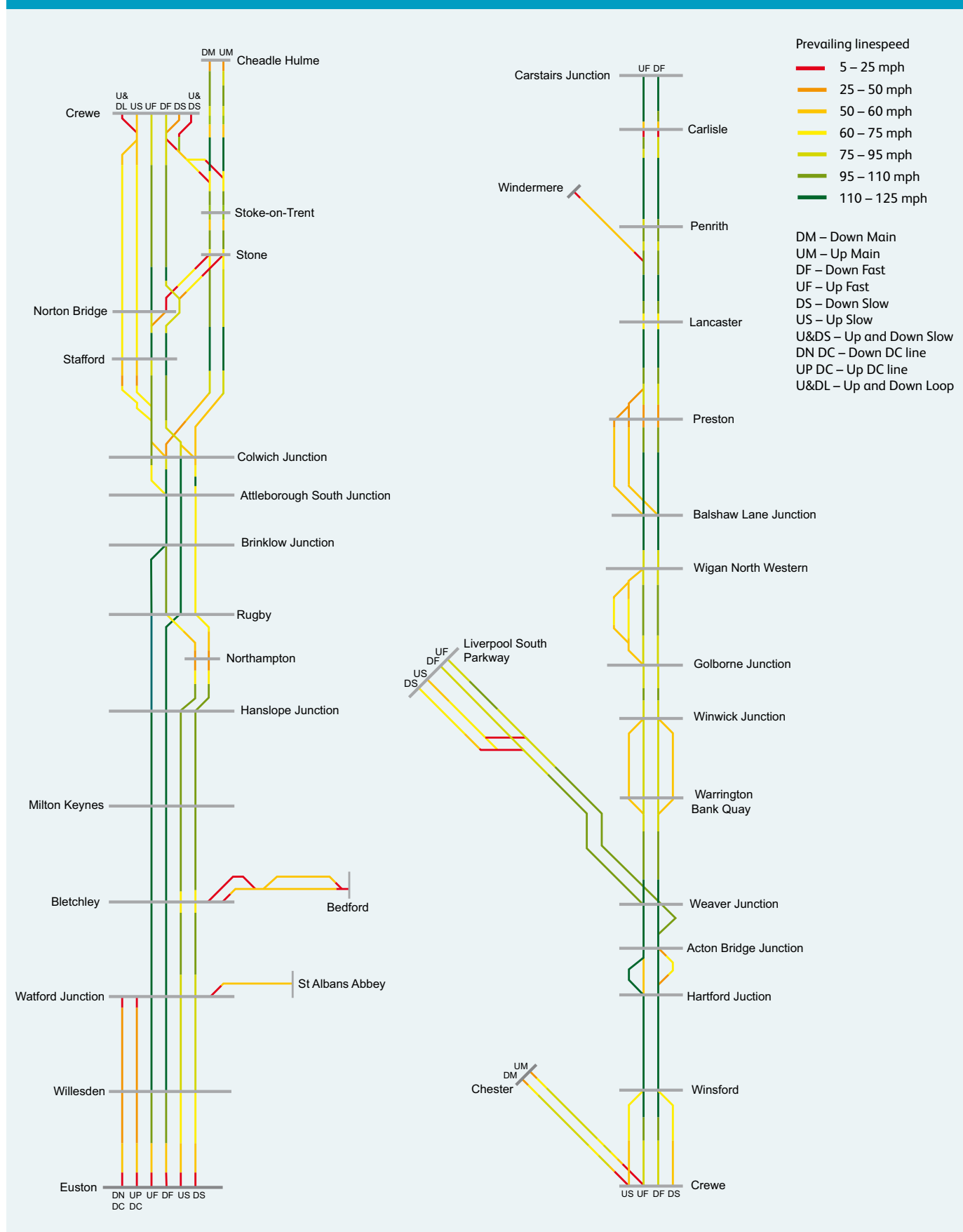
On the DC Lines, (section E), between Camden Junction and Watford Junction the linespeed is largely between 30mph and 45mph, with some sections between 50mph and 60mph, the areas around London Euston and Watford Junction have lower linespeeds.

Section F, the various branch linespeeds include the Watford Junction to St Albans Abbey route where the linespeed is between 50mph and 60mph except for lower speeds on the approach to Watford Junction. Between Bedford and Bletchley it is predominantly between 50mph and 60mph with slower speeds at the Bletchley and Bedford ends. The route between Kids Grove and Crewe is 70mph over the double line section and 60mph on the single line section and between Oxenholme and Windermere, which is further constrained by level crossings.

Section G, the freight only lines have a generally low linespeed. The freight only lines between Harlesden Junction and Wembley Central Junction have a prevailing linespeed of 20mph. In the Crewe area the independent lines have a prevailing linespeed of 10mph. In the North West, the lines between Arpley Junction (near Warrington) and Ditton East Junction (near Ditton) and between Bamfurlong Junction (near Wigan) and Springs Branch Junction (near Wigan) have a prevailing linespeed of 20mph. The section between Skew Bridge Junction (near Preston) and Preston North Junction has a prevailing linespeed of 35mph. At Carnforth the freight only line has a prevailing linespeed of 15mph whilst the lines in the Carlisle area have a linespeed of 25mph. Linespeeds through Carlisle Kingmoor Yard are as low as 5mph.

3. Current capacity, demand and delivery

Figure 3.2 – linespeed



Planning headways

The planning headway is a measure of the distance between signals plus an allowance for conditions on the line of route such as the gradient of the route and number of stations, which dictate how closely trains can travel to each other running at the prevailing linespeed. The diagram in **Figure 3.3** shows the planning headways across the RUS area.

The main line between London Euston and Carstairs Junction has three-minute headways on the fast lines south of Crewe. On the slow line the headways are four minutes south of Rugby, and five minutes between Rugby and Crewe. North of Crewe the headways are four minutes.

Between Norton Bridge and Cheadle Hulme the headways are three minutes, while the section between Colwich Junction and Norton Bridge has headways of five minutes while on the Crewe and Chester line the headways are predominantly five minutes.

On the DC lines the headways vary along the length of the route section, with three minute headways south of Willesden. North of Willesden the headways vary between four and six minutes.

On the St Albans Abbey Line there are no headways as there is limited signalling, therefore there can only be one train on the branch at any one time. The Bedford to Bletchley line is absolute block, controlled by a series of signal boxes. Each block section takes a different amount of time to clear so there is no fixed headway. The Oxenholme to Windermere branch has no headways as there is limited signalling, therefore there can only be one train on the line at any one time.

Loading gauge

The loading gauge defines the size of vehicles and loads of wagons that can be carried on the network. **Figure 3.4** shows the gauge capability of the West Coast RUS area and **Figure 3.5** shows gauge envelopes.

The types of container which can be conveyed on trains over a route depends on both the wagons used and the loading gauge of the overall end-to-end route. The WCML is considered a main artery for intermodal container traffic and is gauge cleared to W9 and W10. This allows the conveyance of containers arriving via the Channel Tunnel to terminals on the WCML which are W9 gauge, as well as 9'6"-high maritime containers on standard wagons which requires W10 gauge. Smaller, standard 8'6"-high containers operating at W8 gauge are also acceptable and widely used. Larger 9'6" containers are progressively being preferred by the shipping industry. Where these containers are wider than normal 9'6" containers, a gauge of W12 is required to operate on conventional wagons. As the network does not have substantial W12 routes, such containers can only be conveyed on wagons with a lowered platform between the wheel-sets. These wagons typically have smaller wheels resulting in higher maintenance costs. The future expectation is to provide for W12 when structures are progressively renewed on gauge-critical routes.

The London Euston to Carstairs Junction route is cleared to allow for W9 and W10 container traffic as is the section between Colwich Junction and Cheadle Hulme, including Norton Bridge to Stone and the Weaver Junction to Allerton West Junction section. The Crewe Independent lines and the Crewe to Kidsgrove sections are also cleared for W9 and W10.

The freight only line between Arpley Junction and Ditton East Junction is cleared to W9, while the Bedford to Bletchley route is cleared to W8. The Crewe to Chester line and the DC lines are cleared to convey W6 traffic.

3. Current capacity, demand and delivery

Figure 3.3 – planning headways

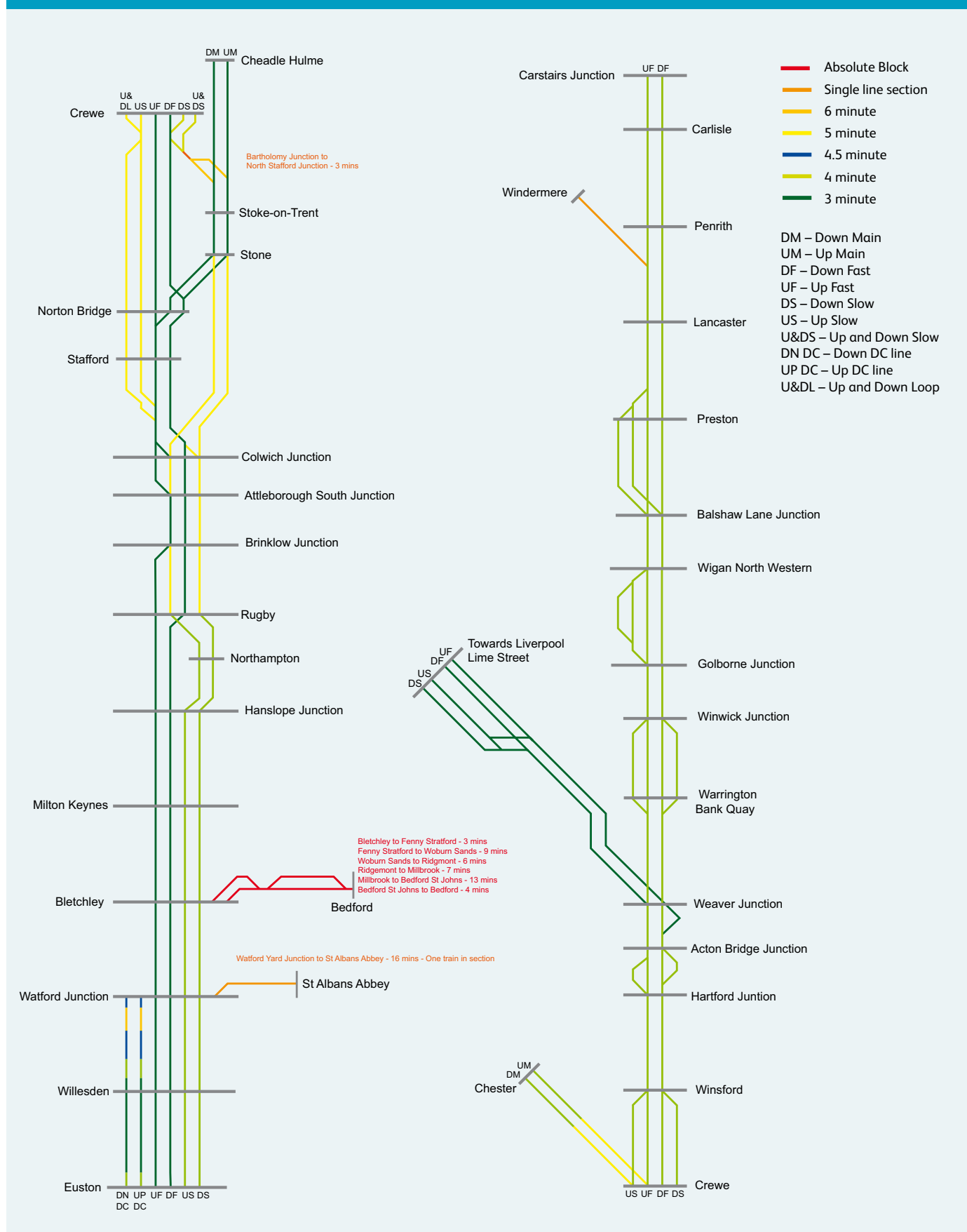


Figure 3.4 – loading gauge

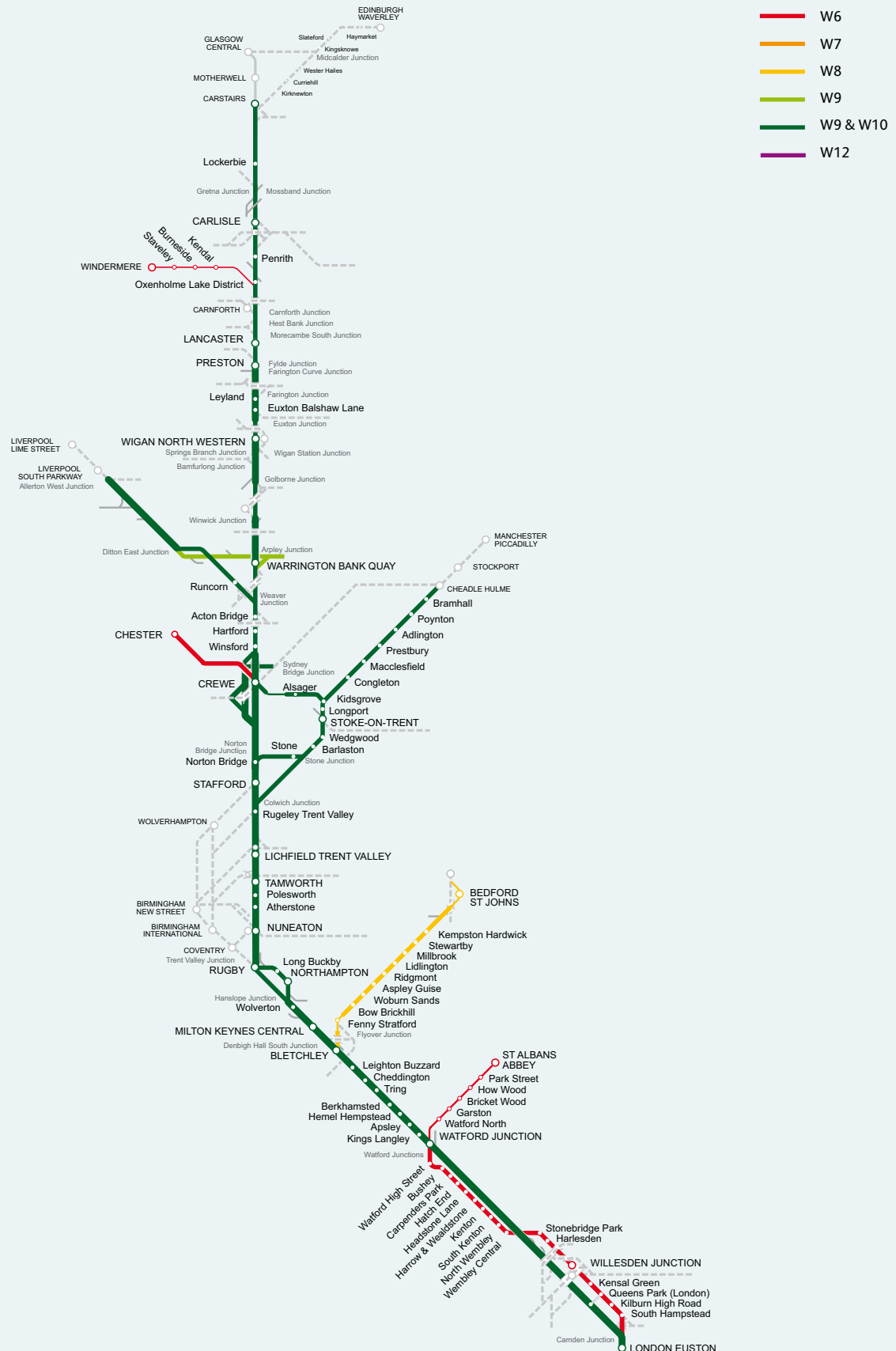
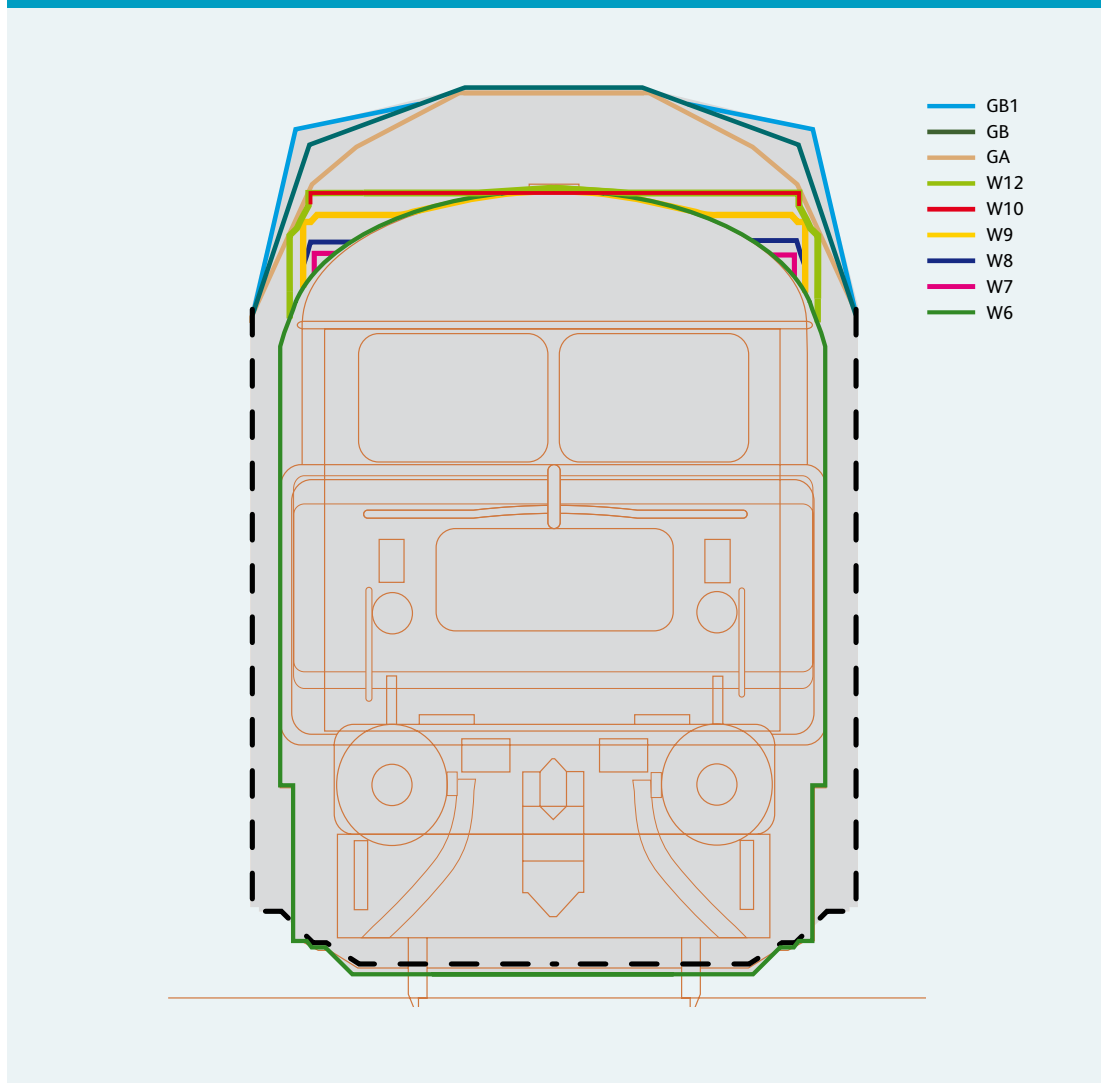


Figure 3.5 – loading gauge envelopes



Route Availability

Route Availability (RA) defines the axle weight of vehicles that can be operated. **Figure 3.6** shows the route availability of the RUS area. The majority of the route is cleared to RA8 apart from the section between Gretna Junction and Carstairs Junction which is cleared to RA10.

Electrification

The electrification of the route is shown in **Figure 3.7**. The majority of the route is electrified using the AC 25Kv overhead system, and includes the sections between London Euston and Carstairs Junction, Colwich Junction to Cheadle Hulme and Weaver Junction to Allerton West Junction. The St Albans Abbey branch and the Crewe independent lines are also AC overhead electrified. The DC lines between London Euston and Watford Junction are DC third rail electrified, with the section between Harrow and Kilburn High road being DC third and

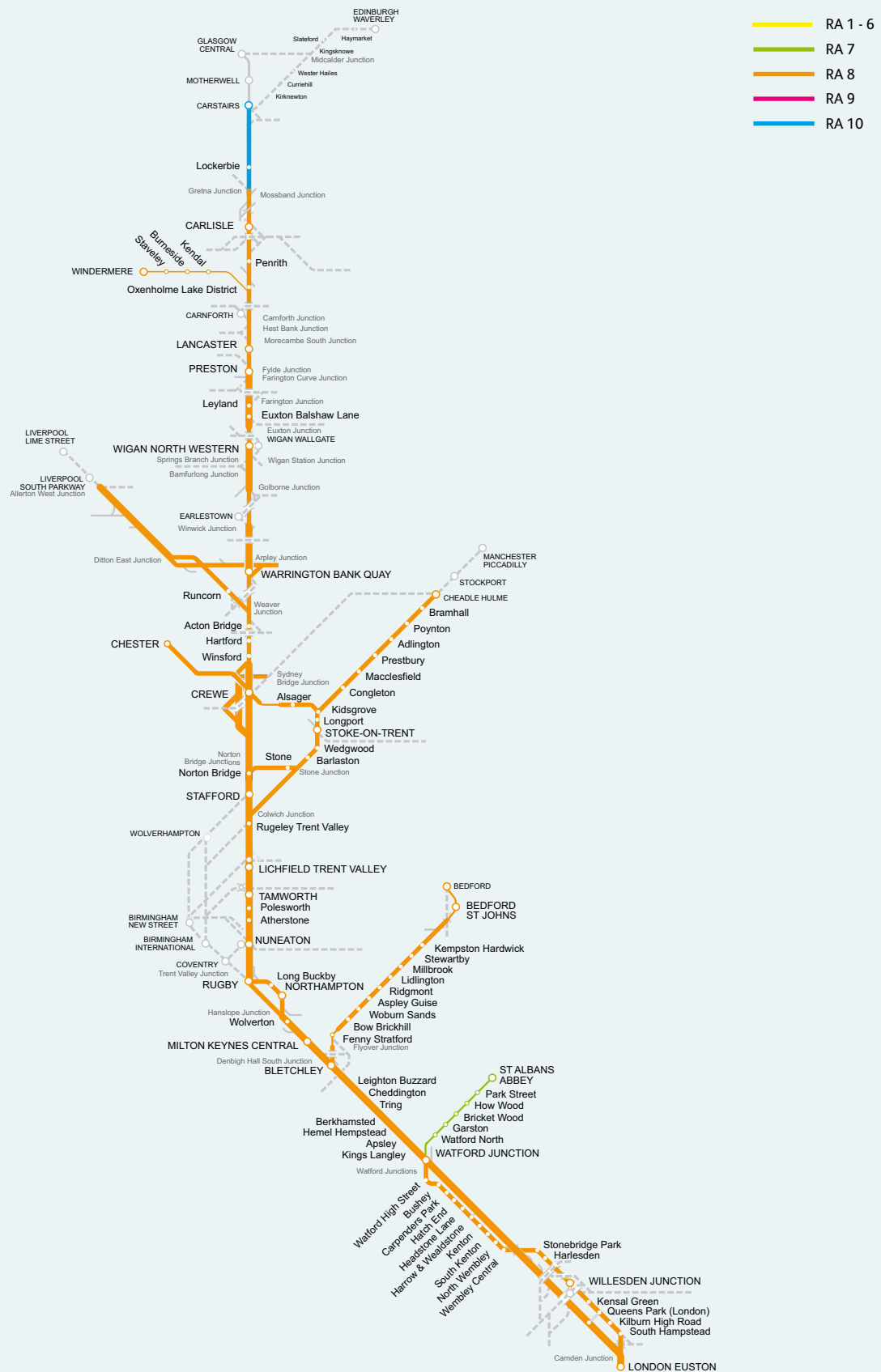
fourth rail electrified. The Bletchley to Bedford Line, Crewe to Chester Line, the Oxenholme Lake District to Windermere branch and the freight only line between Arpley Junction and Ditton East Junction are not electrified. It should be noted that only some freight terminals are electrified.

Loop lengths

Loops are used to allow faster trains to pass slower services. They are particularly important on sections of two track railway with a mix of traffic types.

Figure 3.8 shows the location of loops in the RUS area, while **Table 3.2** shows the length of loops and the entry and exit speeds. Entry and exit speeds affect the usefulness of the loop. The diagram shows that across the RUS area there are seven loops that are 775 metres or longer. Between Lancaster and Carlisle, a key section of two-track railway in the RUS area, there is only one loop that is 775 metres, which is at Eden Valley, number 28 on the map.

Figure 3.6 – route availability



3. Current capacity, demand and delivery

Figure 3.7 – electrification

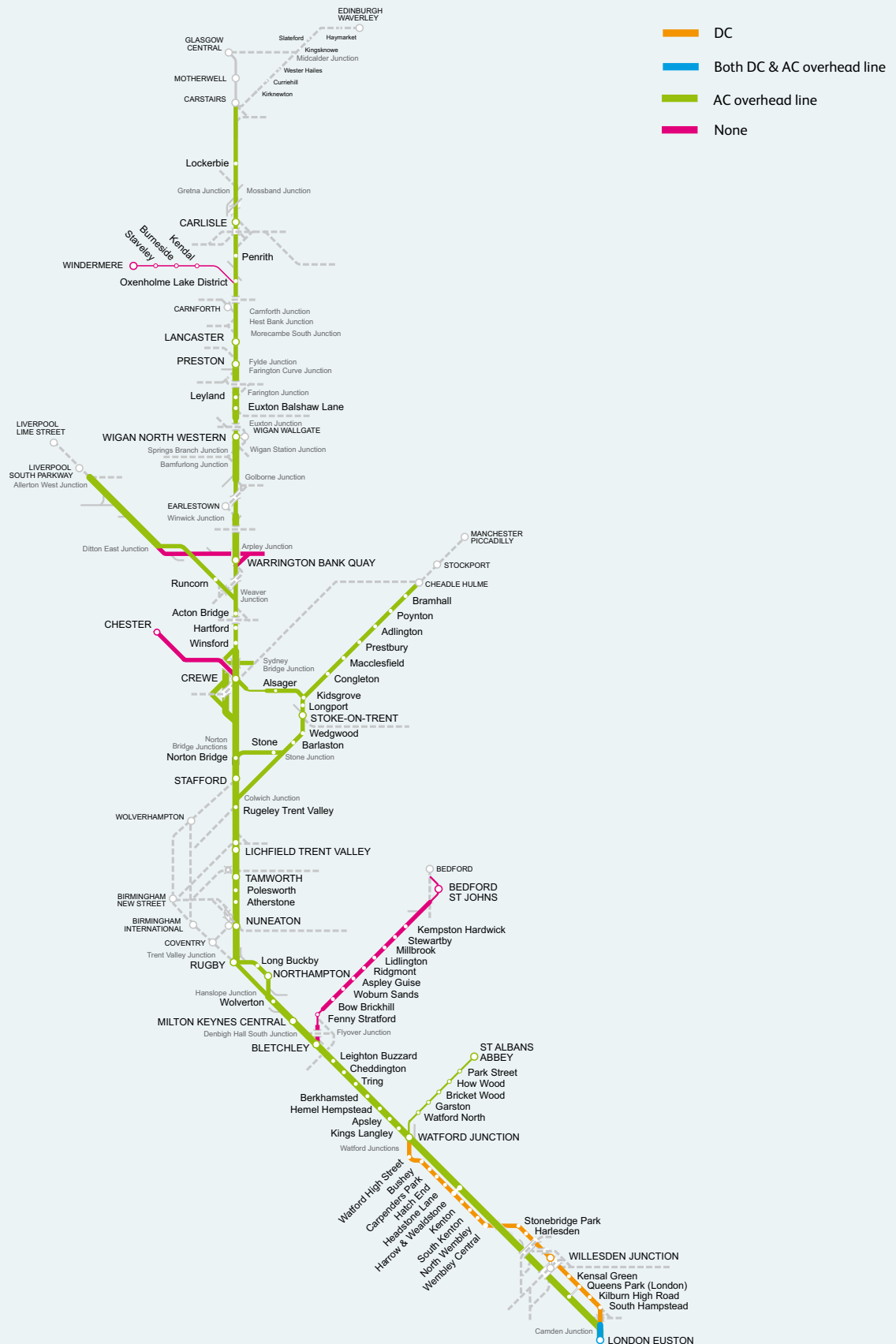
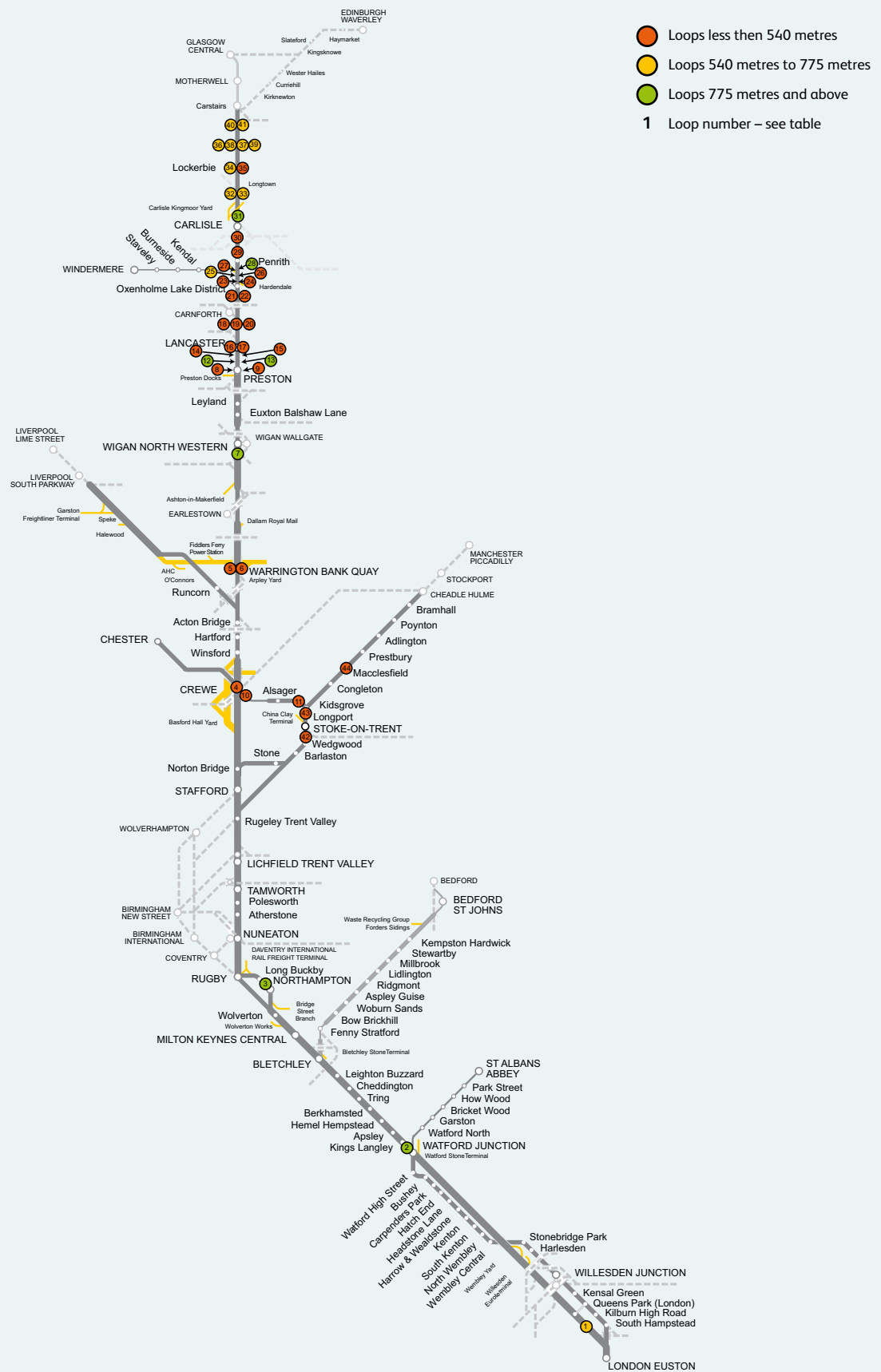


Figure 3.8 – loops' lengths



3. Current capacity, demand and delivery

Table 3.2 – loops' lengths

Map no.	Description	Length (metres)	Greater than 775m?	Greater than 540m?	Entry speed	Exit speed
1	Kilburn Up and Down Goods loop	666m	N	Y	15mph	15mph
2	Watford Up Goods loop	794m	Y	Y	15mph	15mph
3	Northampton Down Goods loop	823m	Y	Y	15mph	15mph
4	Crewe Up and Down Goods loop	361m	Y	Y	20mph	20mph
5	Warrington Bank Quay Up Goods	282m	N	N	15mph	30mph
6	Warrington Bank Quay Down Passenger loop	192m	N	N	15mph	30mph
7	Wigan Down and Up Passenger loop	825m	Y	Y	25mph	10mph
8	Preston Down and Up Goods loop	314m	N	N	15mph	15mph
9	Preston Up and Down Goods loop	384m	N	N	15mph	15mph
10	Kids Grove Up and Down Goods loop	531m	N	N	15mph	15mph
11	Up and Down Potteries loop	430m Dn	N	N	20mph	20mph
		360m Up	N	N	20mph	20mph
12	Oxheys loop	1152m	Y	Y	20mph	20mph
13	Barton and Broughton Down Passenger loop	1033m	Y	Y	25mph	40mph
14	Oubeck Down Goods loop	447m	N	N	15mph	15mph
15	Oubeck Up Goods loop	466m	N	N	15mph	10mph
16	Lancaster Up Passenger loop No. 1	423m	N	N	40mph	10mph
17	Lancaster Down Passenger loop No. 2	363m	N	N	40mph	40mph
18	Carnforth no.1 Up and Down Goods	435m	N	N	15mph	15mph
19	Carnforth no.2 Up and Down Goods	435m	N	N	15mph	15mph
20	Carnforth Up Passenger loop	512m	N	N	15mph	15mph
21	Oxenholme Up Goods loop	460m	N	N	15mph	10mph
22	Oxenholme Down Goods loop	410m	N	N	15mph	15mph
23	Grayrigg Up Goods loop	440m	N	N	10mph	10mph
24	Grayrigg Down Goods loop	430m	N	N	30mph	15mph
25	Tebay Up and Down Goods loop	565m	N	Y	20mph	20mph
26	Shap Up Goods loop	450m	N	N	25mph	15mph
27	Harrisons Down Goods loop	405m	N	N	30mph	10mph
28	Eden Valley Up Goods loop	900m	Y	Y	15mph	25mph
29	Plumpton Up Goods loop	473m	N	N	30mph	40mph
30	Upperby Down Goods loop	402m	N	N	25mph	15mph
31	Caldew Up Passenger loop	879m	Y	Y	30mph	20mph
32	Quintinshill Up Passenger loop	579m	N	Y	40mph	40mph
33	Quintinshill Down Passenger loop	566m	N	Y	40mph	30mph
34	Lockerbie Up Passenger loop	645m	N	Y	40mph	40mph
35	Lockerbie Down Passenger loop	535m	N	N	40mph	40mph
36	Beattock Up Passenger loop	645m	N	Y	40mph	40mph
37	Beattock Down Passenger loop	550m	N	Y	40mph	40mph
38	Beattock Summit Up Passenger loop	580m	N	Y	20mph	20mph
39	Beattock Summit Down Passenger loop	580m	N	Y	40mph	40mph
40	Abington Up Passenger loop	720m	N	Y	40mph	40mph
41	Abington Down Passenger loop	625m	N	Y	40mph	40mph
42	Sideway Junction Down Passenger loop	465m	N	N	10mph	10mph
43	Longport Up Goods loop	279m	N	N	30mph	30mph
44	Macclesfield Up and Down Platform loop	268m	N	N	15mph	25mph

3.3 Rolling stock, depots and stabling

There is a range of rolling stock in use across the West Coast Main Line RUS area with the various characteristics shown in **Tables 3.3** and **3.4**. The Class 390 and 221 trains which operate long distance high speed services are tilt enabled to run at EPS speeds. A mix of rolling stock speeds on a route reduces the capacity as faster stock will catch up with slower trains.

Table 3.3 – passenger rolling stock

Train type	Number of vehicles	Diesel or electric	Top speed	Route sections operated on
Class 390	9 or 11	Electric	140mph (EPS)	A, B, D
Class 378	4	Electric	75mph	E
Class 377	4	Electric	100mph	A
Class 350	4	Electric	100mph	A, B, C, F
Class 323	3	Electric	90mph	B
Class 321	4	Electric	100mph	F
Mark 2 1972 tube stock	7	Electric		E
Class 90 with Mk3	8	Electric	110mph	A
Class 90 with Mk2+3	16	Electric	100mph	A
Class 221	5	Diesel	125mph (EPS)	A, B, C
Class 220	4 or 5	Diesel	125mph	A, B
Class 180	5	Diesel	125mph	A
Class 185	3	Diesel	100mph	A
Class 175	2 or 3	Diesel	100mph	C
Class 158	2	Diesel	90mph	C
Class 156	2	Diesel	75mph	A
Class 153	1	Diesel	75mph	F
Class 150	2	Diesel	75mph	A
Class 142	2	Diesel	75mph	A, B
Class 43 with 7Mk3	7	Diesel	125mph	B

3. Current capacity, demand and delivery

Depots and stabling

In the West Coast Main Line RUS area there is one major depot, at Northampton, for servicing of the Class 350 and Class 321 fleets. There are also stabling and light maintenance activities at Willesden for the Class 378 fleet and the overnight sleeper fleet and at Bletchley and Camden for the 350 fleet. Some maintenance of the Class 221 fleet is undertaken at Crewe London North Western Railway depot.

There are other depots outside of the RUS area which are key to the maintenance of the rolling stock that operates on the West Coast Main Line. These are located at Longsight (Manchester), Oxley (Wolverhampton), Edge Hill (Liverpool), Polmadie (Glasgow) and Central Rivers (near Burton-on-Trent). Investment in these depots, with the exception of Central Rivers which maintains Class 221 stock, has been undertaken to accommodate 11-car Class 390 trains.

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. A draft for consultation on both depots and rolling stock is scheduled for publication in early 2011.

3.4 Stations and car parks

Stations are only considered by a RUS in terms of station capacity, the ability of passengers to safely and efficiently interchange with other services and the impact of station facilities on crowding and passenger flow. This is a network-wide issue and is being examined in detail in the Network RUS: Stations workstream. Station facilities are considered by other processes. An example of this is the Better Stations report released by the Department for Transport (DfT) in 2009 which examined appropriate levels of facilities for different sized stations. Station facility improvements are being taken forward through other industry mechanisms including the National Stations Improvement Programme and the Access for All programme with specific schemes affecting the West Coast Main Line RUS area outlined in **Chapter 4**.

The availability of car parking facilities at stations can be a major factor in influencing the travel decisions of passengers. Limited car parking could be suppressing growth. To help address this issue a national car park programme has been undertaken and is nearing completion, with over £90 million invested in improving car parks at key stations on the route. The programme includes car parks at Preston, Runcorn, Rugby, Wigan North Western and Stafford.

Table 3.4 – freight rolling stock

Train type	Diesel or electric	Top speed	Route sections operated on
Class 325	Electric	100mph	A, B, G, H
Class 92	Electric	90mph	A, B, D, F, G, H
Class 90	Electric	75 to 110mph	A, B, D, F, G, H
Class 86	Electric	75 to 110mph	A, B, D, F, G, H
Class 73	Electro diesel	80 to 90mph	A, H
Class 70	Diesel	75mph	A, B, C, D, F, G, H
Class 67	Diesel	125mph	A, B, C, D, F, G, H
Class 66	Diesel	75mph	A, B, C, D, F, G, H
Class 60	Diesel	60mph	A, B, C, D, F, G, H
Class 59	Diesel	60 to 75mph	A, D, G, H
Class 57	Diesel	75 to 95mph	A, B, C, D, F, G, H
Class 56	Diesel	80mph	A, D, G, H
Class 47	Diesel	75 to 95mph	A, B, C, D, F, G, H
Class 37	Diesel	80 to 90mph	A, B, C, D, F, G, H
Class 31	Diesel	80 to 90mph	A, B, C, D, F, G, H
Class 20	Diesel	60 to 75mph	A, B, C, D, F, G, H

3.5 Route capacity

Capacity usage on the route is derived from: the number of services and how closely they are timetabled together, the mix of the services (speed, stopping patterns, and traffic type) and infrastructure capability in terms of headways and margins at junctions and stations. To assess the capacity usage a qualitative assessment was made using the December 2008 timetable. This identified the key capacity constraints on the route and the reason for these constraints. **Figure 3.9** shows the qualitative assessment of capacity on the route. This assessment also identifies the impact of the traffic on the timetable on the rest of the route and the flexibility for recovery from perturbation.

London Euston to Carstairs Junction

There are a number of constraints which limit capacity on this section, with high levels of capacity utilisation which allow minimal to no growth. These constraints determine the timetable that can be operated over the entire route.

There are also large sections of the route where growth may be difficult to accommodate without affecting performance. The sections between London Euston and Wolverton, Norton Bridge and Weaver Junction, and Euxton Junction to south of Carlisle Station all fall into this category. There is also limited capacity for growth between Long Buckby and Rugby.

There is reasonable capacity for growth on the route where current traffic is not constraining the timetable, between Rugby and Stafford (with the exception of the Brinklow Junction to Attleborough Junction section), between Weaver Junction and Euxton Junction and between Gretna Junction and Carstairs Junction. Specific constraints on the London Euston to Carstairs Junction route include:

London Euston and the station throat: This is a peak-hour constraint caused by platform length and occupation times, and platform end conflicts.

Watford Junction bay platform: The bay platform at Watford Junction is only long enough to accommodate eight-car trains, limiting the length of peak time services.

Brinklow Junction to Attleborough Junction: This section has only three tracks for over five miles and the constraint is caused by the mix of services.

Stafford area: Stafford North and Stafford South Junctions both operate at maximum capacity, caused by the mix of services and crossing moves.

Norton Bridge: Norton Bridge Junction limits capacity as trains to Manchester cross the junction.

Shugborough Tunnel: there are only two tracks through the 710-metre tunnel.

Crewe station area: large number of crossing moves to the north and south of the station limiting passenger and freight capacity and increasing journey times where services need to cross the main line.

Winsford to Hartford: Five miles of two track railway limits the capacity on this section of route.

Euxton Junction to Preston: Capacity is restricted by crossing moves and the mix of services on this section.

Preston to Carstairs Junction: Predominantly two-track railway, coupled to the sinuous and steeply graded topography means that the differential speeds between faster passenger and slower freight services constrain capacity. There are also limited passing loops, with the existing ones being restrictive in length.

Lancaster station: station layout is restrictive due to the signalling capability being unbalanced in the down and up directions with three platforms signalled in the southbound direction and only one in the northbound direction.

Carlisle station area: capacity limited by restrictive layout and low linespeed.

Carstairs: Capacity is constrained at Carstairs due to the station being located close to the junction and the speed restrictions in place.

Colwich Junction to Cheadle Hulme

Between Colwich Junction and Stone Junction, Norton Bridge and Stone Junction and Stone Junction and Stoke-on-Trent there is reasonable capacity for growth. However the number of level crossings constrains the ability to increase linespeeds.

On this route section there are high levels of capacity utilisation between Stoke-on-Trent and Cheadle Hulme resulting in minimal or no capacity for growth on this section and that the section acts as a key timetable constraint. Specific constraints on the section include:

Stoke-on-Trent to Cheadle Hulme: The different types of passenger services and the mix of calling patterns cause high capacity utilisation.

Cheadle Hulme: the lines from Stoke-on-Trent converge with the lines from Crewe and there is a short two-track section between Cheadle Hulme and Adswold Road.

Crewe to Chester

The qualitative assessment suggests that there is reasonable capacity for growth on this route. There are no specific constraints on this section though it is worth noting that as the section is not electrified the London Euston to Chester/North Wales service has to be operated by diesel trains.

3. Current capacity, demand and delivery

Weaver Junction to Allerton West Junction

Analysis suggests that there is reasonable capacity for growth on this route section. There are no specific constraints on this section although it is worth noting that capacity becomes more constrained between Allerton West Junction and Liverpool Lime Street due to the increased mix of services on this section of route. The layout at Liverpool Lime Street may also act as a constraint to capacity.

DC lines

Analysis suggests that any additional growth may be difficult to accommodate between Queens Park and Harrow and Wealdstone. Between London Euston and Queens Park and between Harrow and Wealdstone and Watford Junction there is some capacity for growth. Specific constraints on this section include:

Queens Park to Harrow and Wealdstone: This section of the DC lines is shared with London Underground Limited Bakerloo line services, the number of services operating mean that there is little spare capacity.

Branch lines

The line between Watford Junction and St Albans Abbey and the branch between Oxenholme and Windermere both have very high capacity utilisation with no capacity for growth as the lines are single track throughout and only one train can operate on the lines at any one time. The Bedford to Bletchley line and the line between Crewe and Kidsgrove both have reasonable capacity for growth. Specific constraints include:

Watford Junction to St Albans Abbey: This section is a single line branch with limited signalling. Only one train can run on the branch at any one time which limits the service frequency to one train every 45 minutes.

Bedford to Bletchley: There are short single track sections at each end of the line, along with low linespeeds and two-aspect signalling throughout the route.

Alsager to Crewe: There is a short single line section which limits capacity.

Oxenholme to Windermere: This 10-mile single track line with no passing loops has high capacity utilisation.

Freight only lines

The Crewe Independent lines are constrained by slow linespeeds of 15mph.

Between Carlisle station and Floriston, freight services can be routed via Carlisle Kingmoor Yard.

The line through this area is restricted to sections of 25mph, 10mph and 5mph which generates a 20-minute time penalty for through services routed through the yard.

3.6 Performance

There are two key metrics that measure performance on the rail network. The Passenger Performance Measure (PPM) combines the figures for punctuality and reliability into a single performance measure. It covers all trains throughout the day run by all franchised train operating companies (TOCs) and measures punctuality at final destination. There are two PPM measures:

- ten minutes late for long distance operators
- five minutes late for all other operators.

Performance on the WCML, although initially disappointing after the implementation of the December 2008 timetable, has improved over the 12-month period to October 2010, with high punctuality figures being achieved by many of the train operators on the route.

Freight performance is not measured in the same way but is expressed in minutes delay per 100 train kilometres. Similar to the performance experienced by the passenger operators, improvements during the last 12 months for the two main operators saw 11.8 per cent and 30.9 per cent improvements. Further improvements are required during Control Period 4 (CP4).

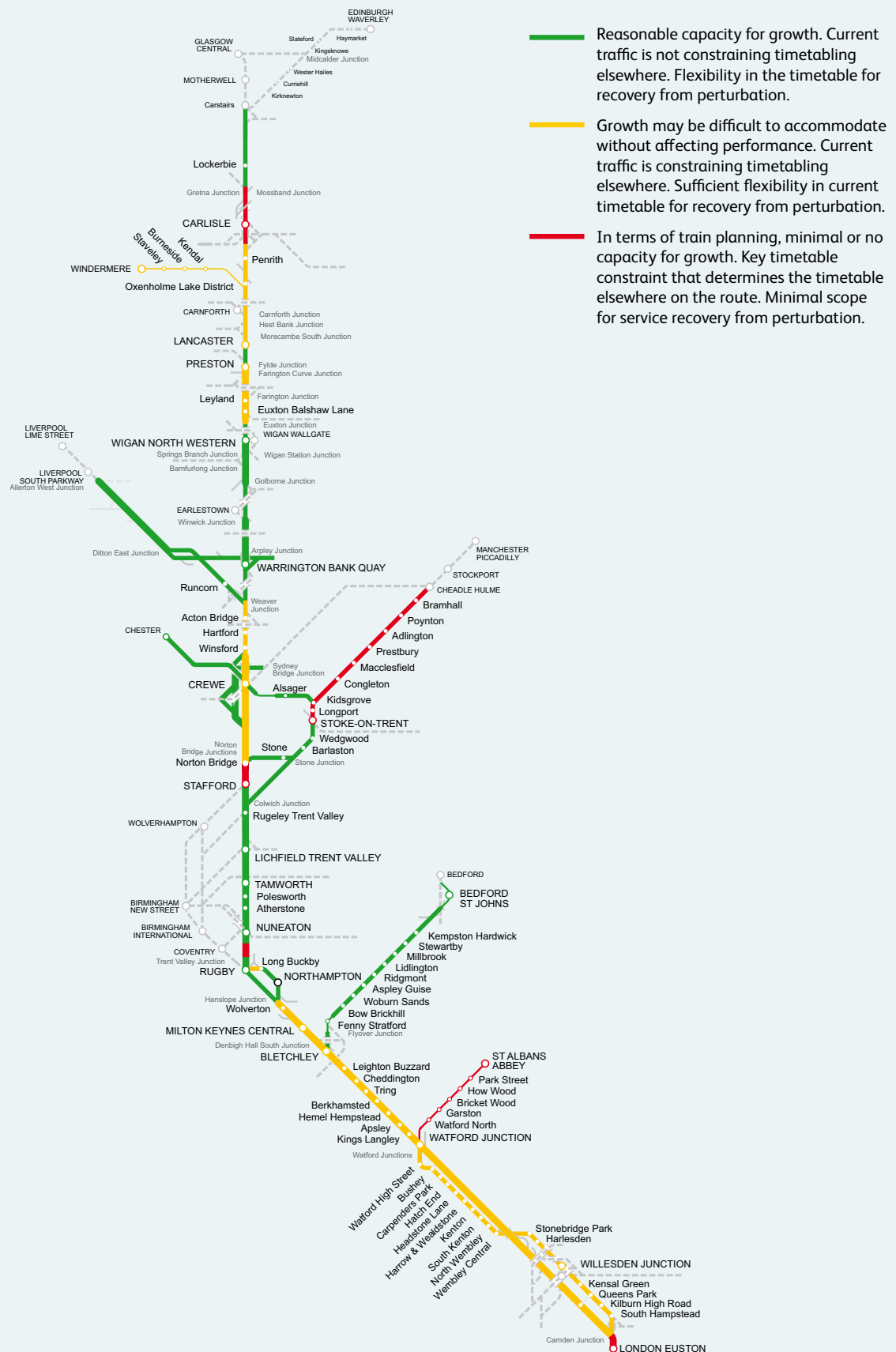
3.7 Network availability

When the 2008 timetable was being developed a fundamental review of network availability was undertaken. Following extensive discussions between the DfT, train operators and Network Rail a new possessions regime was developed. Known as Efficient Engineering Access (EEA), this saw the introduction of seven day railway principles to the route south of Weaver Junction.

A strategy is being developed to apply seven day railway principles across the whole route. This strategy has been developed with cross-industry input to deliver the following objectives as stated in the 'Network Rail CP4 Delivery Plan: Network Availability':

- to enable our customers to operate the full working timetable every day, without route closures routinely requiring diversion and/or bus substitution
- to offer customers the opportunity, where they have identified potential demand, to operate new train services during hours where train paths are not currently offered, particularly at weekends and earlier and later services during weekdays.

Figure 3.9 – route capacity (all day)



3. Current capacity, demand and delivery

The strategy has developed a set of protocols which will reduce disruption caused to passengers and the freight haulage industry by engineering works. A small number of routes, which carry over 60 per cent of all weekend passengers, have been identified for special attention. The principles of the passenger route categorisation are:

- passengers will not be transferred onto buses
- diversions away from a train's normal route will not increase passengers planned journey times by more than 30 per cent
- the only exception to this is when the demands of rail improvement work make achieving this aim impractical.

For freight flows the principle is that when closing a route for maintenance or renewals activity Network Rail will maintain the ability to deliver key traffic flows by means of a preferred or 'fit for purpose' alternative route. In this context, fit for purpose means:

- of the correct gauge and route availability
- able to deliver acceptable journey times
- with sufficient capacity to accommodate the diverted traffic.

3.8 Transport bodies and funders

Department for Transport

The DfT is the Government department responsible for the English transport network. The department is run by the Secretary of State for Transport. The DfT is responsible for letting rail franchises and specifying major rail projects.

Transport Scotland

Transport Scotland (TS) was created in January 2006 as the national transport agency of Scotland. It is an Executive Agency of the Scottish Government and is accountable to Scottish Ministers. TS funds the Scottish rail network including 68 miles of the WCML. It is headed by a chief executive who is directly accountable to the Cabinet Secretary for Finance and Sustainable Growth. TS is responsible for letting the ScotRail franchise and specifying major rail projects in Scotland.

Transport for London

Transport for London (TfL) is the integrated body responsible for London's transport system. TfL is responsible for letting the London Overground concession for the services on the DC lines and for operating the Bakerloo Line service. TfL is also responsible for exercising the Mayor's responsibilities over national rail in London.

Centro

Centro, the West Midlands Integrated Transport Authority, promotes and develops public transport across the West Midlands. Centro invests in a number of activities designed to improve and enhance regional transport, working towards a fully integrated public transport system offering safe and secure travel.

Greater Manchester Integrated Transport Authority and Greater Manchester Passenger Transport Executive

Greater Manchester Integrated Transport Authority is the body responsible for setting local public transport policy and for deciding how money is spent on supporting and improving Greater Manchester's public transport network. The Authority's decisions are implemented by Greater Manchester Passenger Transport Executive.

Merseytravel

Merseytravel is the operating name of the Merseyside Passenger Transport Authority and Executive. Merseytravel has wider powers than most other integrated transport authorities and specifies the franchise for the Merseyside area rather than the DfT. It co-ordinates public transport through partnership initiatives, with the aim of delivering a fully integrated and environmentally friendly public transport network.

Welsh Assembly Government

The Welsh Assembly Government exercises overall planning responsibility, including transport strategy, for Wales. The Wales railway network is spread across 22 authorities in Wales, and four English shire counties with peripheral elements spreading into Merseyside and Chester.

3.9 Train operating companies

There are a number of current operators on the WCML and these are detailed below. A number of the franchises detailed below will have been refranchised by the start of the baseline year of 2014.

Virgin Trains

Virgin Trains operates long distance passenger services between London Euston the West Midlands, the North West, North Wales and Glasgow and Edinburgh. The franchisee operates a fleet of Class 390 electric trains and a number of Class 221 diesel trains. The franchise was awarded in March 1997 and runs until March 2012. The future franchise specification will be determined in 2011.

London Midland

London Midland operates services from London Euston to Tring, Milton Keynes Central and Northampton along with local services in the West Midlands. It operates interurban services, from Birmingham New Street to Liverpool Lime Street and the London Euston to Crewe local service. London Midland also operates the branches from Watford Junction to St Albans Abbey and from Bedford to Bletchley. The franchise was awarded in November 2007 and, subject to achievement of performance targets, runs until September 2015.

Northern Rail

Northern Rail operates services on the WCML between Euxton Junction (near Preston) and Carnforth. These include services from Preston to Manchester, Liverpool Lime Street, Blackpool North and Morecambe. Northern Rail also operates services from both Carlisle and Lancaster to Leeds. The current Northern Rail franchise was formed in December 2004 with the merger of the First North Western and Arriva Trains Northern franchises and, as it achieved a two-year extension after meeting performance targets, runs until September 2013.

First TransPennine Express

First TransPennine Express operates interurban services with limited stops across the northern section of the RUS area. Key services over the West Coast Main Line include Manchester Airport to Scotland services as well as services from Manchester to Blackpool North and Barrow-in-Furness and First TransPennine Express operates all services between Oxenholme and Windermere. The current franchise was awarded in February 2004 and runs until January 2012, with the option for a five-year extension.

Arriva Trains Wales

Arriva Trains Wales operates services from Chester to Crewe and from Wales to Manchester Piccadilly via both Stockport and Warrington Bank Quay. The franchise is due to run until December 2018.

East Midlands Trains

The East Midlands Trains franchise was formed in November 2007 and, subject to achievement of performance targets, runs to March 2015. East Midlands Trains operates the services between Derby and Crewe via Stoke-on-Trent.

CrossCountry

CrossCountry operates long distance services radiating from Birmingham New Street; key flows on the WCML include the South West and South Coast to Manchester Piccadilly services via Stoke-on-Trent. The current franchise runs from November 2007 to April 2016.

Southern

Southern provides an hourly service linking East Croydon (via Clapham Junction) to Watford Junction and Milton Keynes Central. The franchise runs to July 2015 with options for extension to 2017.

London Overground Rail Operations Limited

London Overground Rail Operations Limited (LOROL) operates the services on the DC Lines between London Euston and Watford Junction. The concession is let by TfL and runs for seven years from 2007.

London Underground Limited

Bakerloo line services operate on the DC lines between Queens Park and Harrow and Wealdstone.

ScotRail

The ScotRail franchise is operated by FirstGroup and the franchise provides the Caledonian overnight sleeper services between London Euston and Edinburgh, Glasgow, Inverness, Aberdeen and Fort William, as well as local services between Gretna and Carlisle. The franchise is let by the Scottish Government and runs to the end of 2014.

In addition to the franchised operators listed above, West Coast Railway Company Ltd operates to various charter destinations over the route and Wrexham, Shropshire and Marylebone Railway uses the route to access maintenance and stabling facilities at Crewe.

A number of open access operators aspire to operate services over the route and have applied to the Office of Rail Regulation seeking track access rights to operate services.

3. Current capacity, demand and delivery

Community Rail Partnerships

A number of Community Rail Partnerships operate within the West Coast Main Line RUS area. Those that are members of the Association of Community Rail Partnerships are listed below:

- Abbey Line Community Rail Partnership (Watford Junction – St Albans Abbey)
- Marston Vale Community Rail Partnership (Bletchley – Bedford)
- North Staffordshire Community Rail Partnership (Crewe – Stoke-on-Trent – Derby)
- North Cheshire Rail User Group
- Lakes Line Community Rail Partnership (Oxenholme Lake District – Windermere)
- East Lancashire Community Rail Partnership
- West of Lancashire Community Rail Partnership
- Leeds to Morecambe Community Rail Partnership
- South Fylde Community Rail Partnership
- Ribble Valley Community Rail Partnership
- Cumbrian Coast Community Rail Partnership
- Furness Line Community Rail Partnership.

3.10 Passenger market profile

Current passenger demand

The WCML connects London with the West Midlands, the North West, and parts of Scotland. In addition, several sections of the WCML form part of the suburban railway systems in London, Birmingham, Manchester, Liverpool and Glasgow. In 2009/10 the WCML handled around 75 million passenger journeys. London Euston is the busiest station on the WCML with approximately 31.8 million passengers starting or ending a journey there in 2009/10.

The total number of journeys by route section on the WCML in 2009/10 is shown in **Figure 3.10**. The highest numbers of total annual passenger journeys were on the corridor between London Euston and Rugby. This is largely driven by the commuter demand to and from London Euston.

There are three distinct passenger markets on the WCML, commuting (into London Euston, Birmingham, Manchester and Liverpool), long distance leisure and business markets and interurban leisure and business

markets. These have been condensed for the purpose of analysis into long distance markets served by LDHS and interurban operators, and short distance markets, served by interurban and commuter operators.

The WCML, in comparison to other rail routes in the UK, is more competitive with other modes of travel. The Network RUS: Scenarios and Long Distance Forecasts, published in June 2009, illustrates that the WCML has the highest rail mode share of long distance travel compared to any other route in the United Kingdom, with 31 per cent of all long distance journeys on the corridor being undertaken by rail¹. It further disaggregates the data to show that for the long distance market leisure travel forms the highest share of rail demand on the route at 50 per cent, with business travel forming a relatively high share at 33 per cent.

Passenger growth

Annual growth has varied considerably along the route since 1999 due to various factors. The disruptions caused by the West Coast Main Line Route Modernisation Programme and the economic recession in 2009, both put strong downward pressures on growth in passenger demand. Conversely, substantial growth has occurred due to changes such as the introduction of the December 2008 timetable resulting in a significantly improved train service, increased road congestion and car parking costs especially in city centres, increased modal share of rail and finally the structural changes in travel and employment markets, with more people now working in city centres who have limited alternatives for commuting.

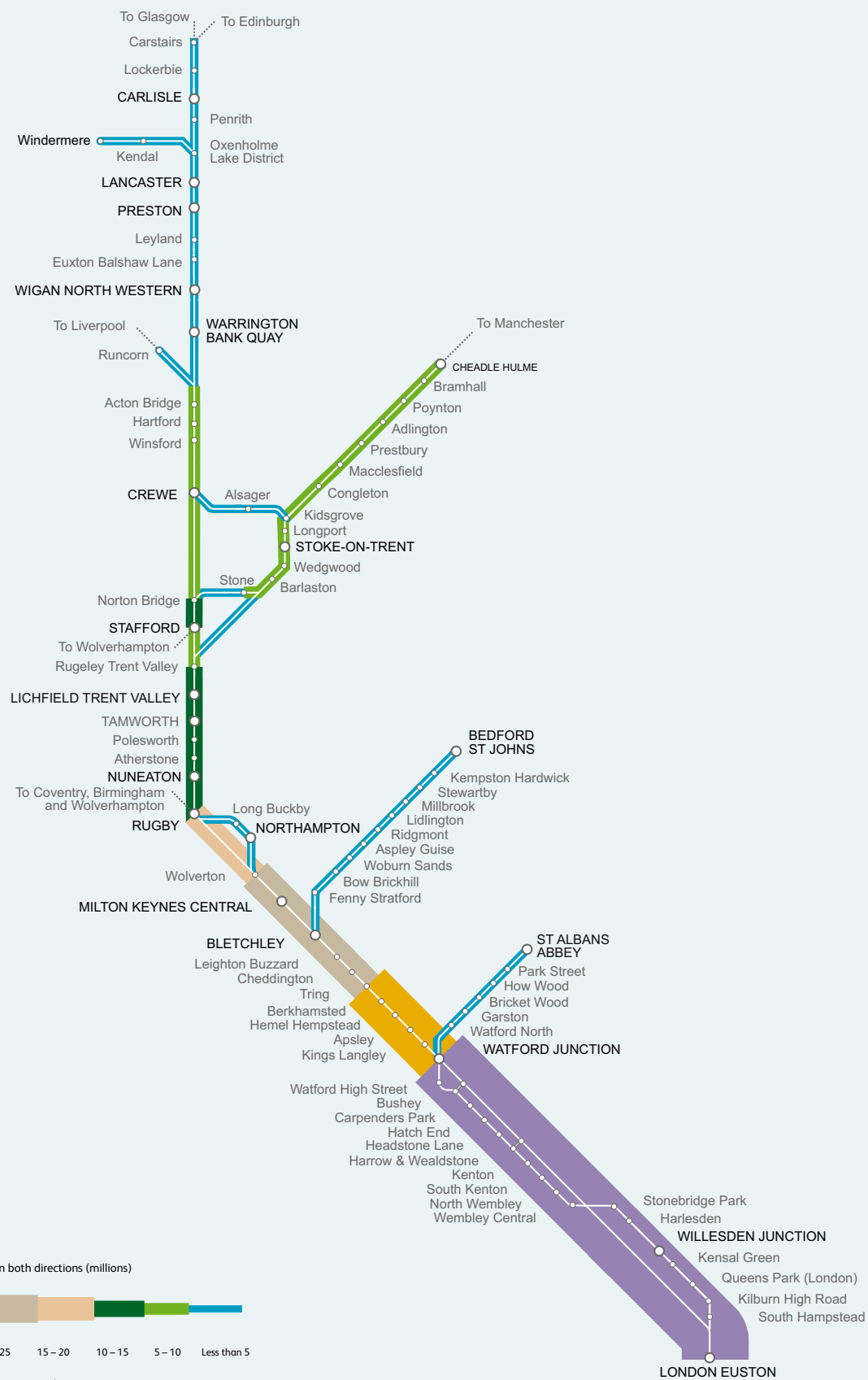
This makes it difficult to compare growth on a yearly basis and so the average annual growth rate by key markets is shown in **Tables 3.7, 3.11 and 3.13** to understand the overall growth on the WCML in the last 10 years.

London long distance passenger demand

The London long distance passenger market is taken as journeys that are over 50 miles to or from London on the WCML. London Euston provides the highest number of originating or terminating annual passenger journeys compared to any other station along the WCML. **Table 3.7** shows the top 10 long distance journeys to/from London Euston, along with total and average annual growth in passenger journeys over the last 10 years.

1. Tables 3.2 and 3.7, Network RUS: Scenarios and Long Distance Forecasts, source PLANET strategic Model (excludes coach and bus demand)

Figure 3.10 – passenger demand on the West Coast Main Line in 2009/10



3. Current capacity, demand and delivery

Table 3.7 – top 10 long distance flows (>50miles) to/from London Euston, in 2009/10

<i>Flows</i>	<i>Passenger journeys (thousand) in 2009/10</i>	<i>Growth between 1999/2000 and 2009/2010</i>	<i>Average annual growth rate</i>
Manchester Piccadilly	2,705	70 %	5.4 %
Birmingham New Street	2,315	58 %	4.7 %
Liverpool Lime Street	1,235	41 %	3.5 %
Northampton	1,155	31 %	2.8 %
Coventry	976	58 %	4.7 %
Birmingham International	802	27 %	2.4 %
Rugby	551	88 %	6.5 %
Stockport	526	56 %	4.6 %
Preston	511	26 %	2.3 %
Glasgow Central	507	23 %	2.1 %

Source: 2009/10 data extracted from Moira (Industry standard demand forecasting model – Midlands version).

In 2009/10, over 31.8 million journeys started from or ended at London Euston. Of these, over 11 million journeys were to or from the top 10 busiest long distance destinations. The highest demand was between London and Manchester followed by that to and from Birmingham. Both of these flows have seen significant growth, averaging at 5.4 and 4.7 per cent growth per annum respectively. The primary reason for this is the introduction of the timetable in December 2008 which saw services to both of these cities increase by 50 per cent, providing faster and more frequent services to London.

London interurban and commuter passenger demand

The London interurban and commuter market covers the short distance journeys (less than 50 miles) to and from London on the WCML. It covers the peak commuting travel as well as off-peak leisure and business travel. Demand has grown for both peak and all day travel between London and stations within a 50-mile radius on the route. **Table 3.8** shows the top 10 short distance journeys to and from London Euston.

Table 3.8 – top ten short distance flows to/from London Euston (<50 miles), in 2009/10

Rank	Flows	Passenger journeys (thousand) in 2009/10
1	Milton Keynes	2,995
2	Watford Junction	1,650
3	Hemel Hempstead	1,117
4	Berkhamsted	1,066
5	Leighton Buzzard	968
6	Queens Park	693
7	Harrow & Wealdstone	578
8	Wembley Central	495
9	Tring	463
10	Kilburn High Road	443

Source: MOIRA (Midland version). It includes estimates of rail journeys made on London travel cards and Oyster pay as you go tickets.

From the 31.8 million journeys starting or ending at London Euston in 2009/10, over 10 million journeys were to or from the top 10 busiest interurban and commuter destinations with the highest demand between London Euston and Milton Keynes Central and then between London Euston and Watford Junction.

London services

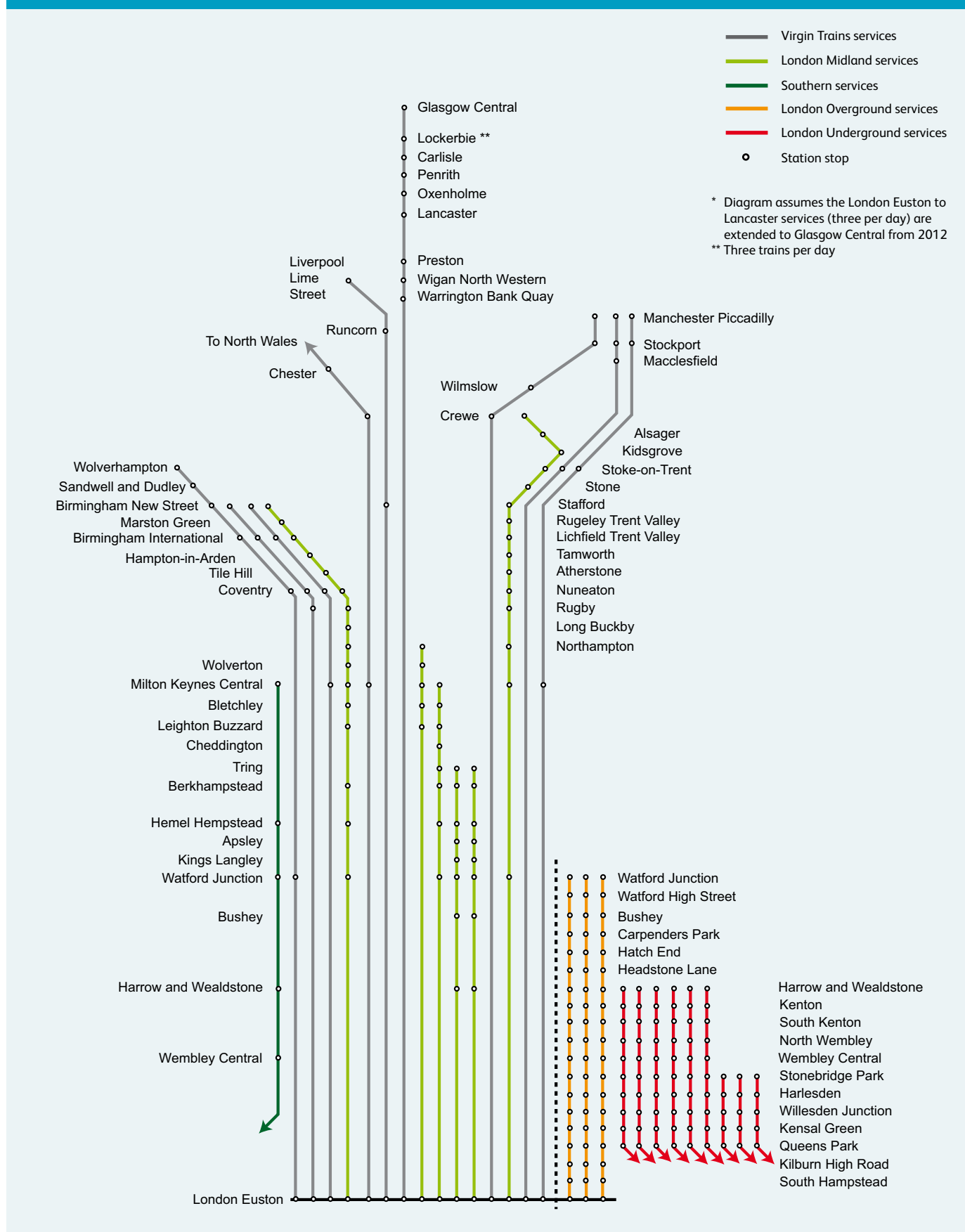
The London market is made up of a number of service flows: These are shown in **Figure 3.11**. **Table 3.9** shows the departure pattern from London Euston and the service frequencies are listed in **Table 3.10**.

Table 3.9 – departures from London Euston in a typical off-peak hour

Departure time	Destination	Line	Operator
xx.00	Manchester Piccadilly	Fast	Virgin Trains
xx.03	Birmingham New Street	Fast	Virgin Trains
xx.04	Tring	Slow	London Midland
xx.07	Liverpool Lime Street	Fast	Virgin Trains
xx.10	Chester/ North Wales	Fast	Virgin Trains
xx.13	Northampton	Fast	London Midland
xx.17	Watford Junction	DC	London Overground Rail Operations Limited
xx.20	Manchester Piccadilly	Fast	Virgin Trains
xx.23	Wolverhampton	Fast	Virgin Trains
xx.24	Milton Keynes Central	Slow	London Midland
xx.30	Glasgow Central	Fast	Virgin Trains
xx.34	Tring	Slow	London Midland
xx.37	Watford Junction	DC	London Overground Rail Operations Limited
xx.40	Manchester Piccadilly	Fast	Virgin Trains
xx.43	Birmingham New Street	Fast	Virgin Trains
xx.46	Crewe	Fast	London Midland
xx.54	Birmingham New Street	Slow	London Midland
xx.57	Watford Junction	DC	London Overground Rail Operations Limited

3. Current capacity, demand and delivery

Figure 3.11 – London passenger services on the WCML (standard off-peak hour)



Virgin Trains operates long distance high speed services between London Euston and Glasgow Central, Manchester Piccadilly (two services via Stoke-on-Trent and one service via Crewe), the West Midlands (Coventry, Birmingham New Street and Wolverhampton), Liverpool Lime Street and Chester (with six trains per day extended to North Wales, four to Holyhead and two to Bangor).

Some services have additional stops in the peak hours to serve stations on the Trent Valley section of the route between Rugby and Stafford. These are listed below:

- two of the London Euston to Scotland services stop additionally at Tamworth and Lichfield Trent Valley in the evening peak
- two of the Manchester Piccadilly to London Euston services stop additionally at Nuneaton in the morning peak
- one of the Liverpool Lime Street to London Euston services stops additionally at Lichfield Trent Valley and Tamworth in the morning peak
- two of the London Euston to Holyhead services stop additionally at Nuneaton in the evening peak.

London Midland operates semi-fast services from London Euston to Tring, Milton Keynes Central, Northampton, Birmingham New Street and Crewe. These service groups combine to give three trains an hour from London Euston to Northampton and four trains an hour from London Euston to Milton Keynes Central.

Southern operates an hourly service between East Croydon and Milton Keynes Central via Kensington Olympia although in certain hours the service begins at Clapham Junction, and only operates as far as Watford Junction.

London Overground Rail Operations Limited operates services on the DC lines between Watford Junction and London Euston. London Underground Limited services also operate on the DC lines between Harrow and Wealdstone and Queens Park and then into Central London via the Bakerloo Line. Two branches feed the southern end of the WCML, the St Albans Abbey line which joins the WCML at Watford Junction and the Bedford to Bletchley line which joins the WCML at Bletchley.

Scotrail operates long distance overnight sleeper services between London Euston and Scotland.

Table 3.10 – London passenger service frequency

<i>Train operator</i>	<i>Service</i>	<i>Frequency</i>
Virgin Trains	London Euston to West Midlands	3 tph
	London Euston to Manchester Piccadilly	3 tph
	London Euston to Liverpool Lime Street	1 tph
	London Euston to Glasgow Central	1 tph
	London Euston to Chester/ North Wales	1 tph
London Midland	London Euston to Birmingham New Street	1 tph
	London Euston to Northampton	1 tph
	London Euston to Milton Keynes Central	1 tph
	London Euston to Tring	2 tph
	London Euston to Crewe*	1 tph
Southern	East Croydon to Milton Keynes	1 tph
LOROL	London Euston to Watford Junction	3 tph
LUL	Queens Park to Harrow and Wealdstone	Up to 6 tph
ScotRail	London Euston to Scotland	2 tpd

*The London Euston to Crewe service operates on an hourly basis between 06:24 and 15:46, with one train running at 18:29.

3. Current capacity, demand and delivery

West Midlands passenger demand

In 2009/10, around 73 million passenger journeys were made to, from or within the West Midlands and Chilterns RUS area. Passenger demand for this area is discussed in greater detail within the West Midlands and Chilterns RUS², published as a draft for consultation in November 2010. **Table 3.11** shows the top 10 non-London flows between stations in the WCML RUS area and the West Midlands in 2009/10, along with the growth in passenger demand on these flows over the last 10 years.

The top ten non-London flows between the West Midlands and the WCML account for over two million passenger journeys per year. These flows have experienced significant growth over the last 10 years, with passenger demand between Birmingham and many WCML stations doubling in this time period.

The main non-London long distance services affecting the WCML run between Birmingham and Scotland (Edinburgh in one hour and Glasgow in

the alternate hour). A total of 2.8 million annual passenger journeys were made on this service in 2009/10. The total annual on train departures by origin and destination stations (northbound only), are shown in **Figure 3.12**. Over 500,000 journeys were made annually in 2009/10 from Birmingham on this service, from which 70 per cent travel north of Crewe and 25 per cent continue to Edinburgh or Glasgow. Demand peaks at Wigan North Western, with over 700,000 passenger on-train departures annually. The analysis therefore suggests that although the service is consistently busy, there are high levels of boarding and alighting passengers along the route. Demand to or from Edinburgh on this service is higher than that to or from Glasgow (58 per cent and 42 per cent respectively). Although on average there is currently sufficient capacity, there may be times during the day when demand exceeds the capacity available. This is particularly true during weekends where experience suggests that demand for travel exceeds weekday demand.

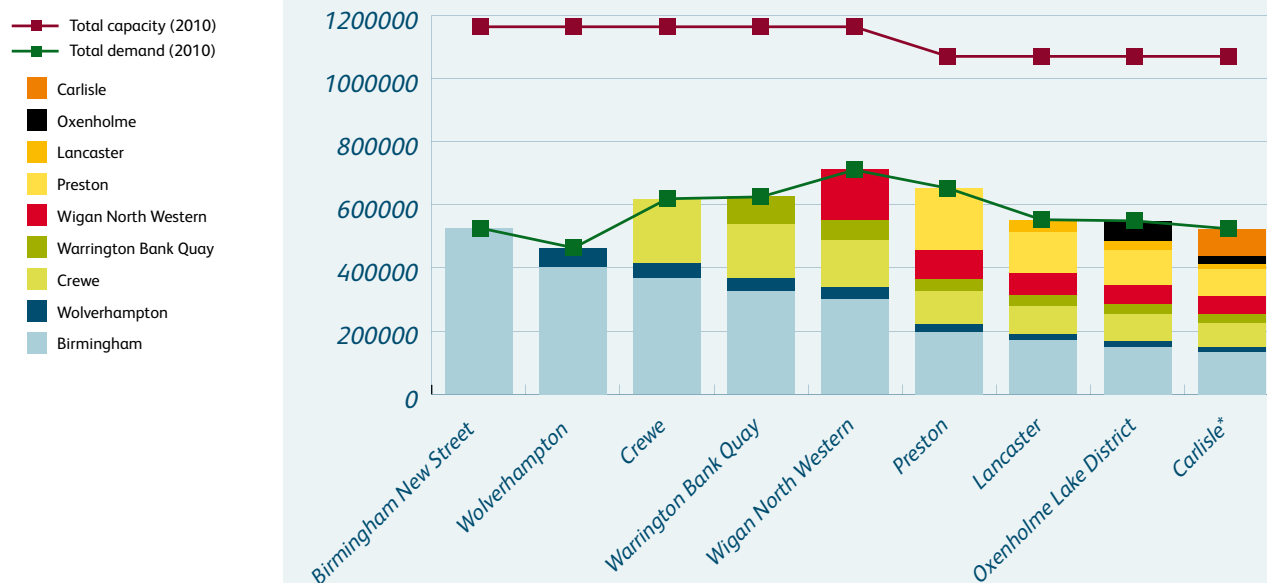
Table 3.11 – top 10 non-london flows to/from the West Midlands on the West Coast Main Line in 2009/10

<i>Passenger flow</i>	<i>Passenger journeys (thousand) in 2009/10</i>	<i>Growth between 1999/2000 and 2009/2010</i>	<i>Average annual growth rate</i>
Birmingham – Manchester	330	105 %	7.4 %
Birmingham – Stafford	310	56 %	4.6 %
Birmingham – Stoke-on-Trent	242	115 %	7.9 %
Coventry – Rugby	223	33 %	2.9 %
Stafford – Wolverhampton	219	20 %	1.8 %
Birmingham – Rugby	209	66 %	5.2 %
Milton Keynes – Northampton	206	25 %	2.2 %
Birmingham – Northampton	198	97 %	7.0 %
Birmingham – Milton Keynes	150	78 %	5.9 %
Birmingham – Liverpool	141	67 %	5.3 %

Source: Data extracted from Moira (Midlands version) for all train operating companies. Includes estimates of rail journeys made on concessionary rail tickets ie Passenger Transport Executive (PTE) tickets. Note, the above analysis excludes journeys between stations in the West Midlands region that fall outside the WCML RUS area ie between Birmingham New Street and Coventry.

2. West Midlands and Chilterns RUS, Draft for Consultation available on the Network Rail website at www.networkrail.co.uk

Figure 3.12 – annual passenger journeys measured by on-train departure between Birmingham New Street and Scotland in the northbound direction for 2009/10



* 58 per cent of journeys departing Carlisle are towards Edinburgh, with the remaining 42 per cent towards Glasgow.
Note, source LENNON data.

West Midlands services

The West Midlands market is served by a number of service flows shown in **Figure 3.13**. The service frequencies are listed in **Table 3.12**.

Virgin Trains operates a fast limited stop service from Birmingham New Street to Scotland, with services operating to Glasgow Central and Edinburgh Waverley in alternate hours. CrossCountry operates services from the South West and the South Coast to Manchester Piccadilly.

The key interurban flow from the West Midlands in addition to those outlined in the London services section above is the Birmingham New Street to

Liverpool Lime Street services operated by London Midland.

Other long distance and interurban flows from the West Midlands are considered in the West Midlands and Chilterns RUS.

Commuter journeys are made using the WCML services between Coventry, Birmingham and Wolverhampton. These commuter journey opportunities supplement the dedicated West Midlands local commuter network, considered in the West Midlands and Chilterns RUS. There are also opportunities at these stations to interchange with long distance and interurban services.

Table 3.12 – West Midlands to West Coast Main Line service frequency

Train operator	Service	Frequency
Virgin Trains	Birmingham New Street to Scotland	1 tph
London Midland	Birmingham New Street to Liverpool Lime Street	2 tph
CrossCountry	South West or South Coast to Manchester Piccadilly	2 tph

3. Current capacity, demand and delivery

Figure 3.13 – West Midlands passenger services (standard off-peak hour)

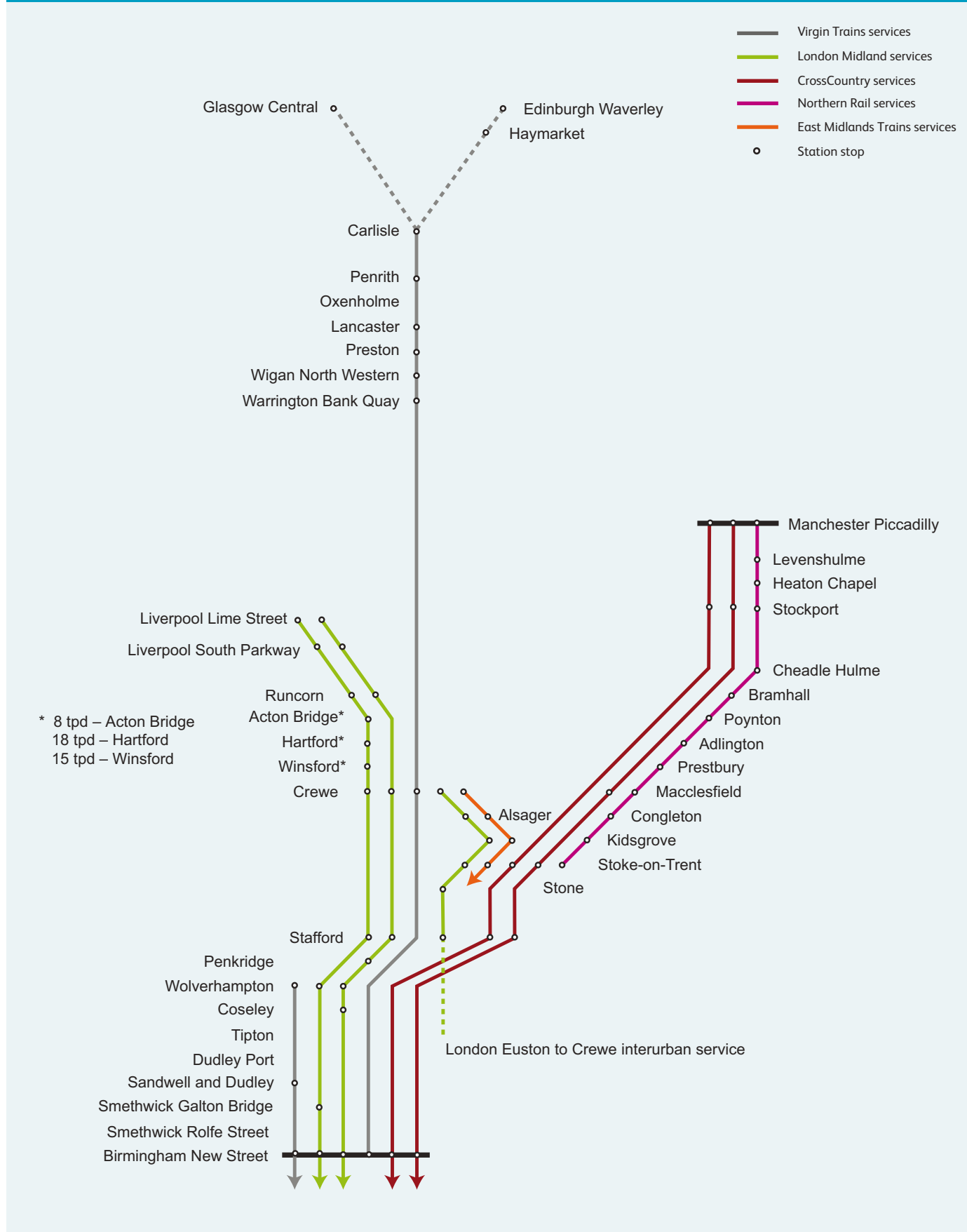


Table 3.13 – top 10 non-London flows to/from the North West on the West Coast Main Line in 2009/10

<i>Passenger flow</i>	<i>Passenger journeys (thousand) in 2009/10</i>	<i>Growth between 1999/2000 and 2009/2010</i>	<i>Average annual growth rate</i>
Manchester – Liverpool	893	79 %	6.0 %
Manchester – Preston	471	136 %	8.9 %
Manchester – Macclesfield	456	138 %	9.1 %
Manchester – Stoke on Trent	386	125 %	8.5 %
Manchester – Birmingham	330	105 %	7.4 %
Manchester – Wilmslow	313	100 %	7.2 %
Manchester – Crewe	313	79 %	6.0 %
Stoke on Trent – Birmingham	242	115 %	7.9 %
Lancaster – Preston	213	58 %	4.7 %
Liverpool – Birmingham	162	64 %	5.0 %

Source: Data extracted from Moira (Northern version) for all train operating companies. Includes estimates of rail journeys made on concessionary rail tickets ie Passenger Transport Executive (PTE) tickets

Note: the above analysis excludes journeys between stations in the North West region that fall outside the WCML RUS area ie between Manchester and Bolton.

North West passenger demand

The North West passenger market covers the area north of the West Midlands to Carlisle, covering a number of large employment and population centres. **Table 3.13** shows the top 10 non-London flows between stations in the West Coast Main Line RUS area and the North West in terms of number of annual passenger journeys.

Table 3.13 also shows the growth in passenger demand between the North West and the WCML. Many flows have more than doubled in demand over the ten years. A large number of these flows are served by the main long distance high speed service from London, which has seen a significant improvement in service since the implementation of the December 2008 timetable.

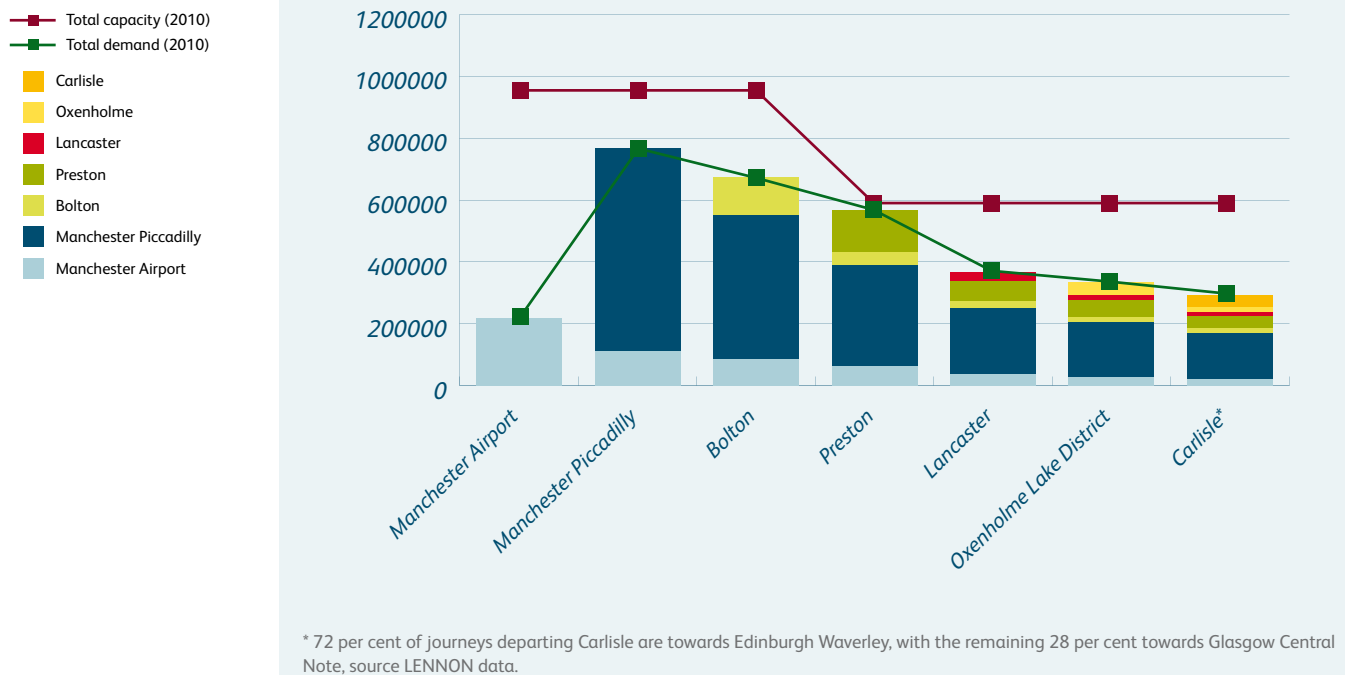
The non-London long distance high speed service operator for this market currently provides a

generally hourly service between Manchester Airport and Scotland (Edinburgh in one hour and Glasgow in the alternate hour). **Figure 3.14** shows the total annual on-train departures by origin and destination stations on the Manchester Airport to Scotland service (northbound only). Over 700,000 journeys are made annually from Manchester on this service, from which 50 per cent travel north of Preston and 22 per cent continue to either Edinburgh or Glasgow. Demand is highest at Manchester Piccadilly and falls as the service progresses. This suggests that the service attracts a large number of commuter and short-distance travellers to or from Manchester. The loadings indicate that overall there is sufficient capacity between Preston and Scotland. Standing can occur between Manchester and Preston.³ Furthermore, it is suggested that crowding experienced during weekends is significantly higher on this corridor, leading to many services experiencing some standing.

3. This short distance commuter and interurban demand is analysed within the Northern RUS.

3. Current capacity, demand and delivery

Figure 3.14 – annual passenger journeys measured by on-train departure between Manchester Airport and Scotland services in the northbound direction for 2009/10



North West services

The North West market is served by a number of service flows. These are shown in the diagram in **Figure 3.15** and service frequencies are listed in **Table 3.14**.

The TPE service between Manchester Airport and Scotland operates on an hourly basis in most hours, with seven trains a day to Edinburgh Waverley and four trains a day to Glasgow Central.

There are also a number of interurban services operated by First TransPennine Express, from Manchester Airport or Preston to Blackpool, Barrow-in-Furness and Windermere. Other interurban

services in the North West fall outside of the West Coast Main Line RUS area and have been considered by the Northern RUS, published as a draft for consultation in October 2010 and further by the Northern Hub work.

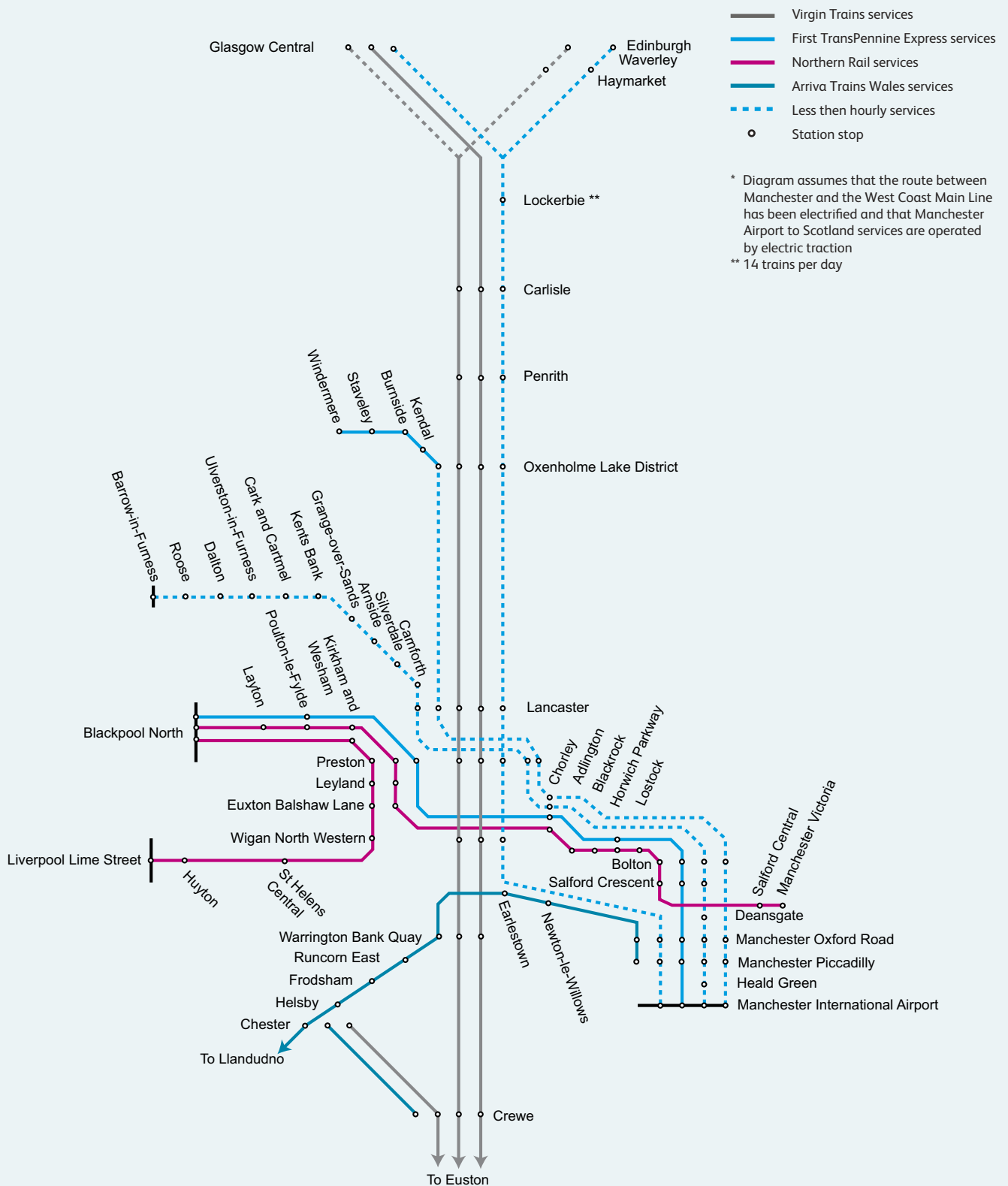
Northern Rail operates local commuter services on the route, between Liverpool Lime Street and Blackpool North via Preston and between Manchester Victoria and Blackpool North. All other commuter services in the North West fall outside of the West Coast Main Line RUS area and are considered in the Northern RUS and the Northern Hub work.

Table 3.14 – North West service frequency

Train operator	Service	Frequency
First TransPennine Express	Manchester Airport to Scotland	1 tph (most hours)
	Manchester Airport to Blackpool North	1 tph
	Lancaster to Windermere	5 tpd*
	Lancaster to Barrow-in-Furness	10 tpd*
Northern Rail	Stoke-on-Trent to Manchester Piccadilly	1 tph
	Manchester Victoria to Blackpool North	1 tph
	Liverpool Lime Street to Blackpool North	1 tph
Arriva Trains Wales	Crewe to Chester	1 tph
	Llandudno to Manchester Piccadilly	1 tph

*The majority of these trains are through trains to/from Manchester and Manchester Airport. Some are to/from Preston.

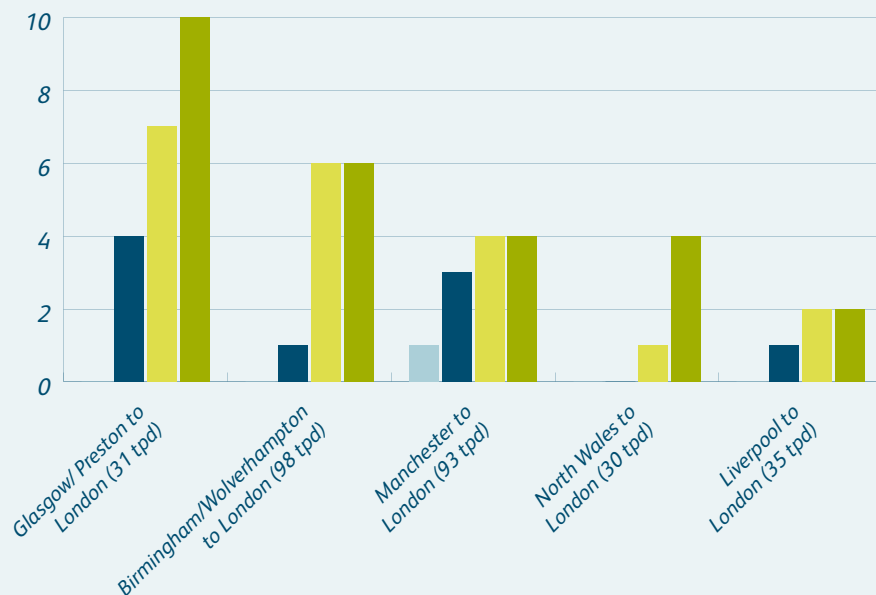
Figure 3.15 – North West passenger services (standard off-peak hour)



3. Current capacity, demand and delivery

Figure 3.16 – numbers of trains with standing passengers on LDHS services to or from London Euston 2009/10

■ Fridays (2010) >80 % LF
■ Weekdays (2010) > 80 % LF
■ Fridays (2010)
■ Weekdays (2010)



Source: Virgin Trains services average passenger count data, 2009/10
 tpd = trains per day LF = load factor (passenger to seat ratio)

Passenger train loadings

In order to understand whether there is sufficient capacity on the WCML to meet current passenger demand, the most recently available train loads were analysed. Capacity was considered for the following operators on the route:

- Virgin Trains
- First TransPennine Express
- London Midland
- London Overground Rail Operations Limited
- Southern.

Capacity for other operators is analysed by other RUSs either recently published or currently in progress such as:

- capacity on Northern Rail and Arriva Train Wales services has been analysed by the Northern RUS Draft for Consultation
- capacity on CrossCountry Trains services has been analysed by the Great Western RUS
- capacity on East Midlands Trains services has been analysed by the East Midlands RUS⁴.

As before, this analysis has been split into long distance markets currently served by Virgin Trains and TPE and short distance markets currently served by London Midland, Southern and LOROL.

Long distance markets train loadings

Long distance markets on the WCML are split into three service groups, to or from London Euston; between Birmingham and Scotland; and between Manchester and Scotland.

Analysis demonstrates that there is currently sufficient capacity on most LDHS services to or from London Euston. **Figure 3.16** shows the average number of daily train services with standing passengers at present. This is based on analysis of the regularly conducted on-train passenger counts averaged across Mondays to Fridays to give a single average weekday load factor for each train operated, and averaged across Fridays to give an average load factor.

4. All RUSs can be found at www.networkrail.co.uk

Friday load factors are shown separately as passenger numbers are greatest on this day of the week, therefore representing the LDHS peak time. It is likely that the use of data which has been averaged for a standard week day and for a Friday has hidden the variation in load factors that occur over the course of a day, week or few month periods, where a significant number of services are likely to be busier than implied by the data. **Figure 3.16** therefore shows the number of services with more than 80 per cent load factors, implying very busy services as there is less than 20 per cent spare seated capacity.

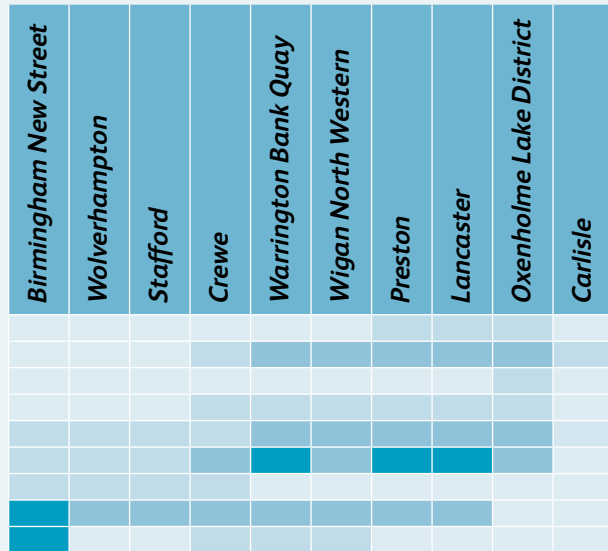
It has also been observed that passenger demand for rail travel is significantly higher during weekends and school holidays. This may necessitate further capacity to meet future demand on the route. Analysis for additional capacity will be undertaken during the consultation period and the findings reported in the final RUS publication.

The second long distance service group on the WCML is operated between Birmingham and Scotland and is served at present by 31 services a day in both directions. 27 per cent of these currently have passengers standing during some part of the journey. **Figure 3.17** shows the passenger loadings upon departure for these services.

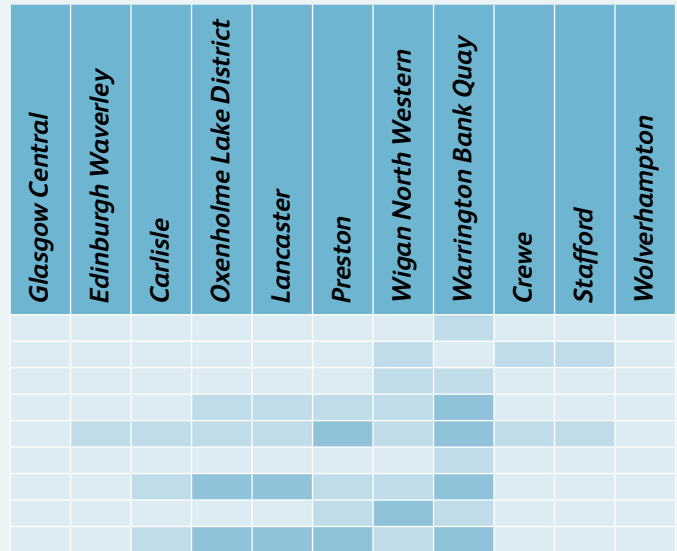
Analysis for average weekday loadings for the year 2009/10 for services currently provided by TPE illustrates that there is currently sufficient capacity on most services apart from those operated in the peaks to or from Manchester. Peak services generally have passengers standing between Manchester and Preston. This is considered in the Northern RUS. However, it has again been observed that passenger demand for rail travel is significantly higher during weekends and school holidays for these services. This may require further capacity than the analysis currently demonstrates. This will be further investigated during the consultation period and the findings reported in the final RUS publication.

Figure 3.17 – 2009/10 load factors for trains departing from stations along the Birmingham – Scotland route in each direction throughout the day

On-train departure in 2009/10 from Birmingham to Scotland on Virgin Trains services



On-train departure in 2009/10 from Scotland to Birmingham on Virgin Trains services



Load factor <80 % Load factor 80% –100% Load factor 100% –120% Load factor >120 %

Source: Virgin Trains average passenger count data for weekdays, 2009/10

Note: only services with load factors higher than 80 per cent at some point on the route have been presented. The DfT guidelines assume that it is not acceptable for passengers to stand for journeys of more than 20 minutes.

The final service considered for interurban and commuter passenger capacity on the WCML is operated by London Midland. This is separated into the following four corridors for presentational purposes:

- London to Northampton
- Northampton to Birmingham New Street
- Northampton to Crewe
- Birmingham New Street to Liverpool Lime Street.

Analysis of the average weekday loadings demonstrates that currently there is sufficient capacity on services operating between Northampton and Birmingham New Street, between

Northampton and Crewe and between Birmingham New Street and Liverpool Lime Street, except during the morning and evening peak for services operating into and out of Birmingham. Demand for commuting into the West Midlands conurbation is considered in detail in the West Midlands and Chilterns RUS draft for consultation published in November 2010.

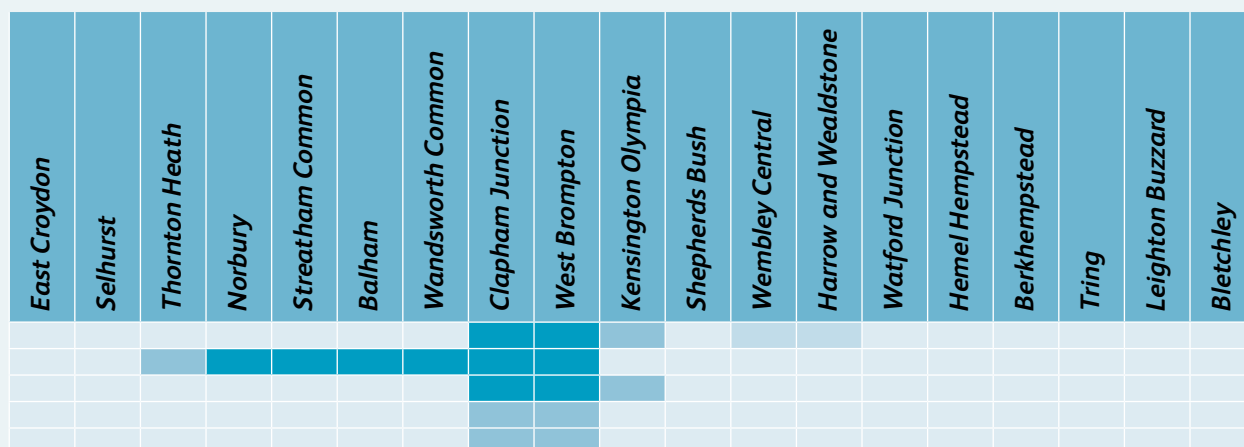
The Northampton to London corridor shows many services with standing passengers, especially during the peaks at London. **Figure 3.20** illustrates this. Of the 231 daily services operated by London Midland on this corridor, 15 per cent currently have passengers exceeding seated capacity, although this tends to be during the three-hour peaks at London.

Figure 3.19 – 2009/10 load factors on trains departing from stations along the Milton Keynes Central to East Croydon route in each direction during the morning three-hour peak

On-train departure 2009/10 from Milton Keynes Central to East Croydon in the morning three hour peak on Southern services



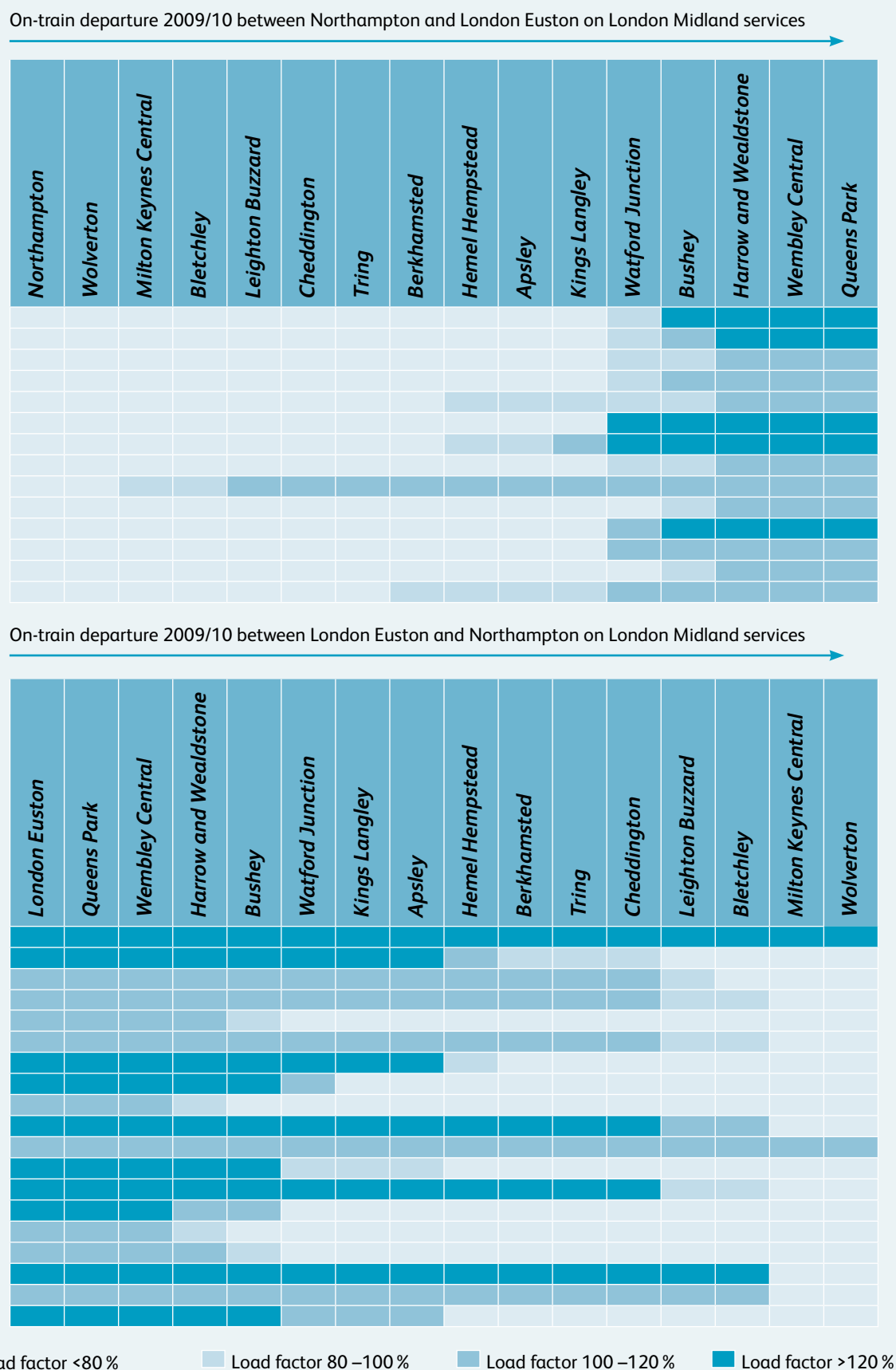
On-train departure 2009/10 from East Croydon to Milton Keynes Central in the morning three-hour peak on Southern services



■ Load factor <80 %
 ■ Load factor 80 – 100 %
 ■ Load factor 100 – 140 %
 ■ Load factor >140 %

3. Current capacity, demand and delivery

Figure 3.20 – current levels of crowding on London Midland trains departing from stations along the Northampton to London Euston corridor in each direction throughout the day



Source: London Midland average passenger count data, 2009/10
Note: only services with passengers standing at some point on the route have been presented.

3.11 Freight operators

There are currently five freight train operators on the route. As the freight market is an open one there is always potential for new operators to enter the market.

DB Schenker Rail (UK)

DB Schenker Rail (UK) was established in 2008 with the acquisition by Deutsche Bahn AG of the former freight operating company English, Welsh and Scottish Railways Ltd (EWS). DB Schenker Rail (UK) is part of the Region West of DB Schenker. It is the largest freight operator in the UK and provides a wide range of rail freight services combined with logistics solutions.

Freightliner Group

Freightliner Group has two divisions: Freightliner Limited and Freightliner Heavy Haul. Freightliner Limited is the largest rail haulier of containerised traffic, predominantly for the deep sea market. Freightliner Heavy Haul is a significant conveyor of bulk goods, predominantly coal, construction materials and waste. It also operates infrastructure services.

GB Railfreight

GB Railfreight which was purchased by Eurotunnel in 2010, is the third largest British rail freight operator. GB Railfreight is a significant operator of deep sea container trains and rail infrastructure services. They also run a number of services for bulk market customers including coal and gypsum.

Direct Rail Services Limited

Direct Rail Services Limited operates traffic for the power industry in Great Britain. In the recent years the company has expanded to run services for the domestic intermodal and short sea intermodal markets. Key traffic flows for domestic container products are to Daventry, Grangemouth, Aberdeen, and the North West.

Colas Rail

Colas Rail is a relative new entrant to the UK rail market and provides rail freight haulage for all market sectors throughout the UK and Europe. Key flows on the WCML are timber from Carlisle to Chirk and intermodal traffic from Dollands Moor (Channel Tunnel) to Hams Hall (near Birmingham).

3.12 Freight market profile

Background

Rail freight plays an important role in Britain's economy directly contributing £870 million to the economy. Since 1995, rail freight has seen freight volumes increasing by 50 per cent and now has a modal share of 11 per cent of all surface freight transport. The rail freight market is dependant on the general performance of the economy, with certain flows such as aggregates being particularly sensitive.

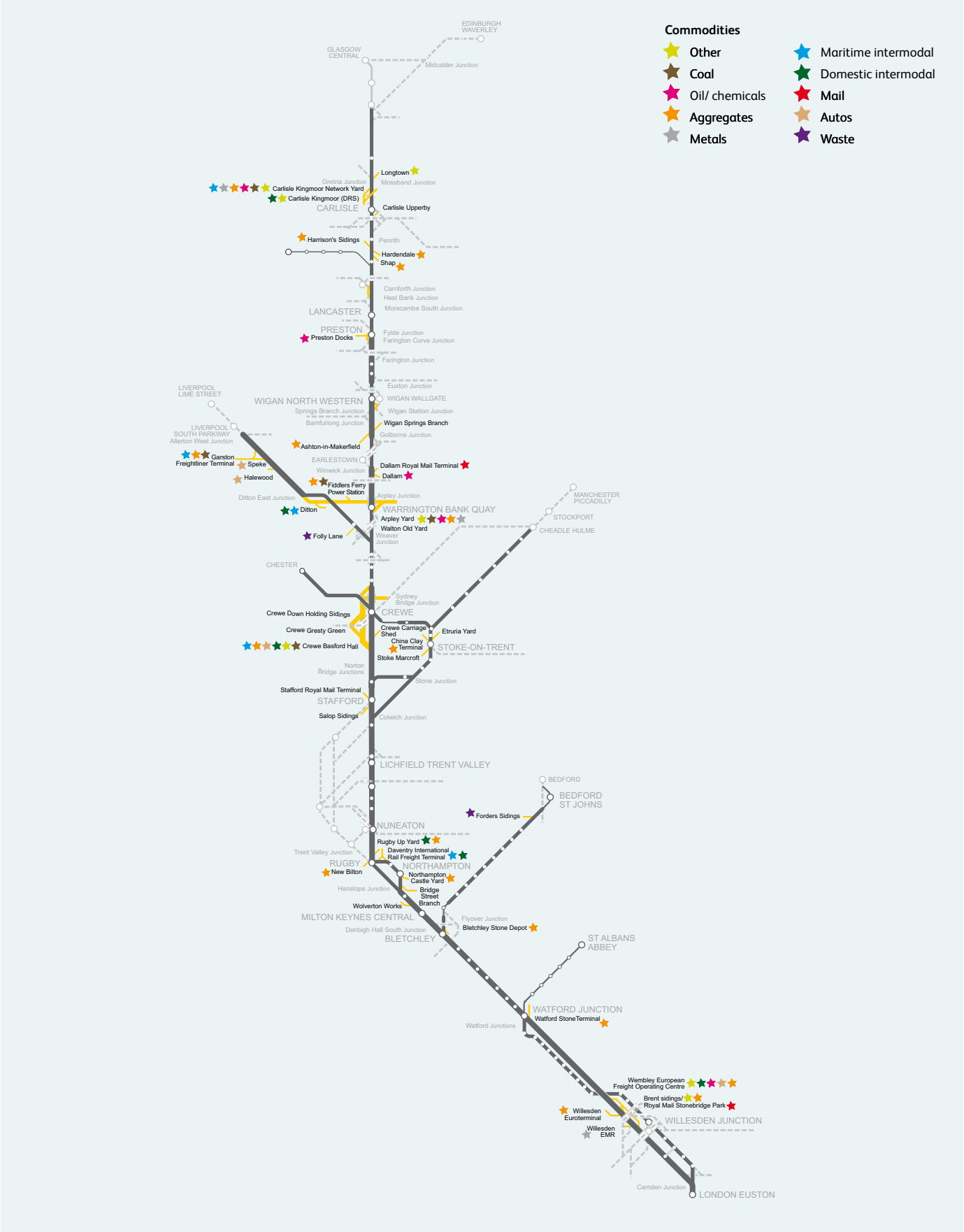
Traditionally rail freight has been associated with the transport of heavy bulk goods and construction materials. These areas continue to be important markets but rail freight's role is becoming much broader to take in consumer goods, mail and cars. The highest rate of growth is in consumer goods and this is expected to continue, between 2004 and 2010 this market grew by 46 per cent. The consumer goods market, particularly supermarket traffic and mail, are much more time sensitive than traditional bulk goods flows. Rail freight is also targeting growth in new and less developed markets, including waste, and cars.

The DfT's July 2007 White Paper 'Delivering a Sustainable Railway' proposed the development of a Strategic Freight Network in England and Wales as part of its high level strategy to address the growing demands on the network for moving passengers and freight. As part of this work £200 million was identified to spend on freight capacity schemes in CP4, details of these can be found in **Chapter 4**. This work also revisited the growth rates from the Freight RUS and produced updated forecasts for 2019 and 2030.

There are a number of freight terminals in the RUS area as well as a number of key terminal destinations off the core RUS area in the West Midlands, and the North West. Freight terminals by commodity are shown in **Figure 3.21**. With the growth in rail freight there is demand for new and expanded terminals. In the West Coast Main Line RUS area terminals at Daventry and Ditton both have plans to expand in order to increase the number of trains they can accommodate.

3. Current capacity, demand and delivery

Figure 3.21 – freight terminals by commodity



Major flows

In the area covered by the West Coast Main Line RUS the key flows are intermodal, both maritime intermodal from the ports and domestic intermodal from inland terminals for internal distribution. There are also a number of flows within the RUS area which originate in Europe and use the Channel Tunnel to access the UK. On the north of the route there are some coal flows, but since the West Coast Main Line Route Modernisation Programme day time flows are mainly routed via the Settle and Carlisle route. There are also numerous smaller flows on the route ranging from timber to mineral water. **Figure 3.22** shows the proportion of timetable slots by commodity that are available for freight operators, which may or may not be used, through key locations on the WCML. The figure shows how the different commodity flows are accommodated on the WCML and shows that there are more bulk flows at the north end of the route, with more intermodal-type traffic at the south. Any change in the make up of the commodity flows will therefore have different impacts across the route.

Maritime intermodal

Maritime intermodal flows are container flows to and from ports. The main import locations into the UK are Southampton and the East Coast ports. The major flow over the RUS area from Southampton is to the Midlands terminals at Rugby, Birch Coppice, Hams Hall, Lawley Street and Daventry, and to the North West terminals at Garston, Trafford Park and Ditton, and to further destinations in the North East and Scotland. The flows from Felixstowe to the Midlands and North West terminals operate via the North London Line joining the WCML at Willesden Junction or via Peterborough joining the WCML at Nuneaton (from Easter 2011 following the upgrade to the loading gauge on the route to accommodate W10 gauge traffic).

Channel Tunnel intermodal

Channel Tunnel intermodal traffic consists of traffic from Spain, Italy, France, Belgium, Germany and other EU countries. This traffic operates to single destinations in the UK such as Trafford Park, Daventry, Hams Hall and other terminals. Despite the problems this traffic has experienced over recent years, it is expected that the level of train services to and from the EU will increase. Traffic is limited to a current maximum of W9 loading gauge due to constraints in southern England. However, it is expected that freight will start to use high speed One in early 2011 and this will bring the prospect of larger loading-gauge traffic into the UK for onward movement via the WCML.

Domestic intermodal

Domestic intermodal traffic is the movement of containerised consumer goods within the UK. Daventry International Rail Freight Terminal is the national hub of Anglo-Scottish intermodal traffic. Key flows include time sensitive supermarket traffic which operates between Daventry and Mossend and Grangemouth and Coatbridge.

Royal Mail

There are two Royal Mail trains a day between Willesden and Shieldmuir in Scotland. These flows are operated by 100mph rolling stock and are very time sensitive. There is potential for growth in Royal Mail flows.

Bulk flows

There are a number of bulk flows across the RUS area. Bulk flows include coal, aggregates and china clay.

Coal flows are expected to respond to future generator demand, based on coal imports and closures of plants reflecting the decreased role of coal in the UK energy mix. Most coal flows from Scotland to power stations in England are routed from Gretna to Carlisle and then diverted off the route and onto the Settle and Carlisle line. There are also flows between Liverpool Docks and Fiddlers Ferry, Ratcliffe and Ironbridge power stations.

Aggregate flows are highly dependant on the health of the construction industry and demand tends to be project driven. Aggregate flows traverse the route and operate to terminals at Northampton, Bletchley, Watford and Willesden. At the north end of the route aggregates are conveyed from the Shap quarries to Teeside, Manchester and Sheffield.

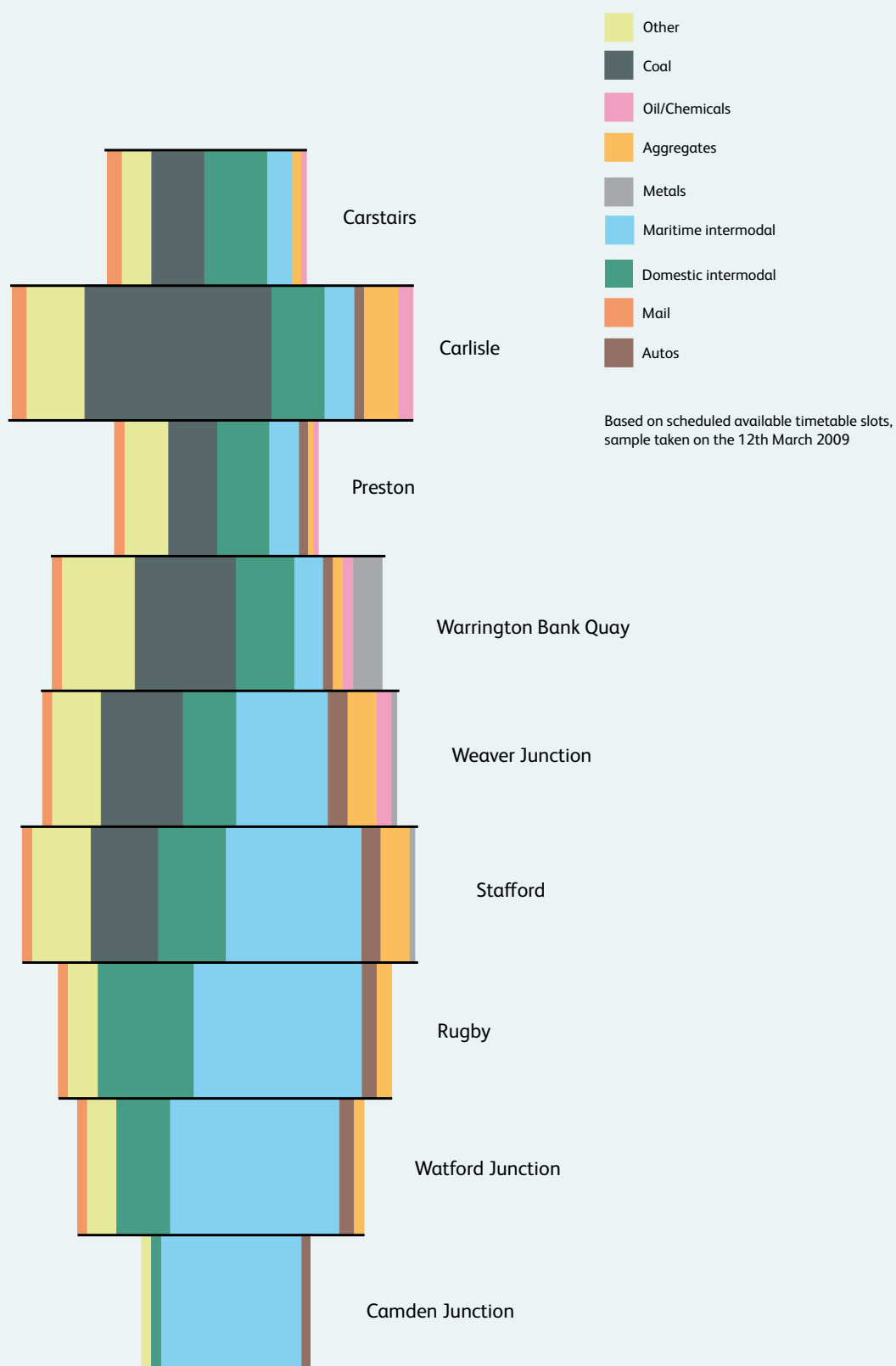
There are china clay trains operating over the route, some of these originate in the South West, while there is also a china clay flow through the Channel Tunnel from mainland Europe, with destinations of Stoke-on-Trent and Irvine in Scotland.

Other flows

There are a number of other flows across the RUS area, these include automotive flows from Halewood (Liverpool) to Southampton and Wembley, scrap metal from Mossend (Glasgow) to Liverpool, timber from Carlisle to Chirk and, as of 2012, waste flows to Folly Lane (Runcorn).

3. Current capacity, demand and delivery

Figure 3.22 – proportion of timetabled slots by commodity through key locations



4. Anticipated changes in supply and demand

This chapter outlines the planned changes to supply within the rail network and the forecast future changes to demand over the period of the West Coast Main Line Route Utilisation Strategy.

The changes in supply are identified as either committed changes which include planned changes to train services or infrastructure, and proposed or uncommitted changes. These changes do not include those determined through this Route Utilisation Strategy.

The chapter goes on to outline the methodology and results of the RUS passenger and freight demand forecasting process.

4.1 Committed schemes

Where significant renewal and enhancement schemes are committed, they form part of the RUS baseline. A committed scheme is one that has confirmed funding beyond Guide to Railway Investment Projects (GRIP) stage 4 – Single Option Development. Any interventions proposed by the RUS are assessed against this baseline rather than current infrastructure.

Policy context

The 2008 Periodic Review set Network Rail's outputs, financial framework and access charges for the period 1 April 2009 to 31 March 2014 (referred to as Control Period 4 or CP4). This is the first periodic review since the passing of the Railways Act 2005 which introduced the new process whereby the Secretary of State issues the High Level Output Specification (HLOS) and a Statement of Funds Available (SoFA).

The HLOS specified various targets (including reliability, capacity and safety) which the collective rail industry is required to achieve during CP4 or within the passenger franchise duration. The CP4 Delivery Plan outlines the committed outputs Network Rail has been funded to deliver in CP4 which includes those required to meet the HLOS metrics.

Further details on the 2007 White Paper and HLOS metrics can be found at the Department for

Transport (DfT) website. Further details on Network Rail committed CP4 outputs can be found at www.networkrail.co.uk

CP4 Delivery Plan outputs

The West Coast Main Line RUS is aligned with the delivery of the key outputs specified within the Network Rail CP4 Delivery Plan. It recognises that some issues raised during the gap identification stage of the RUS are addressed and resolved by the committed CP4 enhancements schemes and associated operational plans. The key elements of the Delivery Plan which need to be considered as part of the baseline for the RUS include the following:

- Strategic Freight Network
- network availability and seven day railway
- rolling stock
- West Coast Main Line power supply upgrade
- Bletchley remodelling
- development of Stafford area improvement works
- Network Rail Discretionary Fund
- National Stations Improvement Programme.

4. Anticipated changes in supply and demand

Strategic Freight Network

Nationally, £200 million has been allocated for the development of the Strategic Freight Network during CP4. The forecast freight growth identified in the Freight RUS has been reviewed as part of the SFN work, which aims to identify the schemes necessary to develop a network of core and diversionary freight routes and resolve conflicts between freight and passenger services.

CP4 funding for the SFN supplements schemes funded through the Productivity Transport Innovation Fund enhancements scheme. These schemes are:

- **Peterborough to Nuneaton loading gauge enhancement:** gauge improvements to provide an alternative W10 gauge route from the Port of Felixstowe to the Midlands, avoiding London. Work started along the route in July 2009 and the scheme will be completed during 2011.
- **Southampton to West Coast loading gauge enhancement:** a scheme to provide a W10 gauge cleared route from Southampton to the WCML via Basingstoke, Reading, Didcot Parkway and Leamington Spa to enable the movement of 9' 6" containers on standard height wagons on this core route. Preliminary works are underway with completion programmed during 2011.
- **Train lengthening:** enables haulage of more freight per train without changing the weight per axle. Thus it can permit some growth without increasing capacity utilisation.

The SFN funding allows additional loading gauge clearance and capacity improvements across the network, including the following schemes that affect the services to and from the West Coast Main Line RUS area:

- improved capacity between Felixstowe and Peterborough
- other infill loading gauge and infrastructure improvements across the network.

Included within the SFN is a specific fund for infill loading gauge schemes to progress towards the SFN vision of extensive W12 gauge clearance. It also includes funding provision of £5 million for studies to develop identified schemes for delivery in Control Period 5 (CP5) between 2014 and 2019 which are currently being defined and agreed with stakeholders.

Seven day railway

The Office of Rail Regulation (ORR) has allocated £160 million nationally to assist in the development of a seven day railway. The programme will increase current levels of network availability by keeping passengers on trains rather than rail replacement buses during engineering works. This is part of the wider aim to develop a railway that reduces disruption to customers (passengers and freight) and better meets their needs, whilst delivering efficient and effective maintenance, renewals and enhancements.

The funding for seven day railway will be spent on both infrastructure enhancements to facilitate the increase in rail operations such as crossovers and bi-directional signalling, as well as changing Network Rail's working methods. Currently there are no specific schemes being progressed in the RUS area with seven day railway funding. However, there are already initiatives in place which will deliver network availability benefits and it is anticipated that all operators within the RUS area will benefit from the ongoing introduction of national pilot initiatives which focus on new methods of working and new technology.

The need to increase service provision at weekends is recognised and efforts to review engineering practices and diversionary route capability constraints continue. Network Rail measures network availability using the new possession disruption indices which were developed by the ORR for CP4. The metrics are highly sensitive to the location, number and duration of engineering possessions, and have an increased focus on understanding and reducing the level of engineering access that is used.

The track renewals strategy within the RUS area will deliver a long-term improvement to network availability, and successful pilot studies for midweek night renewals are being introduced to those parts of the network where this aligns with operators' requirements. The overall network availability strategy pivots around a number of national initiatives, such as faster isolations, changes to working practices, and a modular approach to infrastructure renewals that will enable most renewals to be undertaken within a single line possession of no more than eight hours. There is now also a reasonably strong case to use single line working on a number of routes on the network, subject to robust planning.

Rolling stock

Following the publication of the White Paper 'Delivering a Sustainable Railway' in July 2007, the Government published a rolling stock plan, setting out in more detail how rolling stock would be used to deliver increased capacity. This plan proposed the introduction of new rolling stock where required, as well as the redeployment of existing rolling stock which is displaced. The plan did not set out detailed lists of rolling stock fleets or a planned schedule for their introduction on specific routes.

The HLOS peak demand requirement for London Euston is expected to result in additional electric multiple unit stock being allocated to London Midland. The operational plan produced by London Midland has considered where additional capacity is required within the RUS area and has allocated additional vehicles to achieve this. The planned additional vehicles (eight in total for the WCML services) have not formed part of the baseline for this RUS.

In early 2010, the DfT announced a review of the rolling stock strategy and further details of the plan have not yet been finalised. Whilst the RUS will continue to work on the assumption that the additional vehicles will be delivered it is therefore important to note that any refinement to the plan would directly affect the assumptions and conclusions of any option analysis.

The redeployment of rolling stock will have a key effect on the future utilisation of the WCML route.

Additional Class 390 vehicles

The lengthening of the Class 390 vehicle fleet is progressing with a further 106 vehicles currently being built.

Four new 11-car train sets are planned to enter service in 2011/12, and 31 existing nine-car sets will each have two standard vehicles inserted, to create 35 11-car trains. This constitutes an increase of 52 per cent in standard seating on the 31 sets lengthened. 21 sets will remain as nine-car formations. All the new vehicles are planned to be in full service by December 2012. Any option analysis undertaken assumes these vehicles to be in place for the 2014 baseline.

In order for the lengthened sets to operate, platform work is required at 15 stations on the route. The work involves platform extensions at eight stations. At five stations where platforms cannot be physically extended, selective door opening will be used. Minor works are required at four stations.

4. Anticipated changes in supply and demand

West Coast Main Line power supply upgrade

This project involves power supply renewals and an upgrade of the traction power supply across the busier parts of the WCML route. The work includes:

- modifications and alterations at various electricity supply industry connection points
- provision of new 25kV conductors
- other renewals and improvements to the system.

The work is due to be completed during CP4 and CP5. The power supply upgrade is a key project to help provide for the planned future growth of traffic on the WCML route.

Bletchley remodelling

This project delivers specific capacity enhancements that contribute to the delivery of the DfT's HLOS programme. The primary objectives of the project are:

- renewal of life expired signalling and track assets
- transfer of signalling control from Bletchley to Rugby signalling control centre
- provision of 12-car capability on Platforms four and five
- provision of a bi-directional freight loop to accommodate 775-metre train lengths
- a new, higher speed Bletchley South Junction at Drayton Road
- capability for extending Bedford to Bletchley services to Milton Keynes Central.

This project is due to be delivered by June 2013, and therefore forms part of the baseline.

Development of Stafford area improvements

Enhancements being developed as part of the Stafford area improvement project include a new grade separated junction at Norton Bridge, a new freight loop at Stafford, speed enhancements at

Trent Valley and Doxey Junctions (near Stafford station) and speed improvements on the slow lines between Doxey Junction and Norton Bridge. The enhancements in the Stafford station area need to be delivered in conjunction with the renewals scheme in the area. The project, necessary for freight and passenger capacity, is due to be completed by December 2017.

Network Rail Discretionary Fund

The Network Rail Discretionary Fund (NRDF) is a mechanism for funding minor schemes (nominally under £5 million) which enhance the capacity or capability of the rail network. A NRDF-funded scheme must be value for money and have available resources to deliver the project efficiently.

National Stations Improvement Programme

The National Stations Improvement Programme is a DfT funded cross-industry programme designed to enhance approximately 150 medium sized stations across routes in England and Wales. It is a committed spending requirement in Network Rail's CP4 Delivery Plan and forms an agreed commitment to deliver station improvements for passengers. The primary objective of the programme is to make noticeable and lasting improvement to the environment at selected stations. The programme is being developed through local delivery groups which are required to invest National Stations Improvement Programme funding in the most cost effective way.

Within the RUS area the stations that have currently been identified for NSIP funding in tranche one are presented in **Table 4.1**. The second of the two tranches is currently being developed with industry consultation and should be known in time to report in the final RUS.

Table 4.1 – tranche one National Stations Improvement Programme stations

Berkhamsted	Carlisle	Chester
Milton Keynes Central	Preston	Runcorn
Tamworth	Watford Junction	Wigan North Western

Access for All

The Access for All programme is a 10-year initiative launched by the DfT in 2006 to make more than 200 smaller stations across the country accessible for all. The programme is part of the Railways for All strategy, which aims to address the issues faced by mobility impaired passengers using railway stations. Central to the strategy is the commitment of £35 million nationally every year to 2015 to help enable the provision of an accessible route to and between platforms at priority stations. This generally involves the provision of lifts or ramps, as well as associated works, and refurbishment along the defined route. The stations currently included within the West Coast Main Line RUS area are Carlisle, Cheadle Hulme, Hemel Hempstead and Leighton Buzzard.

4.2 Other committed enhancement schemes

The following schemes are other committed enhancements within the West Coast Main Line RUS area. These schemes, in addition to the capacity schemes specified, have formed part of the baseline of this RUS and as such have been taken into consideration during the appraisal work

Nuneaton North chord

The new single line chord at Nuneaton will allow trains using the existing flyover from Nuneaton South Junction to directly access the WCML on the slow line for flows going northwards. This will allow trains to cross the WCML without disrupting the four main running lines and is vital for freight growth. This will particularly benefit the Felixstowe to Manchester/Glasgow freight services.

Resignalling programme

A signalling renewals programme is planned for parts of the West Coast Main Line RUS area and the RUS will consider the renewed network as the baseline infrastructure. **Table 4.2** shows the current proposals for the resignalling schemes within the RUS area. As part of their development, the projects are assessing any possible enhancements that could be provided as part of the renewal schemes.

Table 4.2 – resignalling programme

Committed project	Planned completion date
Northampton recontrol	2012
Watford Junction area	2013
Crewe, Carlisle, Warrington and Preston signalboxes – life extension works	2013

4. Anticipated changes in supply and demand

4.3 Uncommitted schemes

This section provides information on uncommitted schemes which, if implemented, would have a significant impact within the RUS area (listed south to north). The RUS also recognises those renewal and enhancement projects that are in the early stages of development and therefore, classified as uncommitted, have not been included within the baseline. The RUS does not normally assume that these projects will go ahead, but where an output from an uncommitted scheme may deliver a resolution to an identified gap, the RUS may recommend the same intervention if it proves to be the optimum way forward from the optioneering process.

St Albans Abbey line

Proposals are being formulated to convert the six and a half mile line from Watford Junction to St Albans Abbey to a new tram service which would be appropriate for a community rail route. As part of this proposal an increased level of service would be provided through the provision of a new passing loop.

Croxley rail link

This is a proposal to reopen the disused Croxley branch line in the Watford area, which will provide through Metropolitan line underground services between London and Watford Junction station via Croxley Green.

East-West Rail

The East-West Rail consortium wishes to reintroduce passenger services from Oxford and Aylesbury to Bletchley and Milton Keynes.

The primary objective of this initiative is to improve east-west connectivity between Oxford and Cambridge. The purpose of the reopened railway is to provide a local transport link supporting growth and development. It is seen as a means of easing traffic congestion problems in Oxford, Bletchley and Milton Keynes. Services could continue eastwards on the Bletchley to Bedford line and onwards towards Peterborough and East Anglia, and westwards linking with Reading. This is seen as a long-term strategic route, supporting inter-regional passenger services and creating an alternative freight route between the south of England and the Midlands, the north and Scotland.

Daventry International Rail Freight Terminal

Major expansion of Daventry International Rail Freight Terminal (in phases) to provide more storage and distribution facilities and rail infrastructure is proposed.

Coventry to Nuneaton rail upgrade

There are plans to enhance the transport links between Nuneaton, Bedworth and Coventry. This line runs through an area of proposed major growth in the West Midlands and there are a number of potential locations along the route that could see significant housing growth. This has implications particularly at the Nuneaton end of the line with Platforms 1 and 2 at Nuneaton already well utilised for both passenger and freight services.

Resignalling projects

The resignalling projects planned during Control Period 5 are shown in **Table 4.3**.

Table 4.3 – resignalling projects

Location	Date of scheduled renewal
Macclesfield area	2016
Allerton and Speke	2016
Carlisle area	2019
Motherwell area	2019

High speed line

Although not yet a committed scheme in terms of identified funding, a new high speed line is Government policy.

In 2008 Network Rail commissioned a study to consider the case for a new rail line in the UK. Understanding that the level of growth forecast would require extensive levels of additional capacity the study examined the various routes into London and established that the WCML would require earlier major interventions to provide capacity. The study found there was a case to take forward a self contained high speed line from London to Birmingham, Manchester and Scotland. With high speed long distance services using the new line to take advantage of the resulting journey time improvements and new markets, capacity on the traditional WCML infrastructure would be created for commuter, freight and other interurban services where additional capacity is urgently required.

In 2008 the Government formed High Speed Two Limited to continue to consider the case for high speed rail services from London. The company has now reported a preference for a 'Y'-shaped line from London to the West Midlands before diverging with a route to Manchester and the second route travelling through the East Midlands and on to Leeds. However, the exact route is still being considered.

This RUS assumes that the first stage of the proposed high speed line between London and the West Midlands will be delivered in 2026 in line with Government announcements, with a construction period commencing during CP5. The development work being undertaken by High Speed Two Limited is in the early stages and there are no formal plans yet confirmed concerning the implications of the construction period.

North West electrification

In 2009, the Government announced plans for significant electrification in the North West. There are plans to electrify the Liverpool to Manchester line (via Earlestown) by 2013, Liverpool to Wigan North Western by 2014, Preston to Blackpool North by 2015 and Manchester Victoria to Preston (via Bolton) by 2016.

These proposals will create opportunities for new electric services to be introduced which will improve capacity and connectivity, as well as providing new electrified routes including diversionary routes. Currently there is no formal rolling stock plan available and the RUS has made assumptions in the reference case timetable.

The Northern Hub

There are proposals for significant investment in infrastructure in the Manchester area which will improve service frequencies and connectivity across the whole of the North West region. A preferred infrastructure solution of additional platforms at Manchester Piccadilly along with a new section of railway line in the Ordsall area to provide a direct heavy rail link between Manchester Victoria and Manchester Piccadilly stations will enable significant numbers of new direct journeys to be made. Further details can be found on the Network Rail website at www.networkrail.co.uk

Ports expansion

There are planned expansions at various ports throughout the country which will have an effect on the WCML. These include developments at Avonmouth, Liverpool, Felixstowe, Bathside Bay, Thames Gateway and Southampton. This will have a significant effect on freight services, particularly intermodal growth.

4. Anticipated changes in supply and demand

Ditton expansion

Expansion of the Ditton Freight interchange with the creation of new reception sidings linked into the major distribution site 3MG (Mersey Multimodal Gateway Logistics Park) at Ditton, will allow up to 16 trains per day to be accepted. Completion is planned for 2014.

Delivering a Sustainable Transport System

The DfT published its formal consultation document *Delivering a Sustainable Transport System* in November 2008. It sets out long-term transport priorities for the period to 2019 and beyond and reflects conclusions from the Eddington Transport study (October 2006) and the Stern review. The document sets out five clear transport goals for the network which include delivering reliable and efficient transport networks, reducing carbon dioxide emissions and promoting equality of opportunity for all citizens.

As part of the *Delivering a Sustainable Transport System* programme there are both national and regional studies. The national studies are led by the DfT and the local studies are led by the local authorities. The rail industry is currently engaging with stakeholders to progress a number of strategically relevant studies which will meet the DaSTS objectives.

Depots and stabling

Nationally a strategy is being developed in order to accommodate additional vehicles as part of the Government's HLOS. This may affect depots across the RUS area which may need to be enhanced or have additional facilities provided.

It is recognised that the current capacity and facilities available at depots maintaining Class 390 trains, needs improving to accommodate the increased train lengths involved. There is a current initiative to address this issue in readiness for the deployment of the new 106 vehicles.

Other depot issues are also being considered as part of the Network RUS: Rolling Stock and Depots workstream, which is due to be published as a Draft for Consultation in 2011.

4.4 Future demand

The remainder of this chapter considers the short and medium-term changes in passenger and freight demand affecting the RUS area.

4.4.1 Passenger demand forecasts

This section outlines the methodology and results of the West Coast Main Line RUS passenger demand forecasting process. The forecasts inform the analysis of service and infrastructure gaps on the rail network and the appraisal of options to address them.

The forecast covers the period from 2007/08 to 2029/30. The baseline year for the demand forecasting is 2007/08 as it is the last full year prior to the introduction of the December 2008 timetable where the changes to travel patterns were very significant. All relevant committed service changes beyond 2007/08, including the impact of the December 2008 timetable, have been taken into account.

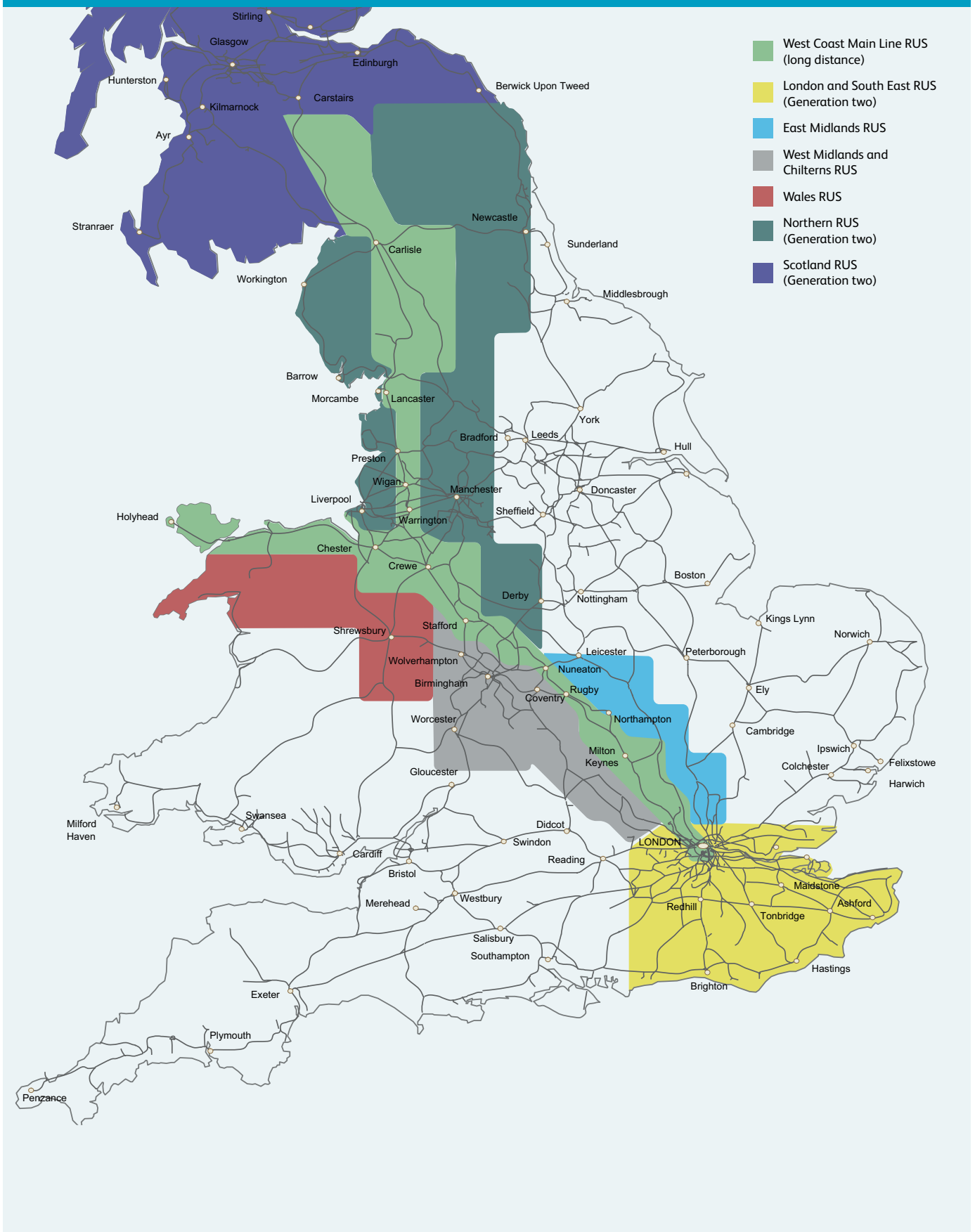
Strategic context

The West Coast Main Line RUS is being undertaken at a time when there is uncertainty over demand for rail travel. Economic growth in the United Kingdom has only just resumed after one of the most severe recessions¹ in recent history and although the underlying rate of growth in most passenger markets has slowed as a result, the longevity and magnitude of this impact is unclear.

Prior to the recession, demand for short distance travel into regional centres and longer distance travel between them was increasing at a faster rate than could be explained by the industry standard forecasting models. This makes it difficult to produce a forecast for the WCML. The issue is exacerbated by the radical alteration in services resulting from the December 2008 timetable change, where the subsequent changes in travel patterns are yet to fully mature.

1. The UK economy has seen Gross Domestic Product (GDP) contract for six consecutive quarters during 2008 and 2009.

Figure 4.1 – Origins of the demand forecasts used in the West Coast Main Line Route Utilisation Strategy



4. Anticipated changes in supply and demand

After forecasts were produced, the Government has announced that the cap on regulated fares is to rise to Retail Price Index (RPI) + three per cent for three years from 2012, returning to RPI + one per cent from 2015. The industry standard forecasting models estimate that the long-term effect of this change is expected to be different between short distance and long distance rail demand.

The short distance market which is dominated by commuter travel is less elastic as there are fewer alternatives available for passengers. The increase to regulated rail fares for this market is expected to result in a small reduction in demand, indicating that the forecasts for 2024 in the RUS might not be achieved for another year at most.

The impact on the long distance market is more difficult to estimate, not least because only a small percentage of fares are regulated. Given the recent strong growth in this market, the fares announcement is unlikely to have a material impact on the RUS strategy

Methodology

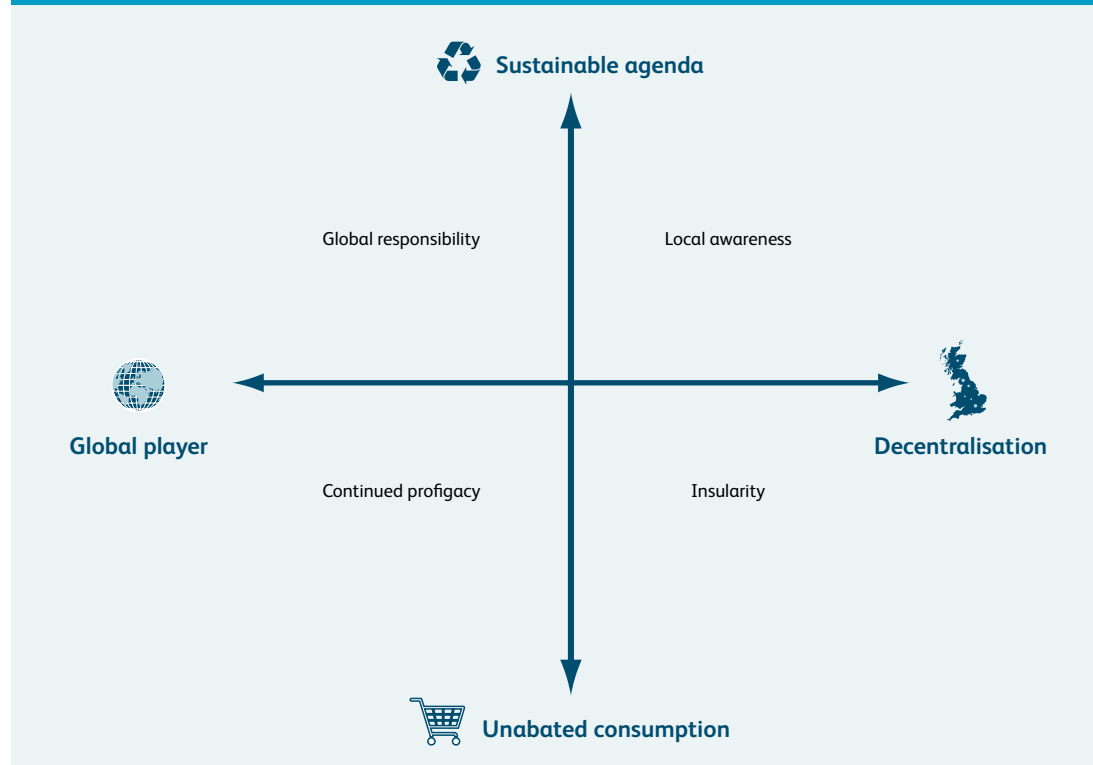
In order to capture the inherent risks to forecasting in the current industry climate, and to make the risk of investing clear to potential funders, forecasts have been produced under two alternative scenarios which are the minimum and maximum

level of demand growth that could be reasonably expected over the period covered by the RUS. This methodology is consistent with that of the second generation RUSs. The route is split into two distinct markets; long distance markets served by long distance high speed services and interurban operators, and short distance markets served by interurban and commuter operators. The former market predominantly serves business and leisure passengers, with the latter catering for commuter, business and leisure travel.

The following approach has been used to forecast passenger flows to, from and within the RUS area:

- forecasts for all long distance passenger flows (over 50 miles) that are contained within, or predominantly within, the RUS area, London and Glasgow are bespoke for this RUS having been derived from the Network RUS: Scenarios and Long Distance Forecasts document
- forecasts for all short distance passenger flows (less than 50 miles) contained within the RUS area such as between Milton Keynes Central and Watford Junction are derived from the forecasts in Network Rail's New Lines Programme, Strategic Business Case report which was published in August 2009

Figure 4.2 – network Route Utilisation Strategy: scenarios and long distance forecasts scenarios



- forecasts for all short distance passenger flows (less than 50 miles) between the RUS area and places outside, eg Crewe and Manchester are taken from other recent RUSs.

Figure 4.1 illustrates the origins of the demand forecasts used in the West Coast Main Line RUS.

Note, West Coast Main Line RUS forecast illustrated is that for long distance flows

Long distance methodology

Standard industry forecasting models plan on the basis that existing behavioural responses to change will continue and that the economy will continue to grow at a consistent rate. Although fairly successful in the short term, this is less useful for longer-term planning, where there is a significant amount of uncertainty over both of these assumptions.

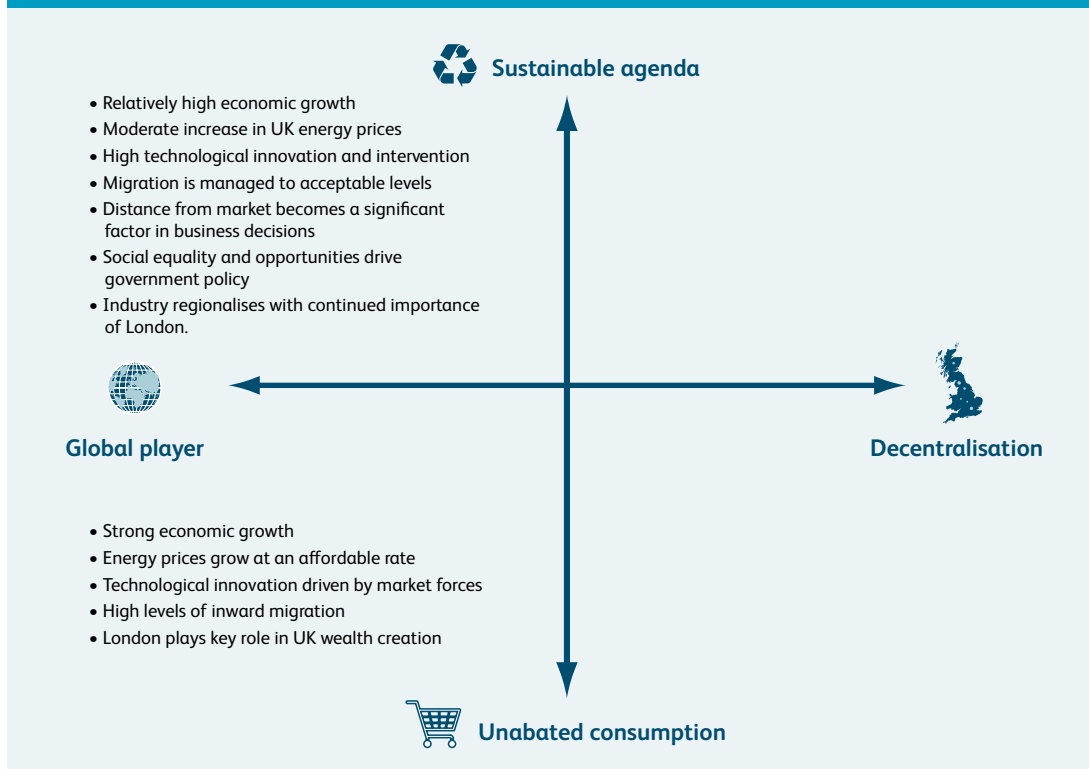
Given the current economic climate there is also a certain amount of ambiguity as to how the drivers of demand will change in the future and how the market will respond to these changes.

The Network RUS: Scenarios and Long Distance Forecasts have been used to forecast demand on all long distance passenger flows (over 50 miles) that are contained within, or predominantly within, the RUS area, in order to overcome the uncertainties already described.

Figure 4.2 presents a series of long-term scenarios and considers how passenger demand will be impacted by each. The scenarios are based around two factors:

- the economic system (shown on the horizontal axis), representing the development of the British economy
- the sustainability regime (shown on the vertical axis), representing the social and environmental values and policies.

Figure 4.3 – drivers of long distance demand by scenario



4. Anticipated changes in supply and demand

Each of the scenarios is based on a vision of how things might be in the future. The insularity and local awareness scenarios assume little or no economic growth in the UK due to restricted global co-operation and high energy and labour prices. The growth forecast for these scenarios is well below that witnessed in preceding decades and is contrary to the current view on the importance of globalisation. The continued profligacy and global responsibility scenarios assume higher economic growth in the UK driven by increasing globalisation of trade and efficiency gains.

These scenarios have been used to provide the alternative views of future passenger demand in the West Coast Main Line RUS as they represent the most likely outcomes, based on current understanding, and also because they provide the widest plausible forecast range for the markets served by the WCML.

The demand drivers for these two scenarios are outlined in **Figure 4.3**.

The key difference between the two scenarios is the importance of London in Britain's future development. The continued profligacy scenario assumes that London has an increasingly dominant influence and plays a key role in UK wealth creation, whereas the global responsibility scenario assumes greater regional importance in the future.

The methodology used to produce these forecasts is detailed in Chapters 7 and 8 of the Network RUS: Scenarios and Long Distance Forecasts which is available at www.networkrail.co.uk

Short distance methodology

The short distance forecast methodology uses the industry standard forecasting approach from the Passenger Forecasting Demand Handbook. The passenger demand forecasts in Network Rail's New Lines Programme, Strategic Business Case report, uses the network modelling framework which is based on the Passenger Demand Forecasting Handbook approach to forecasting. This is the DfT's preferred forecasting model and is common to most established and ongoing RUSs. More details on the forecasting methods of the New Lines Programme and other RUSs can be found at www.networkrail.co.uk

Forecast growth

The passenger demand forecast under the global responsibility scenario tends to be higher for long distance interurban travel. This is in part driven by a lack of maturity in the rail market compared to other modes of transport. The assumptions regarding future government policies under this scenario encourage the use of public transport because of its lower external costs compared to the car. Growth is further exacerbated by the assumption that regional centres will develop at a faster rate than the traditional London and the South East centres. This is reversed under the continued profligacy scenario, which assumes a continued dominance of London in the UK economy, thus instigating high levels of growth to and from London. The assumptions in this scenario most closely reflect the pre-recession economic conditions and planning policies. The passenger demand forecast to and from London therefore tends to be higher under this scenario.

Many stakeholders observed that forecast growth in passenger demand between London and Glasgow was considerably lower than other comparable flows. Upon further investigation, it was confirmed that the model used to estimate the key drivers of change was understating the forecast growth, especially the impact of modal shift from air to rail in the event of journey time improvements. In the absence of any specific data the growth rate used for Glasgow to London flows was agreed to be the same as Edinburgh to London, which is in line with most other similar WCML flows. Further work is being undertaken (outside of the RUS process) to seek to establish more effective methods of modelling the impact of such demand drivers. This work will be reflected in the final strategy expected to be published in summer 2011.

Figure 4.4 illustrates the forecast growth in passenger demand (measured in number of rail journeys) throughout the day for key markets to and from London on the WCML.

Forecast growth in all day passenger demand in short distance flows to and from London, such as stations in the WCML outer region, is expected to be similar under both scenarios at around 30 per cent for the 15 years to 2024/25 (averaging at 1.9 per cent per annum). London has an established rail market and so this growth is predominantly driven by the expected change in London employment. The latest forecast from the draft London Plan October 2009 suggests employment in London will grow by an average of 0.9 per cent per annum from 2007 to 2031. There is also significant growth expected in the Milton Keynes region as part of the Milton Keynes South Midlands subregional strategy.

The market for travel between London and Manchester is expected to grow at the fastest rate, with passenger demand expected to increase by between 56 per cent and 61 per cent depending on the growth scenario. This very high growth rate is a result of a number of demand drivers, including a greater increase in road congestion, changes in commuting patterns which favours rail travel and an increase in the attractiveness of the rail service.

The growth forecast varies considerably between the two scenarios for markets that are further away from London and are relatively less established. The highest variance in passenger growth forecast from **Figure 4.4** is between London and Glasgow, ranging from 41 per cent under the continued profligacy scenario to 54 per cent under the global responsibility scenario. This is equivalent to an annual growth rate of 2.3 per cent and 2.9 per cent per annum respectively.

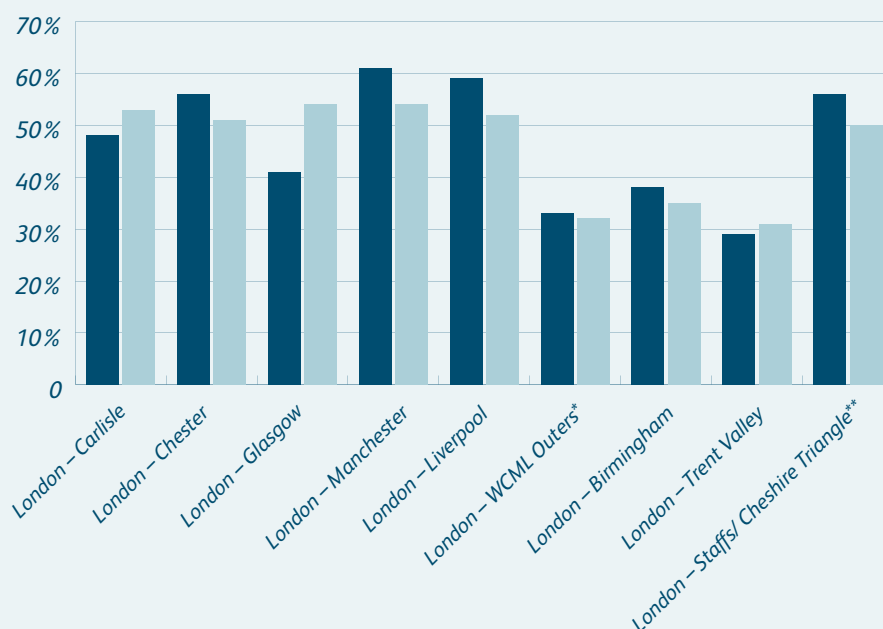
Figure 4.5 illustrates the forecast growth in passenger demand (measured in the number of rail journeys) throughout the day for key non-London markets on the WCML.

The emerging rail market between Liverpool and Scotland is forecast to grow between 30 and 72 per cent to 2024 under the continued profligacy and global responsibility scenarios respectively. This range is slightly higher at 34 and 79 per cent for travel between Manchester and Scotland and rises substantially for travel between Birmingham and Scotland to 34 and 107 per cent respectively. As expected, growth under both scenarios is smaller for short distance markets.

To summarise, under the continued profligacy scenario, the average annual passenger demand is expected to grow in the range of 1.1 per cent

Figure 4.4 – forecast percentage growth in rail passenger journeys on key London flows 2009/10 – 2024/25

■ Continued profligacy
■ Global responsibility



* WCML Outers consists of Hemel Hempstead, Milton Keynes Central, Northampton and Rugby stations.

** Staffs/Cheshire Triangle consists of Crewe, Hartford, Macclesfield, Stafford, Stoke-on-Trent and Uttoxeter stations.

Note, Trent Valley stations refer to Nuneaton, Atherstone, Polesworth, Tamworth, Lichfield Trent Valley and Rugeley Trent Valley stations on the WCML.

4. Anticipated changes in supply and demand

per annum for inter regional markets (less mature markets) and 3.6 per cent per annum for short distance travel to and from key urban centres (which are relatively developed such as London-based markets). Under the global responsibility scenario, growth rates are reversed at 5.0 per cent and 1.5 per cent per annum for inter-regional markets and key urban centres respectively.

4.4.2 Future passenger train loadings

In order to understand whether there is sufficient capacity on the WCML to meet future demand, the passenger demand forecasts were used to estimate the loadings on trains in 2024. As before, this analysis has been split into: long distance services, referring to services operating to and from London Euston, between Birmingham and Scotland, and between Manchester and Scotland; and short distance markets served by, London Overground Rail Operations Limited (LOROL), Southern and London Midland.

Forecast 2024 levels of crowding on long distance services

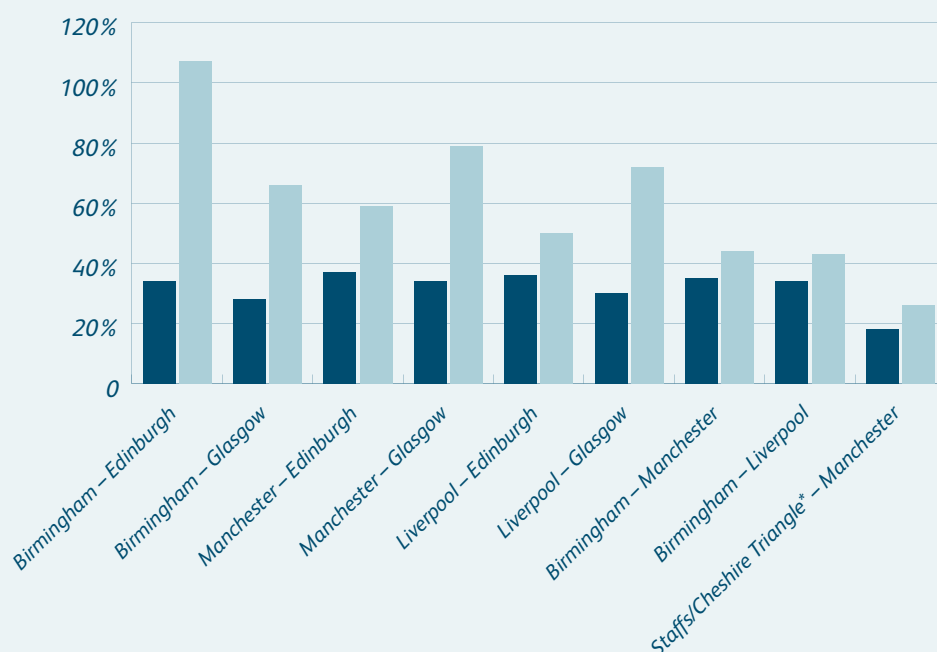
The expected average number of daily LDHS services operating to or from London Euston with standing passengers in 2024 is shown in **Figure 4.6**. Friday load factors are assessed separately as passenger numbers are greatest on this day of the week,

therefore representing the LDHS peak time. Based on current capacity, a significant number of trains are expected to have standing passengers in 2024. However, as detailed earlier in this chapter, an additional 106 vehicles have been procured and are expected to enter service in the near future. This will provide a 52 per cent increase in the number of standard seats where the nine-car Class 390 units have been converted to 11-cars. Once the train diagrams have been optimised to allow the 11-car units to operate on the busiest services, sufficient capacity is provided for most services up to 2024. However, on average 20 services are expected to carry standing passengers on weekdays. This rises to 27 services on average, on Fridays.

Services on the corridor between London Euston and North Wales are currently provided by five-car Class 221 units. By 2024, some of these services are expected to carry standing passengers. In the southbound direction, passengers are expected to stand for only short periods of time (between Chester and Crewe). In the northbound direction however, passengers are forecast to stand for longer than 20 minutes, especially those on services departing London Euston in the three-hour evening peak. The services provided between London and Preston and London and Manchester are forecast to have the next highest number of trains on average with standing passengers.

Figure 4.5 – forecast growth in rail passenger journeys on key non-London flows 2009/10 – 2024/25

■ Continued profligacy
■ Global responsibility



* Staffs/Cheshire Triangle consist of Crewe, Hartford, Macclesfield, Stafford, Stoke-on-Trent and Uttoxeter stations.

It has been observed that passenger demand for rail travel is significantly higher during weekends and school holidays. This may necessitate further capacity than shown in **Figure 4.6** to meet future demand on the route. Analysis for this will be undertaken during the consultation period and the findings reported in the final RUS publication.

The 2024 loadings on the long distance services between Birmingham and Scotland are shown in **Figure 4.7**. Passenger demand is forecast to grow significantly under the global responsibility scenario between Birmingham and Scotland, with over 100 per cent growth expected in the 15 years to 2025. Under the global responsibility scenario, most trains are expected to have load factors greater than 120 per cent. Crowding is lower under the continued profligacy scenario, but approximately 50 per cent of the services will have standing passengers.

The other long distance services on the WCML are between Manchester and Scotland. **Figure 4.8** shows the expected average annual capacity and demand for the Manchester to Scotland service in 2024. Based on average weekday count data, it suggests that there is sufficient capacity on the route to cater for demand in 2024 once the three-car Class 185s have been replaced by four-car electric multiple units after the electrification of certain routes in the North West. The RUS assumes that this results in an increase in seated capacity of between 20 and 30 per cent per train.

Crowding will however become more severe for services operated in the peaks to and from Manchester, with passengers standing from as far as Preston. This is considered in more detail by the Northern RUS Draft for Consultation published in October 2010.

It has been observed that passenger demand for rail travel is significantly higher during weekends and school holidays. This may necessitate further capacity than that shown in **Figure 4.8** to meet future demand on the route. Analysis for this will be undertaken during the consultation period and the findings reported in the final RUS publication.

Forecast 2024 levels of crowding on short distance service

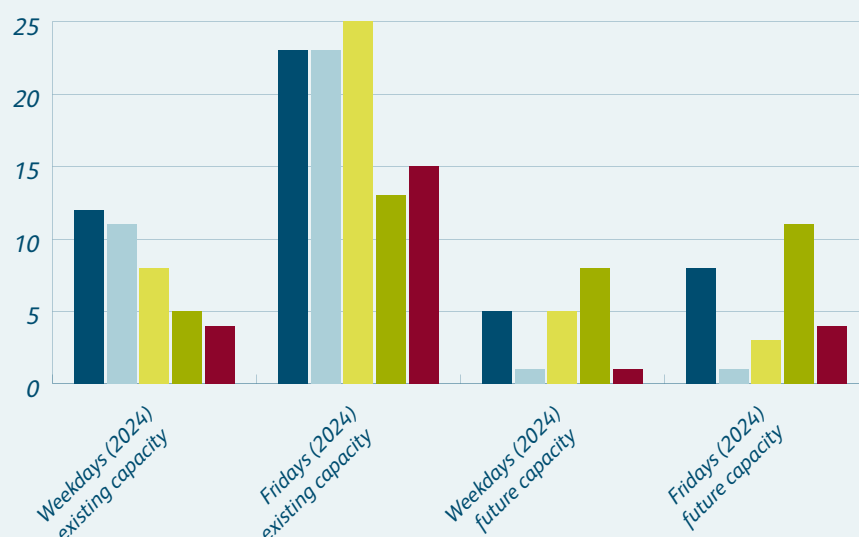
Crowding is forecast on commuter and interurban services to and from London by 2024. These are operated by LOROL, Southern and London Midland.

The recent capacity increase on services provided by LOROL through the introduction of four-car Class 378 units increased the seating capacity on this corridor. In addition, Class 378 units have large amounts of standing space, significantly increasing the total passenger capacity (seats + standing space) available. This is ideal for this type of service where most passengers travel for relatively short periods of time.

Figure 4.9 shows that many services operated by LOROL will continue to have load factors of

Figure 4.6 – average number of 2024/2025 LDHS services operating to and from London Euston with passengers standing

- Glasgow/ Preston to London (31 tpd)
- Birmingham/Wolverhampton to London (98 tpd)
- Manchester to London (93 tpd)
- North Wales to London (30 tpd)
- Liverpool to London (35 tpd)



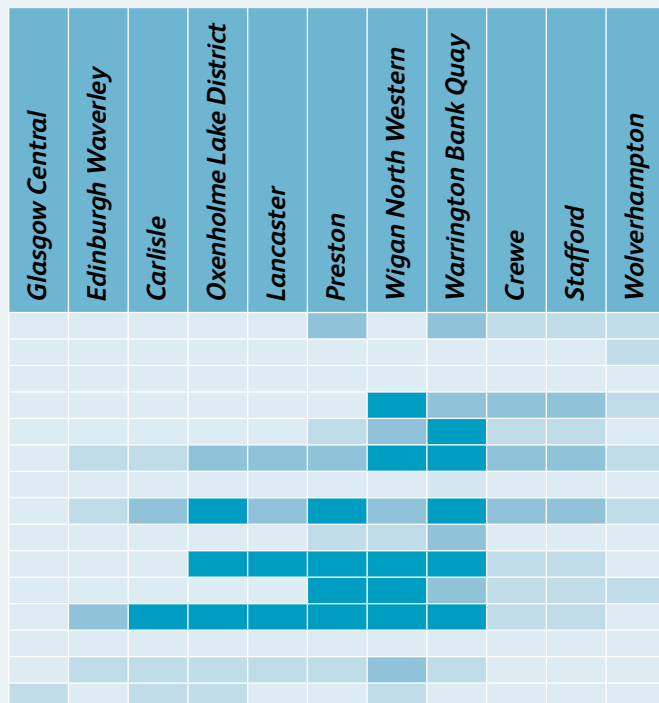
Source: Virgin Trains average passenger count data, 2009/10 and Network Rail West Coast Main Line RUS passenger demand forecast.
Note, 2024 current capacity relates to the existing capacity provided on the service. Tpd refers to trains per day.

4. Anticipated changes in supply and demand

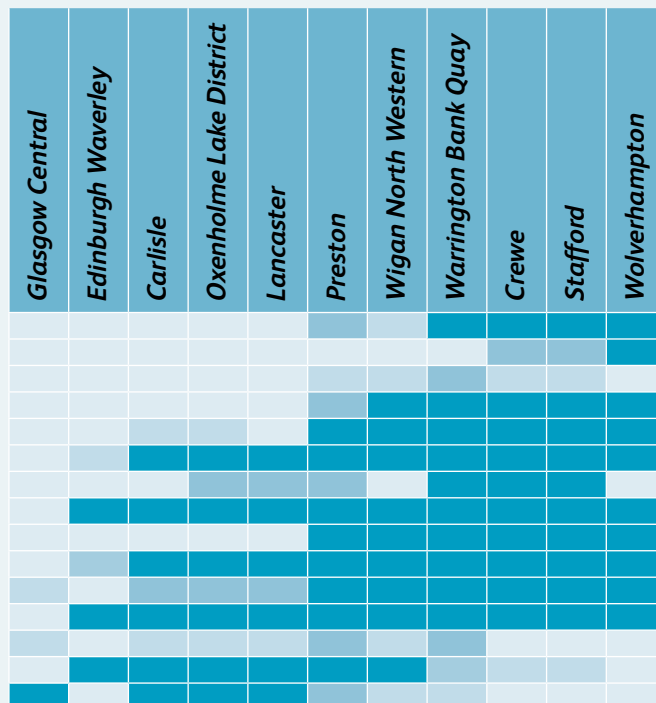
Figure 4.7 – forecast load factors on trains departing from stations along the Birmingham – Scotland route in each direction throughout the day in 2024/25.

Expected on-train departures in 2024/25 from Scotland to Birmingham

Continued profligacy scenario

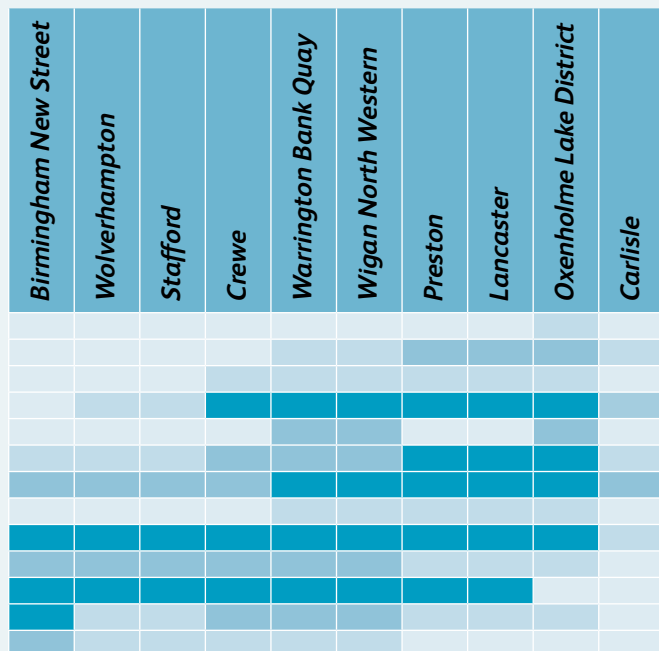


Global responsibility scenario

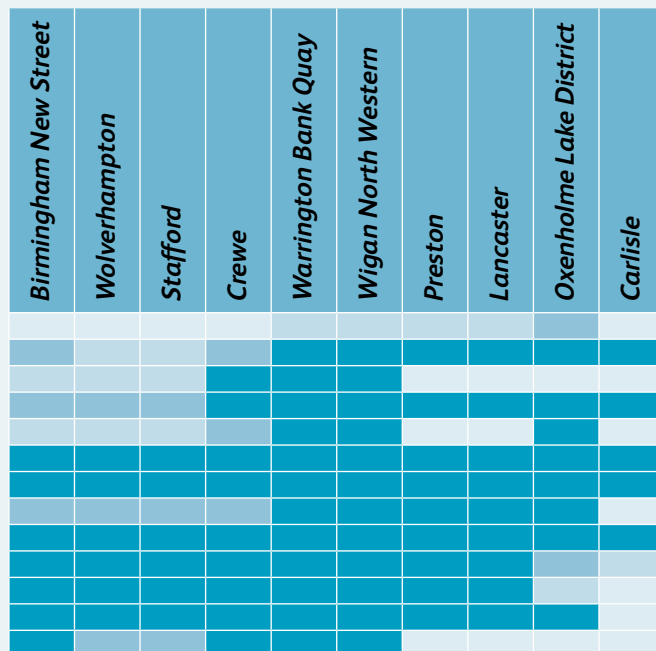


Expected on-train departures in 2024/25 from Birmingham to Scotland

Continued profligacy scenario



Global responsibility scenario



Load factor <80 % Load factor 80 – 100 % Load factor 100 – 120 % Load factor >120 %

Source: Network Rail West Coast Main Line RUS forecast, 2024/25

Note, only services with passengers standing at some point on the route have been presented.

above 140 per cent, however, given the nature of this service, which has considerable number of shorter journeys, this does not represent serious overcrowding by 2024.

Figure 4.10 illustrates the expected levels of crowding on the short distance services provided on the WCML by Southern. It shows that all services operating in the morning three-hour peak are expected to get severely crowded by 2024, with services in the high-peak hour reaching loadings of greater than 200 per cent with passengers potentially unable to board the train.

The short distance services operated by London Midland, has sufficient weekday capacity on most corridors to accommodate future demand apart from the morning peak services arriving at London Euston and evening peak services departing from Birmingham. Crowding into and out of Birmingham is considered in detail by the West Midlands and Chilterns RUS published as a draft for consultation in November 2010.

Severe crowding is also expected on the Northampton to London Euston corridor as shown in **Figure 4.11**. It illustrates that many services will have standing passengers along this route, especially during the peaks at London. From the 231 daily services currently operated by London Midland on this corridor, 30 per cent are forecast to have standing passengers for more than 20 minutes. Many peak-hour services are expected to have load factors of greater than 200 per cent with passengers potentially unable to board the train.

The analysis regarding future loading on the WCML has found various gaps between future capacity and demand on the route. This has been used to identify options. These and their appraisals are reported in **Chapter 5**.

Figure 4.8 – expected annual passenger flow (2010 to March 2024) on-train departures on Manchester Airport to Scotland services in the northbound direction

— Capacity 2024
— Capacity 2010
— Total demand 2024

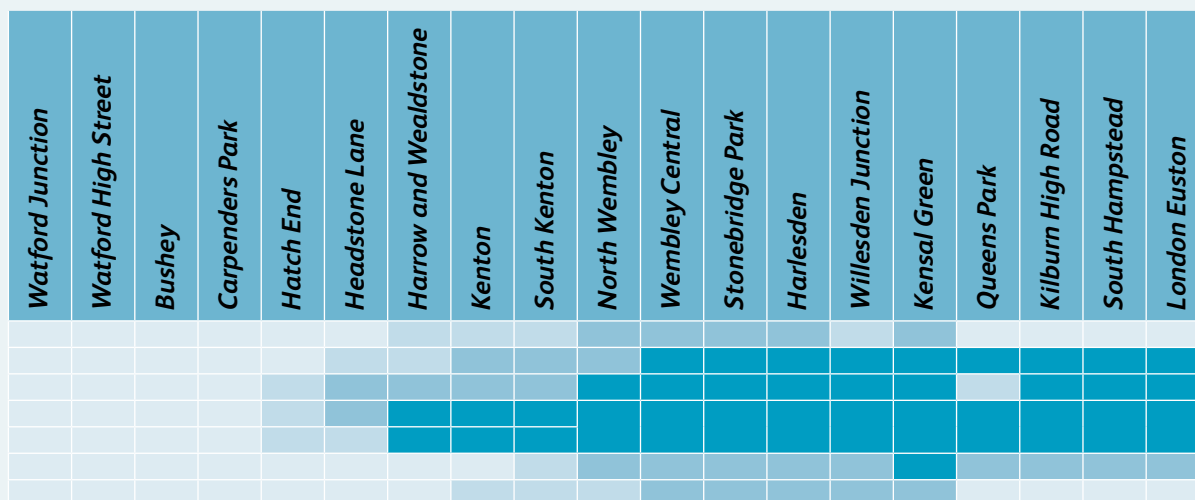


* 72 % of journeys departing Carlisle are towards Edinburgh, with the remaining 28 % towards Glasgow.
Source: Network Rail West Coast Main Line RUS forecast, 2024/25.

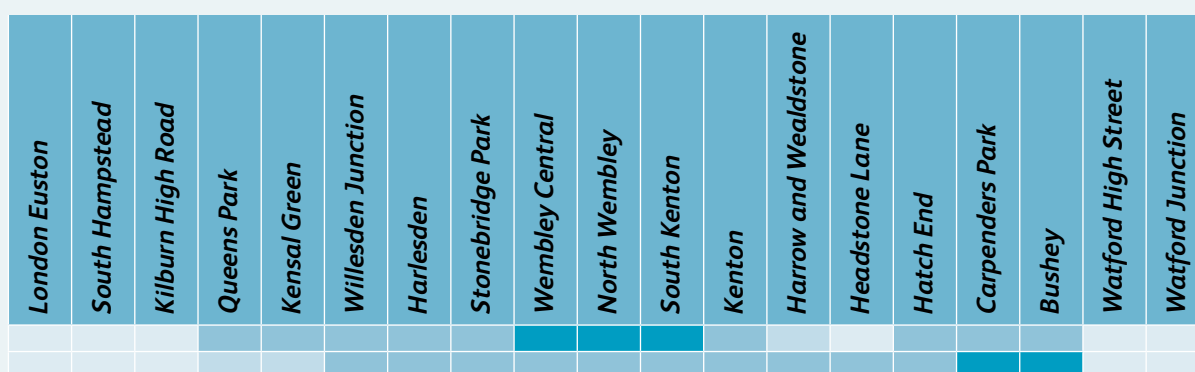
4. Anticipated changes in supply and demand

Figure 4.9 – forecast load factors on LOROL services between Watford Junction and London Euston during the three-hour morning peak by 2024

On-train departure 2024/25 from Watford Junction to London Euston in the three-hour morning peak on LOROL services



On-train departure 2024/25 from London Euston to Watford Junction in the three-hour morning peak on LOROL services



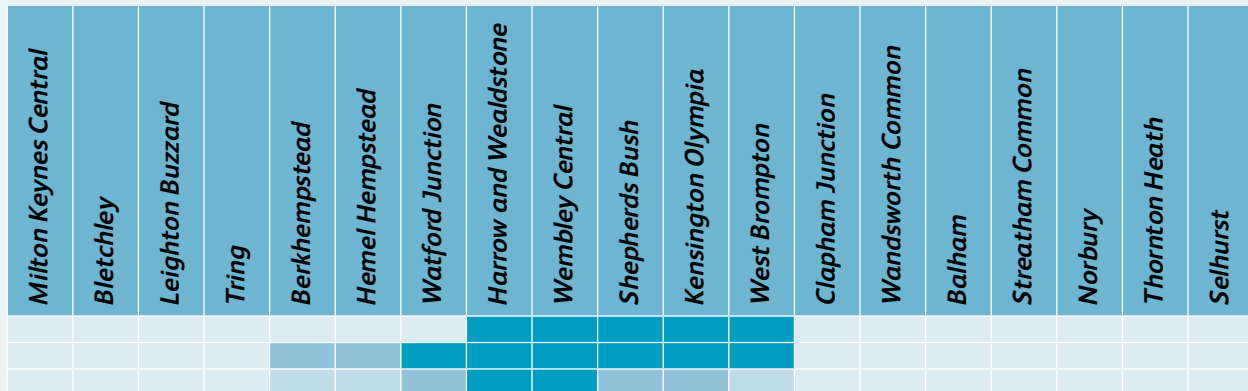
Load factor <80 %
 Load factor 80 – 100 %
 Load factor 100 – 140 %
 Load factor >140 %

Source: Network Rail West Coast Main Line RUS forecast, 2024/25

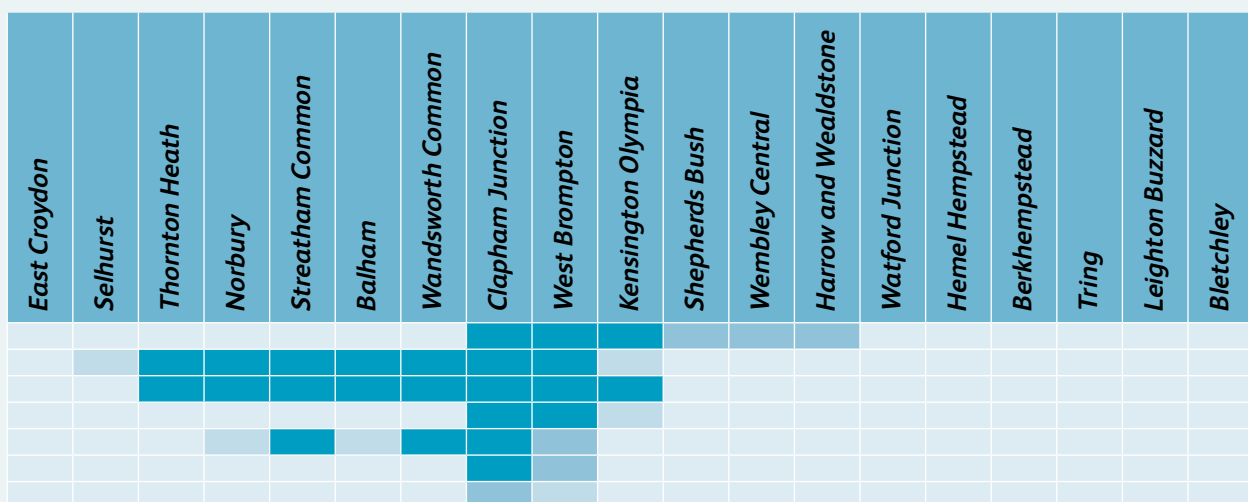
Note, only services with passengers standing at some point on the route have been presented.

Figure 4.10 – expected load factors on trains departing from stations along the Milton Keynes Central to East Croydon route in each direction during the three-hour morning peak by 2024

On-train departure 2024/25 from Milton Keynes Central to East Croydon in the three-hour morning peak on Southern services



On-train departure 2024/24 from East Croydon to Milton Keynes Central in the three-hour morning peak on Southern services



Load factor <80 % Load factor 80 – 100 % Load factor 100 –140 % Load factor >140 %

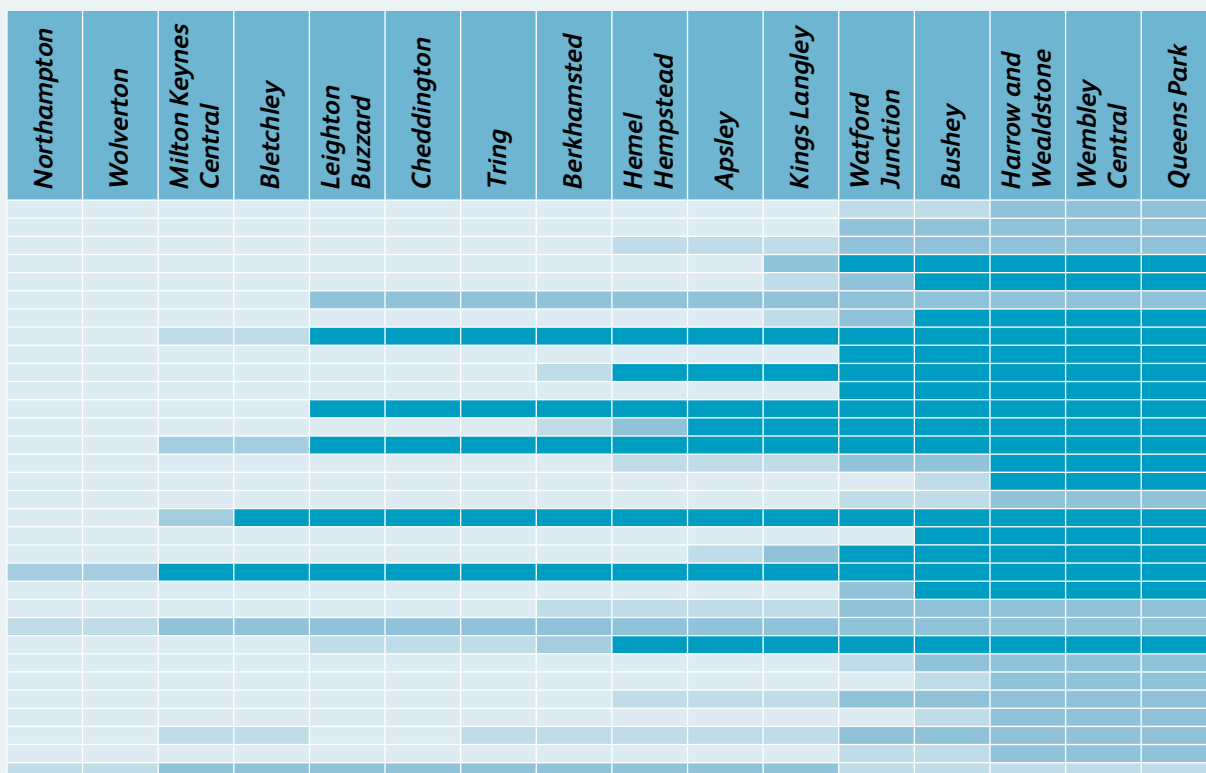
Source: Network Rail West Coast Main Line RUS forecast, 2024/25

Note, only services with passengers standing at some point on the route have been presented.

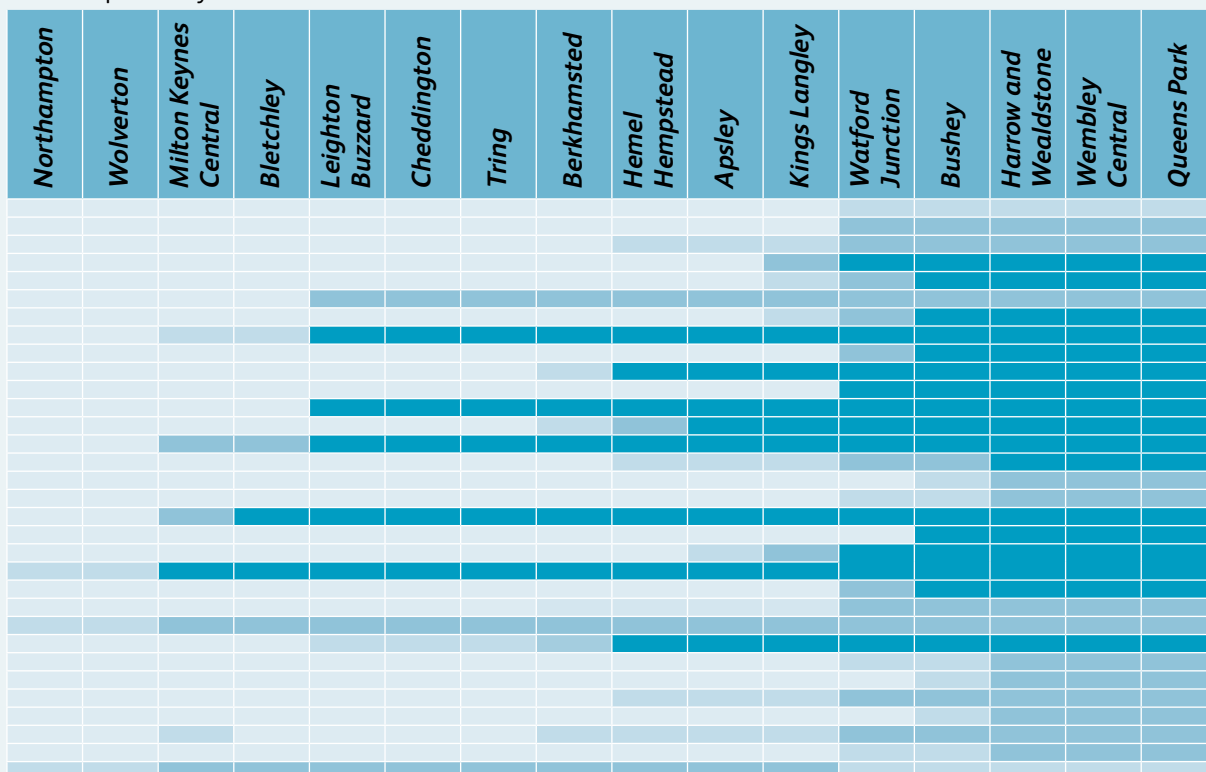
4. Anticipated changes in supply and demand

Figure 4.11 – forecast load factors on trains departing from stations along the Northampton to Euston corridor in each direction throughout the day

On-train departures 2024/25 from Northampton to London Euston throughout the day on London Midland services
Continued profligacy scenario



Global responsibility scenario



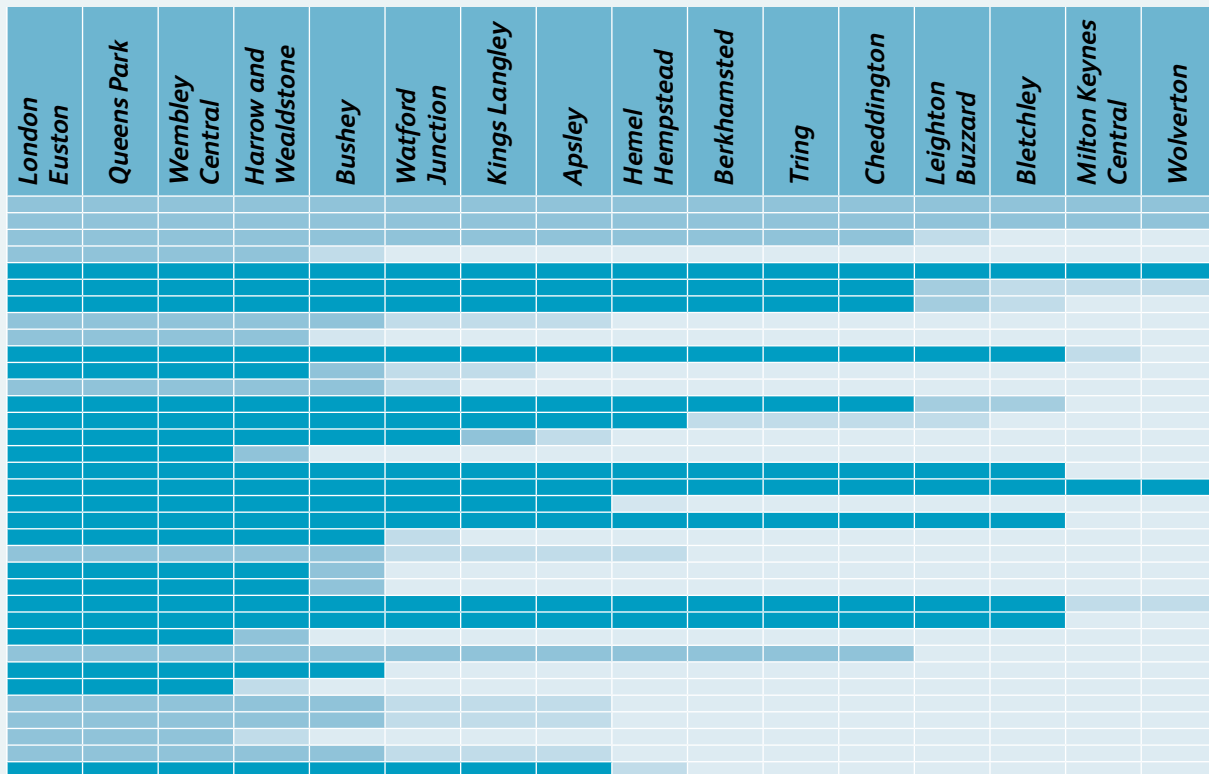
Load factor <80 % Load factor 80 – 100 % Load factor 100 – 120 % Load factor >120 %

Source: Network Rail West Coast Main Line RUS forecast, 2024/25 Note, only services with passengers standing at some point on the route have been presented.

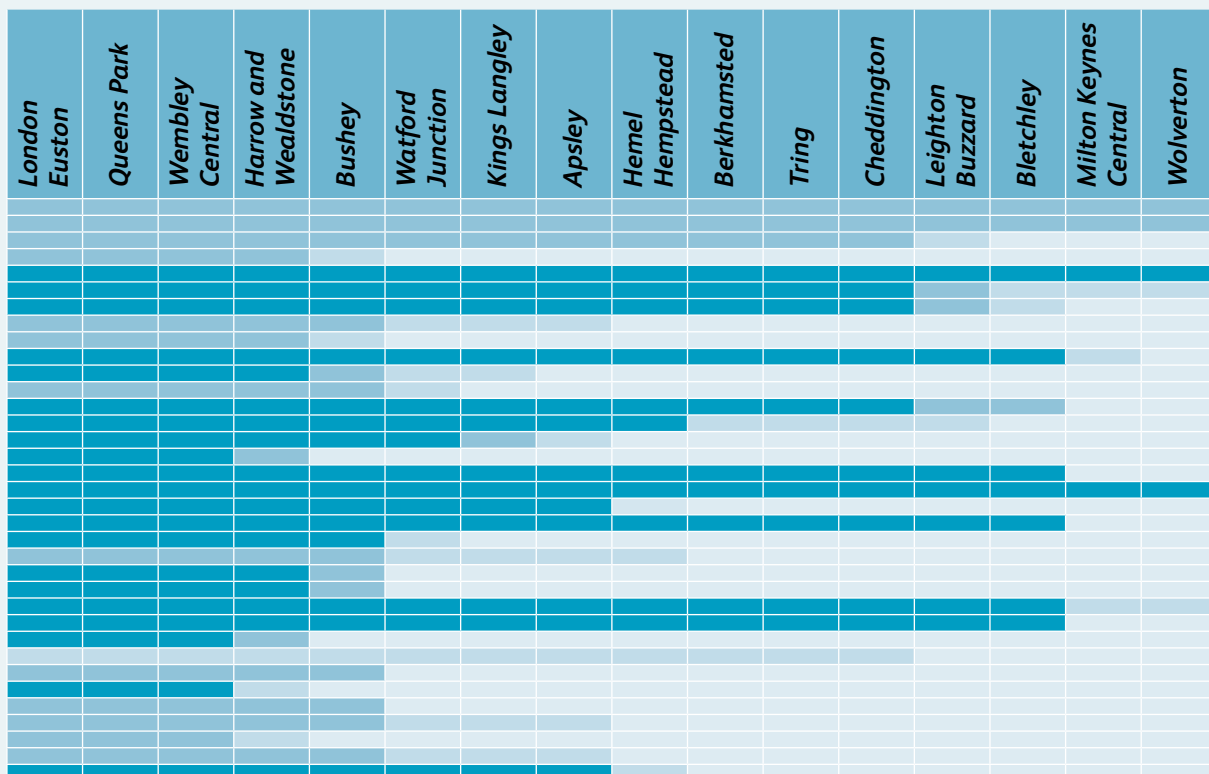
Figure 4.11 – forecast load factors on trains departing from stations along the Northampton to Euston corridor in each direction throughout the day

On-train departures 2024/25 from London Euston to Northampton throughout the day on London Midland services

Continued profligacy scenario



Global responsibility scenario



Load factor <80 % Load factor 80 – 100 % Load factor 100 – 120 % Load factor >120 %

Source: Network Rail West Coast Main Line RUS forecast, 2024/25 Note, only services with passengers standing at some point on the route have been presented.

4. Anticipated changes in supply and demand

4.4.3 Forecast freight demand

Freight demand forecasts were developed nationally to 2019 and 2030 for the SFN. The forecasts were developed using the Great Britain Freight Model to assess the aggregate level of demand. The Great Britain Freight Model is designed to forecast freight moved within Great Britain, including freight to and from the ports and the Channel Tunnel. It covers different modes such as rail and road and produces

a matrix of all forecast freight flows. This provides a 'top down' view based on economic modelling.

As with the method adopted in the Freight RUS, this perspective was complemented by a 'bottom up' view of the markets provided by a review of the forecasts by the industry. The forecast change in demand by commodity type is shown in **Table 4.4**.

Table 4.4 – forecast changes in freight demand by commodity to 2030

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

The changes in origin to destination freight demand were mapped across the network. **Figures 4.12** and **4.13** show the forecast level of freight paths (the number of timetable slots available for freight services) per day by line of route required for both 2019 and 2030. As a sensitivity, an exercise was undertaken within the RUS freight sub group, using commodity tonnage forecasts to validate the numbers of paths required. This exercise supported the forecasts.

The majority of the increase in demand is forecast to occur in the non bulk sector. Deep sea container growth is forecast to continue over the period. The completion of the W10 gauge clearance schemes between Southampton and the WCML, and the Haven Ports to the East Coast Main Line in CP4 will further assist the competitive nature of rail in this market. The route from Felixstowe to Peterborough being cleared to W10, allows access to the East Coast Main Line and if the remainder of the route is gauge cleared from Doncaster to Carstairs. This could provide alternative capacity for services currently routed via the WCML. Domestic non bulk is forecast to grow most rapidly, but this is from a low base. This will mean a significant increase in traffic to freight-handling facilities.

Much of the growth for freight will be routed from the south along the WCML and to terminals, including Daventry. By 2030 the anticipated capacity a new high speed line will generate, allows more commuter services to use the fast lines at the southern end of the route thus enabling an increased capacity for freight services on the slow lines.

The bulk sector is forecast to grow, albeit at a slower rate than the non bulk sector. The demand for coal traffic is in line with the future UK energy policy and carbon emission levels affecting the demand for coal in the medium term.

The RUS notes that the freight forecasts also assume freight services will be operating six days per week and include more efficient, longer trains of up to 640-metre length, which will convey more volume per train and so reduce the demand for train paths.

Figure 4.12 – forecast number of daily freight paths in each direction in 2019



4. Anticipated changes in supply and demand

Figure 4.13 – forecast number of daily freight paths in each direction in 2030



5. Gaps and options

Introduction

Analysis in previous chapters has demonstrated that there are several instances where the current rail network in the West Coast Main Line RUS area is not able to meet existing and/or future demands. These instances are termed ‘gaps’.

The gaps identified are presented in this chapter, along with the options developed and appraised to close these gaps.

Other RUSs

The West Coast Main Line RUS is looking primarily at gaps and options identified within the RUS area, whilst other gaps and options are being dealt with in their respective RUSs. However, there are instances where identified gaps cross the RUS boundaries. The cross-boundary issues considered by this RUS, in conjunctions with other RUSs are:

- capacity – the West Coast Main Line RUS covers a large geographical area and its services operate over many regions. Capacity to and from major urban centres on services along the WCML will be closely aligned with other RUSs, including:
 - the West Midlands and Chilterns RUS for capacity within the West Midlands rail network and specifically at Birmingham New Street
 - the Northern RUS for capacity at Manchester Piccadilly and Liverpool Lime Street
 - the Scotland Generation Two RUS for capacity on the inter city routes into Glasgow Central and Edinburgh Waverley as well as at these key stations
 - the London and the South East RUS for capacity at London Euston and services to and from the West London Line
- journey time between Birmingham and Manchester is also being considered in the West Midlands and Chilterns RUS
- freight capacity and capability work builds on the analysis done in the Freight RUS
- the Network RUS: Stations is considering station capacity issues across the whole of the United Kingdom.

Option appraisal

The appraisal of options includes operational and/or economic consideration, which is undertaken in line with the DfT’s Transport Analysis Guidance (webTAG) and the Passenger Demand Forecasting Handbook version 4.1.¹

Where appropriate, benefit cost ratios (BCRs) have been calculated and reported as this is the main indicator of a scheme’s value for money used by the DfT. A BCR of between 1.5 and 2.0 indicates medium value for money and a BCR of 2.0 or higher indicates high value for money. An option with a BCR of less than 1.5 is deemed to be low or poor value for money and generally will not be recommended.

The appraisals have been carried out over 10-year, 30-year or 60-year periods. A 10-year appraisal period is assumed where only operating costs² are incurred. If the option requires the procurement of extra rolling stock or incurs infrastructure expenditure, the appraisal period rises to 30 years and 60 years respectively. All options have been appraised under the two growth scenarios of global responsibility and continued profligacy detailed in **Chapter 4**. The results under both scenarios are only presented in this section if they result in materially different recommendations.

It is important to understand the difference between value for money, which includes economic benefits such as value of time and crowding benefits, versus affordability which is concerned with the financial profitability of an option. Given the prevailing economic climate at the time of the publication of this Draft for Consultation, an option recommended on a value-for-money basis may be deemed unaffordable by the DfT and/or Transport Scotland.

It is against this background that the RUS has evaluated additional opportunities to maximise income and reduce subsidy.

As part of option appraisal each gap is initially considered in isolation and options are developed to address each gap. Gaps and options are then grouped together wherever possible and analysed to determine their likely benefits and costs. Those that are expected to generate the best business case are appraised and are summarised in the next section.

1. Passenger Demand Forecasting Handbook is an industry standard framework for modelling growth, using demand drivers such as UK demographics, economic growth, and the characteristics of competing modes to predict the change in passenger demand.
 2. Operating costs are those associated with employment of drivers and guards and/or the mileages costs associated with maintenance, track access and fuel/electric current for traction resulting from the option.

5. Gaps and options

Generic gaps

The gaps identified in this RUS can be summarised into seven generic categories and are shown in **Table 5.1**. The remainder of this chapter will define

the individual gaps in greater detail, identifying particular issues and summarising the options considered. It will also explain why the preferred option(s) have been recommended where relevant.

Table 5.1 – generic gaps

Gap reference	Gap
OC	On-train capacity
FC	Freight capacity/capability
JT	Journey time
RL	Regional links
RD	Reactionary delay
NA	Network availability
SC	Station capacity passenger handling

1. OC: On-train capacity

On-train capacity gaps are where the current or forecast passenger demand exceeds the train capacity to the extent that it is not possible to meet the DfT standard of seats being available to prevent standing in excess of 20 minutes. Where the journey is less than 20 minutes, crowding is measured against the total capacity of the train, which includes standing room as well as seating.

Chapter 3 identified that there are overcrowding problems on peak short distance suburban trains to and from London at present on the WCML. This is forecast to substantially worsen by 2024, and in the absence of any capacity interventions the services are expected to become extremely overcrowded. This particularly applies to the services south of Northampton, resulting from increased commuting demand into London.

On the long distance services the expected growth detailed in **Chapter 4** suggests that overcrowding will also occur. This applies particularly to services between Birmingham and Scotland and services to and from London Euston which are expected to see a growth in demand of between two and five per cent per annum.

The following gaps have been evaluated later in this chapter:

- suburban crowding to/from London Euston (**OC1**)
- peak crowding on the Watford Junction to West London Line services (**OC2**)
- long distance on-train crowding to/from London Euston (**OC3**)
- on-train crowding on Sundays between Rugby and Crewe (**OC4**)
- on-train crowding between Birmingham, the North West and Scotland (**OC5**).

Gap OC1: Suburban on-train crowding to/from London Euston

Capacity on suburban services on the WCML at London Euston is currently provided by four, eight and 12-car Class 350 and Class 321 sets operated by London Midland and by four-car Class 378 sets operated by London Overground Rail Operations Limited.

Despite the additional capacity provided by the recent introduction of four-car Class 378 sets, passengers are forecast to exceed seated capacity on London Overground Rail Operations Limited services by an average of 25 per cent for the three hour morning peak between Harrow & Wealdstone and London Euston by 2024. This is expected to increase to an average of 82 per cent for the high-peak hour. However, given the high level of short distance journeys made on these services most passengers will stand for less than 20 minutes, and because of the significant increase in standing space following the introduction of Class 378 rolling stock, this doesn't represent serious overcrowding.

As passengers standing for short periods of time (less than 20 minutes) are within the DfT crowding standard, it is recommended that Transport for London monitors the levels of crowding on these services and develops options to reduce this as and when it becomes necessary.

The services between Northampton and London Euston (operated by London Midland) are forecast to be crowded throughout the day. The additional capacity required between the morning and evening peak can be provided by employing the peak period rolling stock which is not used at this time.

In the morning three-hour peak, on average 37 per cent of passengers on trains arriving into London Euston are expected to have to stand by 2024. This is expected to be significantly worse in the

high-peak hour with an average of 56 per cent of passengers exceeding seated capacity. Many of these passengers are forecast to be standing for more than 20 minutes.

The option to lengthen the existing busiest services on this corridor to a maximum of 12-cars has been appraised in option **OC1.1** and there is a good business case to support the introduction of 40 additional vehicles to alleviate crowding on this corridor throughout the day. Most of the services in the high-peak hour already operate at their maximum length and further lengthening is not a viable proposition as it will incur significant infrastructure costs along the route, including platform lengthening and track and signalling layout changes at London Euston. Analysis suggests that a further 1500 seats are required by 2024 in the morning high-peak hour to alleviate crowding.

The current planning of the train service pattern generally segregates 125mph enhanced permissible speed services which have a less frequent station calling pattern to run on the fast lines with 100mph services which have a more frequent local or interurban calling pattern to run on the slow lines. This allows trains to be planned three minutes apart although two 100 mph trains per hour are planned to use the fast lines, which means that the next services to depart have to leave later to avoid catching the preceding slower trains, effectively reducing the number of trains which can run.

A short-term measure to provide limited additional train capacity at London Euston in the high-peak hour is to reduce the speed differential for services operating on the fast lines to/from London Euston. Removing the speed differential will reduce the time required between subsequent trains and allow an additional timetable slot to be utilised, resulting in two additional timetable slots per hour being available to and from London Euston in the high-peak hour.

Although this potentially offers the opportunity to provide more train capacity, with the increased service pattern already in operation in the peak there is a higher risk that performance issues could be created. As with the lengthening option described above, these services may not be able to run at full length because of the platform constraints at London Euston.

Ultimately the provision of a high speed line between London, the West Midlands and beyond towards the end of the RUS period will enable significant amounts of extra capacity on the fast lines to be utilised by commuter services at the south end of the WCML and the RUS views this as the correct solution.

Further work will be undertaken during the consultation period of this RUS to understand the optimum mix of a) strengthening of existing London Midland services in the peaks and b) additional services operating on the fast lines between Northampton and Euston to deliver the maximum crowding benefit.

5. Gaps and options

Assessment of option OC1.1 – lengthening of suburban services	
Gap being addressed	On-train crowding of suburban peak and off-peak services to/from London Euston.
Concept	Lengthening the busiest trains between Northampton and London Euston to a maximum of 12 cars in sets of four-car units, through the provision of 40 additional vehicles (32 if the eight High Level Output Specification ³ vehicles are delivered in Control Period 4 (CP4) as described in Chapter 4).
Operational analysis	High level analysis suggests that 40 vehicles are sufficient, however, detailed analysis will need to be carried out by the incumbent train operating company so that remaining services are not adversely affected.
Infrastructure required	None required as lengthening to a maximum of 12 cars only (or eight cars where lengthening to 12 cars is not possible). However, alterations to depots and sidings might be necessary to accommodate the lengthened rolling stock. The RUS notes that platform capacity at London Euston and Watford Junction is constrained which needs to be considered when deciding on which services to lengthen.
Passenger impact	Increased capacity and reduced crowding on suburban services on the WCML to/from London Euston. London Overground Rail Operations Limited services are not considered as passengers standing for short periods of time are within the DfT guidelines.
Freight impact	No impact.
Financial and economic analysis	The main costs relate to rolling stock leasing and mileage-related costs. The following table outlines the appraisal results:
	30-year appraisal £million (2002 PV)
	Costs (present value)
	Investment cost 0.0
	Operating cost 120.1
	Revenue -99.3
	Other Government impacts 19.9
	Total costs 40.6
	Benefits (present value)
	Rail users benefits 150.9
	Non users benefits 57.2
	Current TOCs revenue 0.0
	Current TOCs/NR opex 0.0
	Total quantified benefits 208.1
	NPV 167.5
	Quantified BCR 5.1
Link to other options	
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available. Analysis has shown that a total of 40 additional vehicles will be sufficient to lengthen most overcrowded trains apart from those arriving into London Euston in the high-peak hour, which are mostly already at the maximum possible formation. Some overcrowding on the remaining services is still expected by the end of the RUS period following this intervention, but passengers are expected to be standing within total train capacity and for less than approximately 20 minutes which is within the DfT guidelines.

3. HLOS refers to the High Level Output Specification consisting of various targets (including reliability, capacity and safety) which the collective rail industry is required to achieve during CP4 or within the passenger franchise duration.

Gap OC2: Peak on-train crowding on the Watford Junction to West London Line services

Chapter 3 demonstrates that there is a peak capacity gap on Milton Keynes Central to East Croydon services between Watford Junction and Clapham Junction in the three-hour peak at present. This is expected to worsen significantly, with an average of 69 per cent of passengers exceeding seated capacity between these stations in the morning three-hour peak by 2024, rising to an average of 131 per cent of passengers exceeding seated capacity in the high-peak hour.

The option to lengthen these services from four to eight-car trains has been developed in the London and South East RUS published as a Draft for Consultation in December 2010. It is recommended for implementation as soon as rolling stock becomes available. The RUS also notes that crowding on these services is exacerbated by an unbalanced frequency of services in the peak. There is a high level of suppressed demand for services on the route which will require provision of additional capacity. Further work is recommended during the consultation period to identify an operationally viable solution to increase the service frequency to two trains per hour in the peaks. This will be presented in the final RUS publication.

Gap OC3: Long distance on train crowding, to/from London Euston

There is crowding on some long distance services at present. **Chapter 4** demonstrated the London Euston to North Wales corridor will have passengers standing by 2024. This overcrowding is less severe in the southbound direction as passengers are expected to stand for less than 20 minutes (between Chester and Crewe). However, the overcrowding in the northbound direction is expected to result in passengers standing for over 20 minutes (between London Euston and Crewe). It was not possible to identify an option with a value-for-money business case to lengthen these services as the expected level of crowding does not justify the high level of operating and leasing costs associated with this option. It is anticipated that the options to provide an additional hourly service between London Euston and the North West (options JT1.1 and JT1.2 faster

journey times between London and Scotland) will alleviate crowding on services between the morning and evening peaks as they will provide passengers with the opportunity to choose an alternative service. Crowding on peak services departing London Euston may be managed by altering the service pattern in the future to provide passengers with greater opportunities to travel. Ultimately, the provision of the high speed line should relieve both track and rolling stock capacity, to enable an additional peak service to operate between London Euston and Crewe.

Despite high levels of investment and following the introduction of additional Class 390 vehicles into the fleet during CP4, there will be too few 11-car trains to completely prevent standing on long distance services by 2024. On average, around 12 per cent of all long distance high speed (LDHS) services to or from London Euston will continue to carry passengers over seated capacity during some part of the journey.

Initially the option to lengthen the busiest services was considered. However, it was estimated that this would have a poor value for money business case due to the high mileage related costs associated with operating the lengthened services throughout the day.

An alternative option to lengthening is to provide an additional hourly LDHS service to and from London Euston, using spare capacity identified within the baseline train fleet, to address the overcrowding and help meet some of the other journey time and connectivity gaps identified later in this chapter. It is expected that this additional service can be accommodated by optimising the train diagrams to maximise efficiencies within the fleet.

Three options have been identified based on an assessment of how the key markets are likely to develop and the appraisal is reported in the journey time section of this chapter as options JT1.1 and JT1.2 (faster journey times London to Scotland) and JT2.1 (faster journey times London to Manchester). All three options propose the running of additional services between Euston and the North West therefore adding capacity which can be used to overcome crowding.

5. Gaps and options

Gap OC4: On-train crowding on Sundays between Rugby and Crewe

The current hourly service between London Euston and Crewe is reduced to a two hourly service north of Rugby on Sundays. Analysis suggests that some overcrowding is expected in the afternoon by 2024.

The options considered are:

1. Lengthen the busiest service to eight cars. This is likely to have a low value-for-money business case as the level of crowding is unlikely to generate sufficient benefits to justify the additional mileage-related costs.
2. Introduce one additional service in the afternoon to eradicate the overcrowding expected during this time. This will incur additional costs as it will include both mileage-related costs and additional staff costs. However, it will provide an increased benefit as the service frequency increase also delivers improved regional connectivity.

It is recommended that the incumbent train operator develop the latter option further with the DfT as demand grows in the future.

Gap OC5: On-train crowding between Birmingham, the North West and Scotland

The expected growth on the Birmingham – Scotland services will result in substantial overcrowding, especially on services operating to or from Edinburgh Waverley.

As shown in **Chapter 3**, there are high levels of boarding and alighting passengers with many passengers making relatively short journeys throughout the route unlike the commuter or the LDHS services to/from London. There is a high value-for-money business case for a maximum of 16 additional vehicles to lengthen a total of 11 services, with most services between Birmingham and Edinburgh requiring lengthening to a maximum of seven cars. There will continue to be some passengers standing on the service, but this is expected to be within total train capacity and compliant with the DfT guidelines of standing for less than 20 minutes (ie between Birmingham New Street and Wolverhampton or Wigan North Western and Preston).

However, the number of additional vehicles required may be reduced by re-allocating Class 390 trains to operate the busiest Birmingham to Edinburgh services and deploying Class 221 trains to other less busy services. The level to which this can be achieved will be determined by the actual service level and pattern agreed for the new franchise.

2. FC: Freight capacity/capability

Freight capacity/capability gaps are those where the ability to run the volume of services or the characteristics of trains required (for example 775-metre long trains) is not possible.

Freight industry growth is expressed in terms of paths (timetable slots) per day using the 2019 and 2030 Strategic Freight Network (SFN) freight forecasts. These forecasts were developed using individual commodity tonnage assessment followed by an evaluation of how many timetable slots would then be required to convey that volume. The assessment made a number of assumptions regarding efficiencies, unconstrained routing and a view on predicted terminal strategy. In addition, a Network Rail assessment of the delivery of the requirements for freight (contained in Appendix C of the former Strategic Rail Authority's West Coast Main Line Strategy, June 2003) was completed, taking into consideration the provision of peak, off-peak, evening and overnight timetable slots. This was then analysed against specific RUS assessments of capacity, which included the perceived impacts of the various options proposed to address gaps in the passenger markets on route capacity.

The following gaps identified by the freight subgroup have been evaluated:

- insufficient freight capacity, specifically between the Stafford area and Carlisle and at Daventry (**FC1**)
- insufficient W12 gauge cleared routes (**FC2**)
- insufficient diversionary W10 cleared routes WCML to Liverpool (**FC3**)
- insufficient capacity accessing the WCML at Nuneaton from the Coventry corridor (**FC4**).

FC: Freight capacity and capability gaps

The assessment of capacity to accommodate freight growth based on the SFN 2019 and 2030 forecasts, found that there is sufficient capacity for the additional timetable slots required (expressed as train paths per day). The assessment assumed that the efficiencies anticipated are delivered and there are no significant effects on freight capacity caused by more passenger trains or amended timetables such as those recommended in this RUS. The assessment has assumed that freight services will operate over a six-day week with longer trains of up to 775 metres in length conveying more volume thus reducing the additional timetable slots needed. The assessment also assumes that the committed CP4 interventions on the route detailed in **Chapter 4** will transpire.

As no timetable conflicts were identified, there are no specific gaps for the RUS to consider. However, the following options should be considered if additional capacity is ultimately required as a result of growth outstripping the forecasts or if the assumptions made with regard to the characteristics of freight operation do not materialise, or if changed passenger train requirements affect the timetable to a significant degree:

- closing the differential speed capabilities between services, to increase the time window available for freight services
- potential portion working of LDHS services between regional centres and Scotland providing capacity on the predominantly two-track section of the route north of Preston
- the provision of new, or the lengthening of current loops not capable of handling 775-metre freight trains which would be required to support the timetable
- providing new loop facilities, with generic properties such as entry, exit and running speeds of 40mph ideally capable of accommodating two 775-metre trains
- provide a facility at Carlisle to loop 775-metre trains and raise the speed capability for services for Scotland which are routed through Kingmoor Yard which currently has extensive sections where 10mph is the maximum speed
- potential interventions between Carlisle and Mossend will be considered and reported in the final publication.

Another option is the utilisation of more electric traction for freight services along the route, considering the wider industry business case. This will require further infill electrification of the network and electrification of terminals and depots to enable end-to-end electrically hauled journeys to be available. Terminals will need to be able to handle the arrival and departure and loading of suitable length trains without the need for splitting or propelling. This issue needs to be viewed in the context of the locomotive fleet replacement strategy.

In all cases, development of business cases is reliant on sufficient timetable detail which outlines the specific conflicts in order to develop and justify suitable interventions.

Gap FC1: Insufficient freight capacity, specifically between the Stafford area and Carlisle and at Daventry

The assessment of available access identifies sufficient capacity for freight as outlined in the freight capacity and capability section. It should be noted that delivery of the Stafford area capacity enhancement schemes are necessary for freight growth in this area and are assumed as being

committed schemes in the baseline. No specific options have been identified due to the lack of specific timetable conflicts being identified.

Industry representatives, including signalling, operations and timetabling professionals have been consulted and some specific infrastructure enhancements have been suggested which should be progressed through normal industry processes.

At Daventry, there is planned phased, extensive growth of the terminal facilities. The RUS recommends that as part of the planning consents for the terminal expansion, designs need to cater for all growth in train numbers and lengths, including during peak times, with facilities to receive, load/unload, stable and despatch services without consequent impact on the operation of the main line railway.

Gap FC2: Insufficient routes gauge cleared to W12

No specifics have been considered by the RUS, with W12 being a future aspiration and in line with the SFN strategy. The RUS supports the principle of the provision of W12 gauge where possible as part of any renewal or enhancement of existing structures.

Gap FC3: Insufficient diversionary W10 cleared routes West Coast Main Line to Liverpool

The scheme to deliver the electrification of the Chat Moss route between Manchester and Liverpool via Earlestown is specified to deliver the diversionary route into the Liverpool area as part of the baseline. It is anticipated that this project will be delivered in two sections, between Manchester and the WCML by Dec 2013 with the western section from the WCML into Liverpool by December 2014

Gap FC4: Insufficient capacity accessing Nuneaton from the Coventry corridor

The three-track section between Brinklow Junction and Attleborough Junction is considered to be a constraint on timetable development of the route. The freight subgroup considered that one way of accommodating freight growth would be to operate northbound freight services via Coventry and Nuneaton. However, this could potentially move the constraint to Coventry where diverted services would have to cross an intensive southbound passenger service. Equally accessing the northbound slow line at Nuneaton is problematic as the Coventry to Nuneaton passenger service has a long layover in the bi-directional platforms 1 or 2 at Nuneaton which could conflict with these rerouted freight services. As it is anticipated that the quantum of freight growth can be accommodated on the core route this option is not recommended.

3. JT: Journey time

Gaps in the journey time category refer to aspirations for reduced travel time between key locations. Long distance services are a high priority. Given the current economic climate and following the level of investment involved in the West Coast Main Line Route Modernisation Programme, large scale infrastructure interventions are unlikely to be affordable. In addition, the RUS process is duty bound to consider other interventions, such as timetable solutions, before infrastructure enhancements. Therefore, the strategy considers alternatives to infrastructure solutions to reduce journey time, including altering stopping patterns and examining the possibility to reduce extra time allowances in the timetable. The RUS suggests that all opportunities to raise linespeeds and reduce journey times are examined as signalling, track and switches and crossings renewals are undertaken.

The gaps considered in this RUS following substantial subgroup and stakeholder consultation are:

- faster journey times between London and Scotland and London and Manchester (JT1 and JT2)
- faster journey times between London and the North West and Nuneaton/Lichfield/Tamworth (JT3)
- faster journey times between Birmingham and Manchester (JT4)
- additional faster services between London and Rugby (JT5).

The development of options to address these gaps results in a package of measures relating to amended or additional services. These have been grouped into timetable options.

Gaps JT1 and JT2: Faster journey times between London and Scotland and London and Manchester

There is considerable stakeholder interest in improving the journey time for services between London and Scotland and London and Manchester. Given the current economic climate funding is likely to be limited for infrastructure schemes, therefore the options considered for decreasing journey time relate to either removal of station stops from the service pattern or providing an increase in frequency, thus providing an improvement in generalised journey time.⁴

Ultimately one of the main objectives of the Government proposal to provide a new high

speed network will enable a fast service between conurbations on the route with phase one (proposal of a high speed line from London to the West Midlands) expected to deliver the following:

- London – Birmingham journey time reduced from the current 84 minutes to approximately 49 minutes
- London – Manchester journey time reduced from the current 128 minutes to approximately 100 minutes
- London – Liverpool journey time reduced from the current 128 minutes to approximately 110 minutes
- London – Glasgow journey time reduced from the current 271 minutes to approximately 240 minutes.

Given the size of the existing rail passenger market served by the high speed network proposals, it is believed that an improvement in journey time will promote even greater rail travel between the centres shown, as rail becomes more competitive with both road and air. The options detailed in JT1.1, JT1.2 and JT2.1 have been developed and appraised to improve journey times in the interim.

Options JT1.1 and JT1.2 (faster journey times from London to Scotland) and option JT2.1 (faster journey times from London to Manchester) do not require additional rolling stock or incur infrastructure costs as it is believed that the additional hourly off-peak service can be accommodated within the baseline rolling stock fleet. In addition timetable modelling for the options to decrease journey times between London and Scotland shows that although some conflicts exist, these can be managed through the timetable development process.⁵

The first option assessed as JT1.1 (faster journey times between London and Scotland) is the removal of all calls apart from Preston in the off-peak London Euston – Glasgow Central services, thereby reducing the London – Glasgow journey time by 23 minutes to 248 minutes. The lost connectivity to Warrington Bank Quay and Wigan North Western would be replaced with a new off-peak service to or from London. This new service would additionally call at a number of intermediate stations, including Milton Keynes Central and Crewe. These service changes would reduce load factors helping to meet gap OC3 (long distance on train crowding to/from London Euston) by redistributing passengers for the intermediate stops.

4. Generalised journey time represents the total journey time experienced by rail passengers, including the in-vehicle time and penalties for wait time, calculated by considering frequency of service and interchange requirements.

5. Future increase to freight or passenger services requires the remodelling of the Stafford area to increase capacity as outlined in Chapter 4.

The second option assessed as **JT1.2** (faster journey times between London and Scotland) is the removal of Warrington Bank Quay and Wigan North Western and alternately Lancaster or Carlisle calls from the off-peak London Euston – Glasgow Central services, thereby reducing the London – Glasgow journey time by 17 minutes to 254 minutes. The lost connectivity to Warrington Bank Quay and Wigan North Western would be replaced with a new off-peak service to or from London. These service changes would also help to meet gap **OC3**.

The third option assessed as **JT2.1** (faster journey times between London and Manchester) is to increase the off-peak London Euston – Manchester Piccadilly service frequency from three to four trains per hour, with the new service calling only at Stockport offering a fast 1 hour 58 minute journey time London – Manchester. Increasing the London Euston – Manchester Piccadilly service frequency also means that fewer 11-car train sets are required to address overcrowding. The remaining 11-car sets can be used to provide additional

capacity elsewhere. No operational analysis has been undertaken although the complexities of timetabling such a service on the busy Stockport to Manchester Piccadilly corridor are recognised.

Analysis of the business case for these options suggest that the latter two options both have a good business case but require a small subsidy, albeit with the potential to turn this into a net revenue increase through increased capture of the domestic air market. It is therefore not possible to conclude at this stage which is preferred, particularly given current Government spending policy, and recommendation in the strategy is conditional on further work during the RUS consultation period and the pending WCML refranchising process.

Further, more expensive, incremental capacity improvements have not been considered in detail as Network Rail, High Speed Two Limited and the DfT have already examined this, concluding that a new line is the preferred strategy.

5. Gaps and options

Assessment of option JT1.1 – improved journey times between London Euston and Glasgow Central – 248 minutes.																																	
Gap being addressed	Faster journey times between London and Scotland.																																
Concept	<p>Alter the calling pattern of the existing London Euston – Glasgow Central service to provide a fast two hourly service only calling at Preston. This will reduce the existing journey time to 248 minutes (saving a total of 23 minutes). To compensate stations such as Warrington Bank Quay, Wigan North Western, Lancaster etc for the loss of frequency, an additional hourly service will be run with alternate hour calling pattern to a northern destination. Options may include Liverpool, Blackpool, Lancaster or other North West destinations dependent on the value of the market. This additional service would call at stations on a two hourly pattern as detailed below:</p> <p>1) London Euston, Milton Keynes Central, Rugby, Nuneaton, Crewe, Warrington Bank Quay, Wigan North Western and Preston</p> <p>2) London Euston, Watford Junction, Rugby, Tamworth, Lichfield Trent Valley, Crewe, Warrington Bank Quay, Wigan North Western, Preston (not calling at Preston if Liverpool is the destination).</p>																																
Operational analysis	This can be timetabled in the northern direction from London Euston, but will require a timetable recast in the southern direction.																																
Infrastructure required	None.																																
Passenger impact	Improved journey times between London Euston, Preston and Glasgow Central and increased frequency between London, Preston and Glasgow Central. Some reduction in overcrowding on the intermediate stops between London and the North West.																																
Freight impact	None foreseeable in terms of the capacity assessment, however some flexing of freight services is necessary, but the timetable recast should make sure that no disbenefits occur for freight services as a result.																																
Financial and economic analysis	The main costs relate to mileage and train crew. The following table outlines the appraisal results:																																
	<table><tr><th>10-year appraisal</th><th>£million (2002 PV)</th></tr><tr><td colspan="2">Costs (present value)</td></tr><tr><td>Investment cost</td><td>0.0</td></tr><tr><td>Operating cost</td><td>82.8</td></tr><tr><td>Revenue</td><td>-31.5</td></tr><tr><td>Other Government impacts</td><td>5.5</td></tr><tr><td>Total costs</td><td>56.9</td></tr><tr><td colspan="2">Benefits (present value)</td></tr><tr><td>Rail users benefits</td><td>48.5</td></tr><tr><td>Non users benefits</td><td>15.7</td></tr><tr><td>Current TOCs revenue</td><td>0.0</td></tr><tr><td>Current TOCs/NR opex</td><td>0.0</td></tr><tr><td>Total quantified benefits</td><td>64.2</td></tr><tr><td colspan="2">NPV</td><td>7.3</td></tr><tr><td colspan="2">Quantified BCR</td><td>1.1</td></tr></table>	10-year appraisal	£million (2002 PV)	Costs (present value)		Investment cost	0.0	Operating cost	82.8	Revenue	-31.5	Other Government impacts	5.5	Total costs	56.9	Benefits (present value)		Rail users benefits	48.5	Non users benefits	15.7	Current TOCs revenue	0.0	Current TOCs/NR opex	0.0	Total quantified benefits	64.2	NPV		7.3	Quantified BCR		1.1
	10-year appraisal	£million (2002 PV)																															
	Costs (present value)																																
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	Current TOCs revenue	0.0																															
	Current TOCs/NR opex	0.0																															
	Total quantified benefits	64.2																															
NPV		7.3																															
Quantified BCR		1.1																															
Note: The alternative of a London Euston to Liverpool service has a weaker business case (less than 1.0) as passengers from Wigan North Western and Preston are not compensated for the loss of service frequency. The market between Glasgow and London is dominated by domestic air competition. In these markets rail demand is expected to be more elastic to journey time improvements. There is evidence supporting higher journey time elasticity on rail flows between Glasgow and London. ⁶ A sensitivity analysis using this higher elasticity results in an extra 48,000 annual journeys and £3.8 million in revenue. This increases the benefit to cost ratio to 2.3. Further analysis of the application of this elasticity will be undertaken during the consultation period.																																	

Assessment of option JT1.1 – improved journey times between London Euston and Glasgow Central – 248 minutes.	
Link to other options	<p>JT1.2: Improved journey times between London Euston and Glasgow Central – 254 minutes</p> <p>JT2.1: Improved journey times between London Euston and Manchester Piccadilly</p> <p>JT5: Additional service calling at Rugby</p> <p>RL4, RL5, RL6: Lack of direct services between Watford Junction, Milton Keynes Central, Northampton, Rugby and the North West.</p>
Conclusion	<p>Once the potential benefits of modal shift are incorporated in the option, there is a high value for money business case. Although this option provides connectivity benefits, the operating costs significantly outweigh the revenue generated, resulting in additional subsidy of around £4 million per annum. This option is also inferior to options JT1.2 and JT2.1 and is therefore not recommended for implementation.</p>

5. Gaps and options

Assessment of option JT1.2 – improved journey times between London Euston and Glasgow Central – 254 minutes	
Gap being addressed	Faster journey times between London and Scotland.
Concept	<p>Alter the calling pattern of the existing hourly London Euston – Glasgow service by removing calls at Warrington Bank Quay and Wigan North Western, and also Lancaster in one hour and Carlisle in the alternate hour. This results in a journey time of 254 minutes (saving 17 minutes in total). To compensate for the loss of frequency at Warrington Bank Quay and Wigan North Western, run additional hourly services to a northern destination. Liverpool is not tested as a destination as it is expected to have a weaker business case (see JT1.1). Options may include Blackpool, Lancaster or other North West destinations dependent on the value of the market. This additional service would call at stations on a two hourly pattern as detailed below:</p> <ol style="list-style-type: none"> 1) London Euston, Milton Keynes Central, Nuneaton, Warrington Bank Quay, Wigan North Western and Preston. 2) London Euston, Milton Keynes Central, Crewe, Warrington Bank Quay, Wigan North Western and Preston.
Operational analysis	This is currently able to be timetabled in the northern direction from London Euston, but will require a timetable recast in the southern direction.
Infrastructure required	None.
Passenger impact	Overcrowding is reduced as a consequence of redistributing London – North West passengers over twice as many trains. Improved journey times between London, Glasgow and Preston, as well as increased frequency for stations between London and Glasgow, including Nuneaton, Milton Keynes, Preston and Oxenholme. Passengers travelling between Glasgow and Carlisle, Lancaster, Warrington Bank Quay and Wigan North Western will have reduced opportunities to travel directly between these stations.
Freight impact	None foreseeable in terms of the capacity assessment, however some flexing of freight services is necessary, but the timetable recast should make sure that no disbenefits occur for freight services as a result.

Assessment of option JT1.2 – improved journey times between London Euston and Glasgow Central – 254 minutes

Financial and economic analysis	The main costs relate to mileage and train crew. The following table outlines the appraisal results:		
	10-year appraisal period, weekday count data	Hourly north west	Hourly north west, inc. modal shift from air
	Costs (present value)		
	Investment cost	0.0	0.0
	Operating cost	95.0	95.0
	Revenue	-69.1	-106.7
	Other Government impacts	12.7	12.7
	Total costs	38.5	1.0
	Benefits (present value)		
	Rail users benefits	84.4	84.4
	Non users benefits	31.8	31.8
	Current TOCs revenue	0.0	0.0
	Current TOCs/NR opex	0.0	0.0
	Total quantified benefits	116.2	116.2
	NPV	77.6	115.2
	Quantified BCR	3.0	Financially neutral
	<p>Note: All figures are presented in 2002 market prices.</p> <p>This option provides a high value for money business case. As explained in option JT1.1: Improved journey times between London Euston and Glasgow Central – 248 minutes, the market between Glasgow and London is dominated by domestic air competition. In these markets rail demand is expected to be more elastic to journey time improvements. Using a higher journey time elasticity on rail flows between Glasgow and London, the business case improves significantly, to the extent that it becomes financially neutral. The applicability of the elasticity will be investigated further in the consultation period.</p> <p>Note: This additional service can be operated within the baseline fleet. It has been advised by the DfT that the leasing costs for operating this service should not be considered as all additional vehicles have already been procured and are committed.</p>		
Link to other options	<p>JT1.1: Improved journey times between London Euston and Glasgow Central – 248 minutes</p> <p>JT2.1: Improved journey times between London Euston and Manchester Piccadilly</p> <p>JT5: Additional service calling at Rugby</p> <p>RL4, RL5, RL6: Lack of direct services between Watford Junction, Milton Keynes Central, Northampton, Rugby and the North West.</p>		
Conclusion	<p>Once the potential benefits of modal shift are incorporated in the option, there is a very high value for money business case. Under this scenario the option breaks even financially to the Government, but is financially positive to the franchisee. This option is recommended for further development as it also has many of the connectivity benefits identified by wider stakeholders. It is conditional on further work during the RUS consultation period and WCML refranchising process, which includes:</p> <ul style="list-style-type: none"> continued monitoring of the impact of the December 2008 timetable on passenger demand and train loads improving the industry's understanding of the potential for small and medium journey time reductions to stimulate a switch from domestic air to rail travel not using the four additional Class 390 train sets elsewhere on the network. 		

5. Gaps and options

Assessment of option JT2.1 – improved journey times between London Euston and Manchester Piccadilly.			
Gap being addressed	Faster journey times between London and Manchester.		
Concept	By redeployment of Class 390 diagrams run an additional fast hourly London Euston to Manchester Piccadilly service, resulting in four trains per hour between these cities. The new service is expected to additionally call at Stockport, achieving a total journey time of 118 minutes. This is expected to generate the highest revenue benefits, over and above any other city pairs on the WCML based on present experience.		
Operational analysis	No operational analysis has been undertaken at this stage, however a timetable recast would be necessary and the complexities of accommodating this service on the busy Stockport to Manchester Piccadilly corridor are recognised.		
Infrastructure required	None – subject to timetable and operational appraisal.		
Passenger impact	Increasing the London Euston – Manchester Piccadilly service frequency means that fewer of the 11-car train sets are required to address overcrowding on this service group and can be used to provide additional capacity elsewhere. Improved journey times between London, Stockport and Manchester. However, there may be a dis-benefit to the passengers using the local service as these are likely to require a timetable recast. A reduction in crowding to and from London.		
Freight impact	None foreseeable, but the timetable recast should make sure that no disbenefits occur for freight services as a result of this.		
Financial and economic analysis	The main costs relate to mileage and train crew. The following table outlines the appraisal results:		
	10 year appraisal period, weekday count data	Hourly Manchester	Hourly Manchester, inc. modal shift from air
	Costs (present value)		
	Investment cost	0.0	0.0
	Operating cost	81.4	81.4
	Revenue	-63.3	-117.7
	Other Government impacts	11.6	11.6
	Total Costs	29.7	-24.7
	Benefits (present value)		
	Rail users benefits	65.2	65.2
	Non users benefits	24.7	24.7
	Current TOCs revenue	0.0	0.0
	Current TOCs/NR opex	0.0	0.0
	Total quantified benefits	89.9	89.9
	NPV	60.2	114.6
	Quantified BCR	3.0	Financially positive
	<p>Note: All figures are presented in 2002 market prices.</p> <p>This option provides a high value for money business case. The market between London and Manchester has an element of domestic air competition. In these markets rail demand is expected to be more elastic to journey time improvements. Using the higher journey time elasticity on rail flows between Manchester and London the business case improves significantly, to the extent that it becomes financially positive. The applicability of the elasticity will be further investigated during the consultation period.</p> <p>Note: This additional service can be operated within the baseline fleet. It has been advised by the DfT that the leasing costs for operating this service should not be considered as all additional vehicles have already been procured and are committed.</p>		

Assessment of option JT2.1 – improved journey times between London Euston and Manchester Piccadilly

Link to other options	<p>JT1.1: Improved journey times between London Euston and Glasgow Central – 248 minutes</p> <p>JT1.2: Improved journey times between London Euston and Glasgow Central – 254 minutes</p> <p>JT5: Additional service calling at Rugby</p> <p>RL4, RL5, RL6: Lack of direct services between Watford Junction, Milton Keynes Central, Northampton, Rugby and the North West.</p>
Conclusion	<p>Once the potential benefits of modal shift are incorporated in the option, there is a very high value for money business case. Under this scenario the option becomes financially positive. Although it doesn't have the connectivity benefits identified in the previous two options, this option is recommended for further development as it has the greatest potential for maximising revenue. It is conditional on further work during the RUS consultation period and WCML refranchising process, comprising:</p> <ul style="list-style-type: none"> • continued monitoring of the impact of the December 2008 timetable on passenger demand and train loads • improving the industry's understanding of the potential for small and medium journey time reductions to stimulate a switch from domestic air to rail travel • not using of the four additional units elsewhere on the network.

Gap JT3: Faster journey times between London/the North West and Nuneaton/Lichfield/Tamworth

With the implementation of the December 2008 timetable, a number of station calls in various services were withdrawn in order to speed up end-to-end journey times. An alternative slow line interurban service between London Euston to Crewe was introduced, calling at most intermediate stations. Although this maintained a degree of connectivity, it also increased journey times to and from a number of stations (except during peak hours where station calls were maintained on long distance high speed services to and from London).

Two options have been considered to address this gap:

1. An additional hourly long distance high speed service between London and the North West calling at Lichfield Trent Valley and Tamworth. This option has a poor value-for-money business case and is not recommended for implementation (see option **JT1.1:** Improved journey times between London Euston and Glasgow Central – 248 minutes).
2. Reducing the journey time on the existing London Euston to Crewe interurban services by rerouting them from Stafford direct to Crewe, not calling at Stone, Stoke-on-Trent, Kidsgrove and Alsager. Then extending the service group to the North West rather than terminating at Crewe. This is detailed in option **JT3.1** overleaf and illustrated in **Figure 5.1**.

5. Gaps and options

Assessment of option JT3.1 – divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe	
Gap being addressed	Faster journey times between London/North West and Nuneaton/Lichfield/Tamworth.
Concept	Stage 1 diverts the existing London Euston to Crewe interurban service from Stafford direct to Crewe via the WCML, not calling at Stone, Stoke-on-Trent, Kidsgrove and Alsager. Stage 2, extends the service to Liverpool Lime Street via Runcorn to optimise fleet utilisation. This is illustrated in Figure 5.1 .
Operational analysis	High level timetable analysis suggests that it is possible to implement this option currently. However, further work needs to be undertaken to assess the impacts on capacity at Liverpool Lime Street, including the additional services outlined in the Northern RUS – published as a Draft for Consultation in October 2010.
Infrastructure required	None, noting the operational analysis required regarding capacity at Liverpool Lime Street.
Passenger impact	Faster journeys from Trent Valley stations between Rugby and Stafford to the north, and direct services between the North West and stations south of Crewe ie between Liverpool Lime Street and Milton Keynes Central/Watford Junction. This also provides an additional direct hourly service between London and Liverpool. However, there is a disbenefit to passengers travelling between local stations and Stoke-on-Trent.
Freight impact	May impact on freight, with minor timing changes on the slow lines between Stafford and Crewe.
Financial and economic analysis	The main costs relate to mileage. There are no additional rolling stock or train crew requirements as the diversion away from Stoke-on-Trent offsets the additional costs of extending the service. However, there is a subsequent reduction in connectivity at Stoke-on-Trent and therefore the option is developed further and appraised as a combination package with option JT4.1 : Reroute an existing long distance high speed service between Birmingham and Manchester to operate via Crewe. The combined option is shown as JT4.2 : service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity. The following table outlines the appraisal results for both stage 1 and stage 2:
	30-year appraisal £million (2002 pV)
	Costs (present value)
	Investment cost 0.0
	Operating cost 14.2
	Revenue -10.6
	Other Government impacts 2.0
	Total Costs 5.5
	Benefits (present value)
	Rail users benefits 30.1
	Non users benefits 8.0
	Current TOCs revenue 0.0
	Current TOCs/NR opex 0.0
	Total quantified benefits 38.1
	NPV 32.6
	Quantified BCR >5.0
	Note: Altering Stage 2 to extend the service to Preston or Liverpool Lime Street via Warrington Bank Quay (rather than Runcorn), reduces the business case to medium value for money. This is due to the higher costs associated with these options as they incur additional rolling stock and crew costs.
Link to other options	JT4.1 : Reroute existing LDHS service between Birmingham and Manchester to operate via Crewe JT4.2 : Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity RL3.1 : Extend existing Derby to Crewe service to Manchester Airport RL2.1 : Additional calls in Euston – Lancaster/Glasgow service at Winsford/Hartford and Acton Bridge RL2.3 : Extend existing Euston to Crewe interurban service to Warrington Bank Quay.
Conclusion	This option will be further developed in the consultation period as part of the combination option presented in JT4.2 : Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity. The analysis will take into account the capacity available at Liverpool Lime Street.

Gap JT4: Faster journey times between Birmingham and Manchester

There is a stakeholder aspiration to improve connectivity and journey times between Birmingham

and Manchester. The preferred optimal option (in terms of providing maximum financial and economic benefits) requires alteration to one of the existing Birmingham – Manchester LDHS services.

Assessment of option JT4.1 – reroute existing long distance high speed service between Birmingham and Manchester to operate via Crewe.	
Gap being addressed	Faster journey times between Birmingham and Manchester.
Concept	Divert the slower of the two existing LDHS services connecting Birmingham and Manchester (the service from Bournemouth) from the Stoke-on-Trent route to operate via Wilmslow. This is illustrated in Figure 5.1 .
Operational analysis	Due to the mix of LDHS and local services, journey times between Birmingham and Manchester for the two LDHS services on the route via Stoke-on-Trent vary, with one service running more slowly behind local trains. Detailed timetables have not been developed for the alternative routing but a journey time saving of between 13 and 19 minutes northbound and two and eight minutes southbound are believed to be achievable.
Infrastructure required	None.
Passenger impact	Faster journey times between Birmingham and Manchester, however, there is a loss of connectivity for passengers between Birmingham and Stoke-on-Trent.
Freight impact	Potential impact on freight between Norton Bridge and Cheadle Hulme (via Crewe).
Financial and economic analysis	This is a cost neutral option as the only impact is a marginal change in mileage-related costs. However, this option creates a gap in services for passengers at Stoke-on-Trent and is appraised as a combination package with option JT3.1 : Service alteration to the existing interurban service between London Euston and Crewe. The table outlines the appraisal results, assuming the maximum journey time benefits are achieved:
	30-year appraisal £million (2002 pV)
	Costs (present value)
	Investment cost 0.0
	Operating cost 1.4
	Revenue -12.6
	Other Government impacts 2.1
	Total costs -9.1
	Benefits (present value)
	Rail users benefits 14.5
	Non users benefits 4.8
	Current TOCs revenue 0.0
	Current TOCs/NR opex 0.0
	Total quantified benefits 19.3
	NPV 28.4
	Quantified BCR Financially positive
	Note: The business case changes from being financially positive to marginally negative in both financial and economic terms if only the minimum savings in journey time are achieved.
Link to other options	JT3.1 : Service alteration to the existing interurban service between London and Crewe, JT4.2 : Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity.
Conclusion	This option will be further developed in the consultation period as part of the combination option presented in JT4.2 : Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity.

5. Gaps and options

While option **JT4.1** presents a good business case for improved journey times between Birmingham and Manchester, it creates a disbenefit to passengers in the Stoke-on-Trent area. When combined with the proposal in option **JT3.1** to reroute the London Euston to Crewe interurban service via the WCML between Stafford and Crewe, it creates a gap in the level of service between Stoke-on-Trent and the West Midlands. A combined option which includes the journey time benefits of options **JT3.1** and

JT4.1 while seeking to reduce the disbenefits to passengers in the Stoke-on-Trent area has therefore been appraised. This option also incorporates option **RL3.1** the extension of the Derby to Crewe services to Wilmslow and Manchester Airport in order to provide a direct service from the East Midlands and towns in the Potteries to Manchester Airport. This combined option is described under **JT4.2**, and illustrated in **Figure 5.1** on page 100.

Assessment of option JT4.2 – service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity (options JT3.1 and JT4.1).

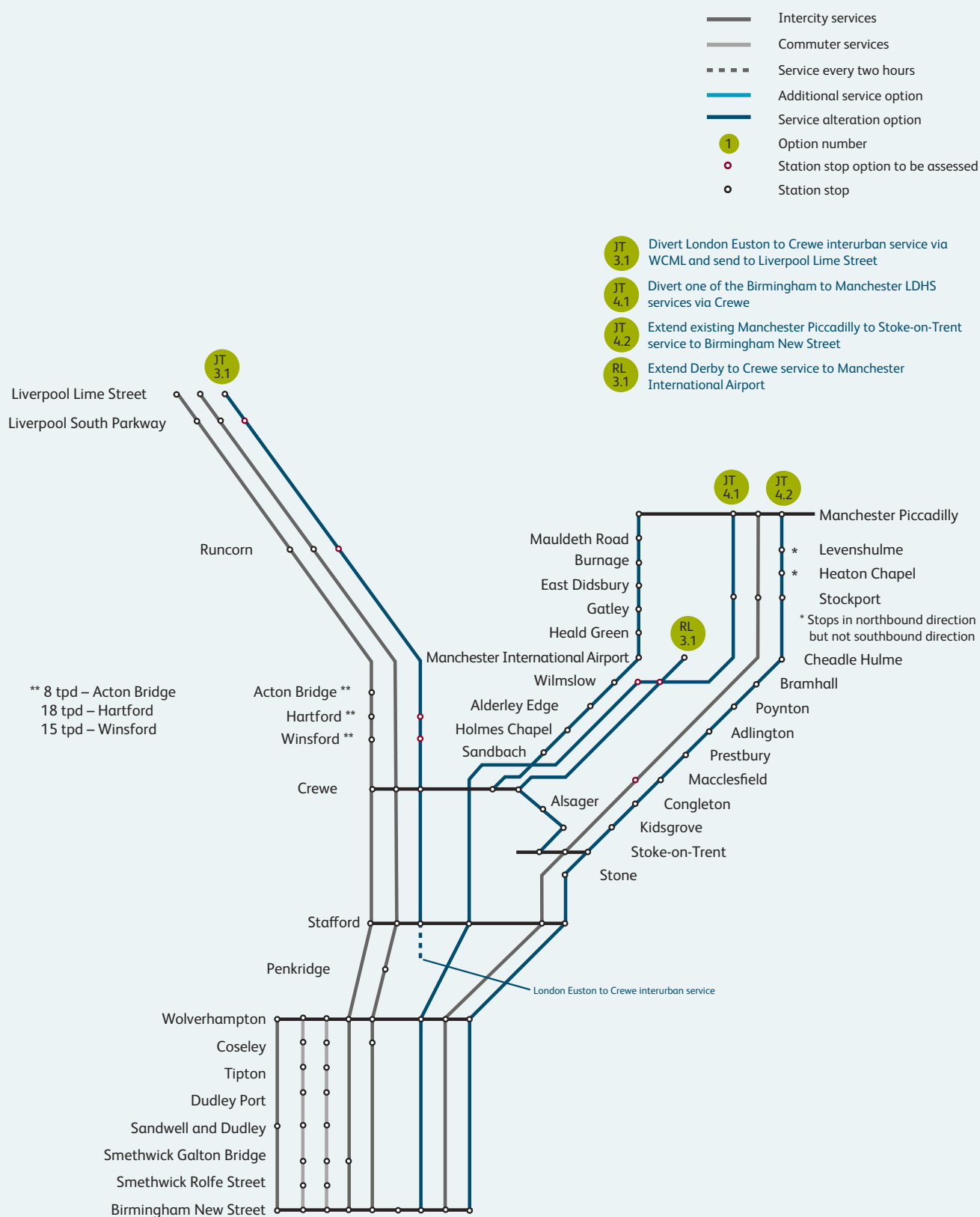
Gap being addressed	Faster journey times between Birmingham and Manchester. Reduced capacity between Birmingham, Stafford, Stoke-on-Trent and Macclesfield (created through options JT3.1 and JT4.1)
Concept	Address the subsequent reduction in capacity between Birmingham, Stafford, Stoke-on-Trent and Macclesfield (created through options JT3.1 and JT4.1) by extending the existing Manchester to Stoke-on-Trent service to Birmingham New Street via Stone, Stafford and Wolverhampton. An alternative proposition to this is to extend the existing Manchester Piccadilly to Crewe (via Manchester Airport) service to Stoke-on-Trent and Birmingham New Street. The option is inferior to the option of extending the Manchester Piccadilly to Stoke-on-Trent service via Macclesfield to Birmingham New Street as it does not compensate Stockport or Macclesfield stations for their loss of frequency. This is illustrated in Figure 5.1 . This combination also includes option RL3.1 , the extension of the Derby to Crewe services to Wilmslow and Manchester Airport in order to provide a direct service from the East Midlands and towns in the Potteries to Manchester Airport.
Operational analysis	Due to the mix of LDHS and local services the timings for the two LDHS services on the route via Stoke-on-Trent vary, with one service running more slowly than the other behind local trains. Detailed timetables have not been developed for the alternative routing but a journey time saving of between 13 and 19 minutes northbound and two and eight minutes southbound are believed to be achievable. Further work needs to be undertaken to assess the impacts of JT3.1 (divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe, and extend to Liverpool Lime Street) on capacity at Liverpool Lime Street, including the additional services outlined in the Northern RUS. Further analysis needs to be undertaken to assess the capacity constraints at Birmingham New Street, Manchester Piccadilly and on the Wolverhampton to Birmingham corridor. Capacity is constrained along this mainly two-track corridor, due to the volume of services, differential speed capability of trains and differing stopping patterns, resulting in planning for additional services being complex.
Infrastructure required	None.
Passenger impact	Faster journeys from local stations between Rugby and Stafford to the North, and direct services between the North West and stations south of Crewe ie between Liverpool Lime Street and Milton Keynes Central/Watford Junction. This also provides an additional direct hourly service between London and Liverpool. Improved journey times between Birmingham and Manchester. Also, maintaining connectivity between Birmingham, Stafford, Stoke-on-Trent, and addressing the gap created in JT3.1 Service alteration to the existing interurban service between London Euston and Crewe and JT4.1 . Improved connectivity between the East Midlands and Manchester Airport.
Freight impact	Potential impact on freight between Norton Bridge and Cheadle Hulme (via Crewe).

Assessment of option JT4.2 – Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester interurban service to improve journey times and connectivity (options JT3.1 and JT4.1).

Financial and economic analysis	The following table outlines the appraisal results for the maximum journey time benefits together with the rerouting and extension of the services.	
	30-year appraisal	£million (2002 pV)
	Costs (present value)	
	Investment cost	0.0
	Operating cost	77.6
	Revenue	-52.4
	Other Government impacts	8.9
	Total Costs	34.1
	Benefits (present value)	
	Rail users benefits	81.2
	Non users benefits	23.6
	Current TOCs revenue	0.0
	Current TOCs/NR opex	0.0
	Total quantified benefits	104.8
	NPV	70.7
	Quantified BCR	3.1
	Changing the assumption to include the minimum journey time savings between Birmingham and Manchester continues to provide a high value-for-money case. However, under this assumption, the business case changes to medium value-for-money if demand is forecast to grow at the rates estimated for the continued profligacy scenario.	
Link to other options	JT3.1: Service alteration to the existing interurban service between London and Crewe. JT4.1: Reroute an existing LDHS service between Birmingham and Manchester to operate via Crewe. RL3.1: Extend existing Derby to Crewe service to Manchester Airport	
Conclusion	This option is recommended for further development to understand the available capacity on the route, especially between Birmingham New Street and Wolverhampton. Further analysis is also required to understand capacity and platform availability at Birmingham New Street, Liverpool Lime Street and potentially at Manchester Piccadilly if timings are altered.	

5. Gaps and options

Figure 5.1 – illustration of the combined intervention JT4.2: service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity



Gap JT5: Additional faster services between London and Rugby

The two most viable options considered are:

1. To call the existing London Euston to Glasgow Central service additionally at Rugby. The disbenefits to longer distance passengers far outweigh the benefits to passengers at Rugby resulting in a net disbenefit and poor value-for-money business case. In addition, this option contradicts the journey time aspirations presented in JT1 (faster journey times between London and Scotland) and so it is not recommended.
2. Provide an additional hourly LDHS service between London and the North West calling at Rugby. This option has a lower value-for-money business case than the alternate options tested and is not recommended for implementation (see option JT2.1: Improved journey times between London Euston and Glasgow Central – 248 minutes).

No other options have been identified for this gap. Ultimately, the provision of a high speed line between London, Birmingham and the north towards the end of the RUS period will provide significant amounts of extra capacity on the fast lines to be utilised by commuter services on the south end of the WCML.

4. RL: Regional links

Regional links gaps refer to aspirations for improved connectivity both within the WCML RUS area as well as to key locations beyond the geographic scope of the RUS.

Regional planning strategies place emphasis on links between key regional hubs, particularly where current service levels do not promote a competitive position for rail. Several regional links gaps were created with the implementation of the December 2008 timetable, when calling patterns were changed to speed up long distance journey times. The following gaps have been appraised:

- irregular service between London and Crewe via the Trent Valley⁷ during the peak in the northbound direction (RL1)
- lack of direct services between Winsford/Hartford and Warrington (RL2)
- lack of direct services between Manchester Airport and towns in the Potteries⁸ (RL3)
- lack of direct services between Watford/Milton Keynes/Northampton/Rugby and the North West of the RUS area (RL4, RL5, RL6, RL7)

- irregular services or no direct services between the North West (Manchester and Liverpool respectively) and Scotland (RL8)
- poor frequency of services (when compared to other cities of a similar size and population) between London and Liverpool (RL9)
- poor frequency of direct services between Lockerbie and Glasgow/Edinburgh (RL10)
- sub-optimal connectivity at Carlisle between the WCML and the Cumbrian coast (between Carlisle and Barrow-in-Furness via Workington), Newcastle, Leeds and the Glasgow and South Western route to Dumfries and Kilmarnock (RL11)
- gap in the morning peak timetable for fast services between the West Midlands and Milton Keynes Central (RL14).

Gap RL1: Irregular service from London to Crewe via the Trent Valley during the peak

Following the implementation of the December 2008 timetable, the new interurban service between London Euston and Crewe provides the local stations with an improved level of connectivity. However, in the peak hours it is not possible to operate this service, resulting in a large gap in service for passengers wishing to travel to one of the smaller stations from the south. Stakeholders feel that this is constraining growth at these stations. Nuneaton, Tamworth and Lichfield Trent Valley continue to receive a direct service from London Euston in the peaks as a number of the LDHS services call.

The following three options have been considered:

1. Call the LDHS service between London Euston and Chester additionally at the smaller stations. The option results in an increase in journey times for the LDHS services which is expected to substantially outweigh the benefits to passengers at the smaller stations between Rugby and Rugeley Trent Valley.
2. Provide an additional interurban service from London Euston to Stafford in the evening peak. This is not deemed to be feasible given the capacity constraints at London Euston.
3. Extend the existing London Euston to Northampton service to Stafford. The appraisal of this is detailed in option RL1.1.

7. Trent Valley stations refer to Nuneaton, Atherstone, Polesworth, Tamworth, Lichfield Trent Valley and Rugeley Trent Valley stations on the WCML.

8. Station in the Potteries refer to all stations between Stone and Longport in the WCML RUS area.

5. Gaps and options

Assessment of option RL1.1 – extend two evening peak London Euston – Northampton services to Stafford	
Gap being addressed	Irregular service between London and Crewe calling at local stations during the evening peak in the northbound direction.
Concept	Extend two evening peak London Euston – Northampton services to Stafford.
Operational analysis	Timetable analysis has not been undertaken for this option.
Infrastructure required	None.
Passenger impact	Increases travel opportunity between London Euston and the local stations north of Rugby which may encourage commuting between these stations.
Freight impact	Potential impact on freight services from Daventry and freight using the slow lines north of Rugby.
Financial and economic analysis	The main costs relate to rolling stock leasing and increased mileage, as well as train crew costs. The following table outlines the appraisal results:
	30-year appraisal £million (2002 PV)
	Costs (present value)
	Investment cost 0.0
	Operating cost 10.6
	Revenue -0.9
	Other Government impacts 0.2
	Total costs 9.8
	Benefits (present value)
	Rail users benefits 2.2
	Non users benefits 0.5
	Current TOCs revenue 0.0
	Current TOCs/NR opex 0.0
	Total quantified benefits 2.6
	NPV -7.2
	Quantified BCR 0.3
	A sensitivity was undertaken to appraise the option assuming no additional rolling stock costs. This increases the BCR to 0.4.
Link to other options	
Conclusion	This option cannot be recommended as the BCR is below the RUS recommendation threshold.

Gap RL2: Lack of direct services between Winsford/Hartford and Warrington Bank Quay

Warrington Bank Quay station provides access to employment opportunities in Warrington for the residents of Winsford and Hartford. Currently there are no direct services between these places, resulting in a total journey time of over one hour. Stakeholders feel that this is suppressing demand at these stations.

Option JT3.1: Service alteration to the existing interurban service between London and Crewe considered extension of the service to Preston, calling at Winsford, Hartford, Acton Bridge, Warrington Bank Quay and Wigan North Western. This had an inferior business case to the option of diverting this service to Liverpool Lime Street via Runcorn and so was not recommended.

The alternative of diverting one of the two existing Birmingham New Street to Liverpool Lime Street trains per hour to Preston with the London Euston to Crewe service extended to Liverpool Lime Street via Runcorn is considered in option **RL2.1**.

Assessment of option RL2.1 – divert one of the existing two Birmingham New Street to Liverpool Lime Street trains per hour to Preston	
Gap being addressed	Lack of direct services between Winsford/ Hartford and Warrington.
Concept	Following the extension of the London Euston to Crewe service to Liverpool Lime Street via Runcorn (as part of option JT4.1), divert one of the existing two Birmingham New Street to Liverpool Lime Street trains per hour to Preston, calling at Winsford, Hartford, Acton Bridge, Warrington Bank Quay and Wigan North Western.
Operational analysis	Timetable analysis is yet to be undertaken for this option.
Infrastructure required	None.
Passenger impact	Provides an hourly direct service between Winsford/Hartford/Acton Bridge and Warrington Bank Quay. Reduces the frequency of direct services between Birmingham and Liverpool to one train per hour.
Freight impact	None.
Financial and economic analysis	This option will not require any additional rolling stock or train crew to operate and so the main costs relate to mileage. The loss of one of the two hourly direct Birmingham New Street to Liverpool Lime Street services results in a reduction in Birmingham to Liverpool revenue (despite the London Euston to Crewe interurban service extending to Liverpool Lime Street providing new opportunities to make a journey involving an interchange at Crewe). This is somewhat compensated by the additional revenue from Birmingham New Street to Warrington Bank Quay and Wigan North Western. Overall, the costs for this option are significantly higher than the benefits generated.
Link to other options	JT3.1: Divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe, JT4.2: Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity.
Conclusion	This option will be further considered in the consultation period as part of option JT4.2: Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity, to take account of the crowding benefits and to further understand the capacity constraints at Liverpool Lime Street so that a carefully considered recommendation can be made.

Gap RL3: Lack of direct services between Manchester Airport and towns in the Potteries

Many stakeholders expressed a desire to connect stations in the Potteries area with Manchester

Airport. A number of options were examined to close this gap and all considered existing services being extended to/from Manchester Airport. The option table for option **RL3.1** details the best option in terms of a value for money business case.

5. Gaps and options

Assessment of option RL3.1 – extend the existing Derby to Crewe service to Manchester airport	
Gap being addressed	Lack of direct services between Manchester Airport and towns in the Potteries.
Concept	Extend the existing Derby to Crewe service to Manchester Airport. This is illustrated in Figure 5.1 .
Operational analysis	Timetable analysis suggests that this option can be achieved subject to an understanding of capacity constraints at Manchester Airport. The assessment also highlighted that minor retiming of some freight services is required.
Infrastructure required	None.
Passenger impact	Provides an hourly service between the East Midlands, towns in the Potteries and Manchester Airport and two trains per hour between Crewe and Manchester Airport.
Freight impact	Potential impact on freight capacity between Crewe and Manchester, with minor alterations to timings, no affect on capacity.
Financial and economic analysis	The main costs relate to the leasing of rolling stock, train crew and additional mileage. The following table outlines the appraisal results:
	<div>30-year appraisal<div>£million (2002 PV)</div></div>
	Costs (present value)
	Investment cost0.0
	Operating cost14.7
	Revenue-5.1
	Other Government impacts1.1
	Total Costs10.7
	Benefits (present value)
	Rail users benefits8.5
	Non users benefits1.8
	Current TOCs revenue0.0
	Current TOCs/NR opex0.0
	Total quantified benefits10.3
	NPV-0.4
Quantified BCR1.0	
A sensitivity analysis was undertaken, extending the existing Manchester Piccadilly to Crewe via Manchester Airport service to Stoke-on-Trent. This had a weaker business case as the extension of the Derby to Crewe service doubles the service frequency between Crewe and Manchester Airport.	
Link to other options	JT3.1: Divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe, JT4.1: Reroute existing LDHS service between Birmingham and Manchester to operate via Crewe, JT4.2: Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester interurban service to improve journey times and connectivity.
Conclusion	This option is recommended for further development as part of the combination of interventions detailed in JT4.2: Service alterations to the London Euston to Crewe interurban service and the Birmingham to Manchester LDHS service to improve journey times and connectivity. Further work during the consultation should include analysis as to whether a one-car unit will be sufficient to accommodate demand.

Gap RL4, RL5, RL6, RL7: lack of direct services between Watford Junction, Milton Keynes Central, Northampton, Rugby and the North West

The implementation of the December 2008 timetable reduced the connectivity from many of these stations, suppressing demand. The option to stop the existing London Euston to Glasgow Central service at one of Watford Junction, Milton Keynes Central or Rugby was considered along with rerouting the service via Northampton. In all cases the option will compromise the aspiration for reduced journey times between London and the North West/Scotland. The appraisal results showed that the disbenefits of the increased journey times to long distance passengers far outweighed the benefits to passengers at all listed stations, with the exception of Milton Keynes Central.

Running an additional off-peak hourly LDHS service between London Euston and the North West also offers the opportunity of introducing some of these stops as detailed in options JT1.1 Improved journey

times between London Euston and Glasgow Central – 248 minutes and JT1.2: Improved journey times between London Euston and Glasgow Central – 254 minutes.

Finally, as described in option JT3.1: Service alteration to the existing interurban service between London and Crewe, the option to accelerate the interurban service between Rugby and Crewe by diverting it away from the Stoke-on-Trent route and extending it to Liverpool Lime Street provides further connectivity benefits from these places to the North West.

Gap RL8: irregular or no direct service between the North West (Manchester and Liverpool respectively) and Scotland

There are currently three hours during the day during which the otherwise hourly Manchester to Scotland service does not run. This is partly due to the lack of available rolling stock and also the current timetable structure. The option to provide additional services is considered initially as detailed in the table for option RL8.1.



5. Gaps and options

Assessment of option RL8.1 – additional services between Manchester Airport and Scotland	
Gap being addressed	Irregular or no direct service between the North West (Manchester and Liverpool respectively) and Scotland.
Concept	Provide two additional Manchester Airport to Glasgow services per day in each direction, and retime the existing services to provide an hourly pattern.
Operational analysis	High level timetable analysis suggests this is possible as the service already operates for the rest of the day.
Infrastructure required	None.
Passenger impact	Provides an improved regular hourly service between Manchester and Scotland which may lead to an increased abstraction from air travel because of the increased frequency. The option also increases passenger capability en route.
Freight impact	Minor retiming of one freight service required.
Financial and economic analysis	The main costs relate to rolling stock, crew and mileage. The following table outlines the appraisal results:
	30-year appraisal £million (2002 PV)
	Costs (present value)
	Investment cost 0.0
	Operating cost 23.6
	Revenue -9.7
	Other Government impacts 1.8
	Total Costs 15.7
	Benefits (present value)
	Rail users benefits 21.6
	Non users benefits 7.1
	Current TOCs revenue 0.0
	Current TOCs/NR opex 0.0
	Total quantified benefits 28.6
	NPV 12.9
	Quantified BCR 1.8
	Note: The additional services are assumed to operate with electric multiple units (which are known to generate better journey times due to their improved acceleration/deceleration speeds) following the electrification of the routes between Manchester and the WCML by 2015. Providing a more frequent service between Manchester and Scotland is expected to promote a modal shift from air to rail. However, this analysis has not been undertaken, but it is anticipated that including this will further improve the business case.
Link to other options	RL8.2: Introduction of a new direct service between Liverpool and Scotland.
Conclusion	This option provides a medium value-for-money business case and is recommended for implementation as soon as rolling stock becomes available.

This option is further modified to include portion working by attaching and detaching a Liverpool to Preston⁹ service at Preston with the Manchester

to Scotland service. This provides a direct service between Liverpool and Scotland and is detailed in the option table for **RL8.2**.

9. The implementation of a second hourly Liverpool to Preston service (as proposed in the electrification strategy) is assumed to be available by 2018.

Assessment of option RL8.2 – introduction of a new direct service between Liverpool and Scotland	
Gap being addressed	Irregular or no direct services between the North West (Manchester and Liverpool respectively) and Scotland.
Concept	Attach and detach the Liverpool – Preston and Manchester – Scotland services at Preston to provide a direct hourly Liverpool – Scotland service. This option is dependent on implementation of a recommendation of the North West and Northern RUSs to implement the additional Liverpool to Preston service,
Operational analysis	High level analysis suggests this can be timetabled. However a detailed timetable exercise has not been undertaken and may result in some structural changes at Preston.
Infrastructure required	None.
Passenger impact	Provides a direct service between Liverpool and Scotland.
Freight impact	None.
Financial and economic analysis	The main costs relate to rolling stock, crew and mileage. Providing a direct service between Liverpool and Scotland is considered as a step change in service provision, therefore a gravity model ¹⁰ has been used to determine the number of passenger journeys that would be generated.
	30-year appraisal £million (2002 PV)
	Costs (present value)
	Investment cost 0.0
	Operating cost 139.7
	Revenue -81.1
	Other Government impacts 14.9
	Total costs 73.5
	Benefits (present value)
	Rail users benefits 65.5
	Non users benefits 57.1
	Current TOCs revenue 0.0
	Current TOCs/NR opex 0.0
	Total quantified benefits 122.6
	NPV 49.1
	Quantified BCR 1.7
	Given the high costs associated with this option, along with the added uncertainty over passenger demand estimation, a sensitivity test was carried out which looked at providing a two hourly Liverpool Lime Street – Edinburgh Waverley service which would attach to the existing Manchester Airport to Edinburgh Waverley service at Preston. As expected, this approximately halved the operating costs as shown in the table opposite. The gravity model was again used to estimate the additional passenger journeys generated from this option.

10. The gravity model forecast the number of trips between two places, taking into account their population size and their distance. It is based on the fact that larger places attract people and commodities more than smaller places and places closer together have a greater attraction.

11. Industry standard demand forecasting model.

5. Gaps and options

Assessment of option RL8.2 – introduction of a new direct service between Liverpool and Scotland		
Financial and economic analysis	30-year appraisal	£million (2002 PV)
	Costs (Present Value)	
	Investment cost	0.0
	Operating cost	84.8
	Revenue	-50.4
	Other Government impacts	9.3
	Total costs	43.7
	Benefits (present value)	
	Rail users benefits	46.5
	Non users benefits	35.9
	Current TOCs revenue	0.0
	Current TOCs/NR opex	0.0
	Total quantified benefits	82.4
	NPV	38.7
	Quantified BCR	1.9
	A sensitivity test was carried out for both of these options, using the demand forecast from MOIRA rather than that estimated by the gravity model. The BCR for the hourly Liverpool – Scotland service reduced to 0.6 and the two hourly Liverpool – Edinburgh service reduced to 0.8.	
Link to other options	RL8.1: Additional services Manchester Airport to Scotland.	
Conclusion	This option has a medium value for money case once the impact of additional passengers suggested by the gravity model is incorporated. As the outcome of this appraisal is sensitive to the level of passenger demand, further work will be undertaken in the consultation period to better understand this issue. If the final analysis still produces a value-for-money business case, then consideration should be given to introducing these options incrementally.	

***Gap RL9: Poor frequency of services
(when compared to other similar cities)
between London and Liverpool***

The options for running additional services from London Euston to the North West, included analysis of Liverpool Lime Street as a destination. In all cases Liverpool has the weakest business case, with the exception of option JT3.1: Service alteration to the existing interurban service between London and Crewe. Work will be undertaken in the consultation period to understand whether there is sufficient capacity at Liverpool Lime Street, for both this service and any Northern RUS and Northern Hub options affecting the station.

***Gap RL10: Poor frequency of direct
services between Lockerbie and Glasgow/
Edinburgh***

There is a desire for a suitable commuting service in both directions from Lockerbie to Glasgow and Edinburgh, along with an appropriate off-peak service frequency to allow return trips for the leisure market.

The best option identified to provide a commuting service is the extension of an existing Carstairs-Glasgow service to start from Lockerbie. This would also allow interchange with an Edinburgh bound service at Carstairs. Ultimately the service alterations required would not generate the level of additional passenger demand required to make a business case for the operational costs and the signalling alterations necessary to permit regular turnback of trains at Lockerbie and the option is not recommended.

The option to increase the number of stops in the off-peak long distance service between Birmingham and Scotland and Manchester and Scotland has been considered. However, the increased journey represents a significant risk to the value of longer distance flows, due to the need to retime services through the busy approaches to Glasgow Central or Edinburgh Waverley and without an extensive timetable assessment this option cannot be recommended. In the future the opportunity to call at Lockerbie should be considered during timetable development processes.

***Gap RL11: Sub-optimal connectivity at
Carlisle between the West Coast Main
Line, the Cumbrian coast, Newcastle,
Leeds and the Glasgow and South
Western route to Dumfries, Kilmarnock
and on to Glasgow***

The Lancashire and Cumbria RUS established in October 2008 considered connectivity at Carlisle.

However, during the period of analysis, the December 2008 timetable was still in development and the impacts unknown. The gap was therefore referred to the West Coast Main Line RUS for consideration.

The WCML timetable was considered in terms of structure and the conflicts it is designed to overcome. Given the long distance nature of the routes involved, any move to centralise timetable structure around Carlisle to optimise connections at this station would have major impacts at hub locations such as at Newcastle, Leeds, Glasgow and along the WCML route itself. The potential damage to freight capacity, connections at other stations and to terminal capacity on the routes suggests the timetable should not be amended to specifically allow better connections at Carlisle. However, it is recommended that future timetable development of these local services considers connections into and out of the WCML timetable and between the different routes.

***Gap RL14: Gap in morning peak fast
services between Birmingham New Street
and Milton Keynes Central***

Many stakeholders consider that there is suppressed demand resulting from the gap in morning peak services between these two stations. Given that both these centres are expected to see significant growth, future demand for commuters is expected to rise substantially.

Adding stops into various services was considered, with the only operationally deliverable solution being an additional stop in the 0730 service from Birmingham New Street to London Euston. The service is already heavily loaded with passengers travelling to London Euston, and the introduction of a stop would result in considerable crowding south of Milton Keynes Central. A set down only stop has a negative business case due to the increased journey time for passengers travelling to London Euston so this option is not recommended.

Failure to provide a suitable fast commuter service between Birmingham and Milton Keynes is seen as an unacceptable long-term position and the RUS recommends that future timetable development addresses this gap as a priority. Ultimately, the provision of a new high speed line between London, the West Midlands and the north towards the end of the RUS period will enable significant amounts of extra capacity on the fast lines to be utilised by commuter services on the south end of the WCML.

5. Gaps and options

5. RD: Reactionary delay

One method for assessing passenger train performance is the Public Performance Measure which measures the punctuality of an operator's service against the published timetable. The discrepancy between the two results in delay which can be further disaggregated into primary and reactionary delay. The latter develops as a result of an incident causing primary delay elsewhere on the network and then the infrastructure or service characteristics constraining the ability to recover with minimal impact.

An analysis of performance for freight and passenger operators since the implementation of the December 2008 timetable shows that despite an initial period of poor performance, there has been a steady improvement in performance and reliability to the point where good levels of punctuality were achieved on the route in the year to October 2010.

Several attempts were made to identify any strategic issues where the levels of reactionary delay require development of an intervention. The findings show that the level of reactionary delay does not warrant any interventions at this time. Following the West Coast Main Line Route Modernisation Programme in 2008, which removed many of the major constraints on the route and resulted in high levels of reliable infrastructure, there is no long-term assessment available to show a trend in poor performance. The RUS has therefore not evaluated any proposals.

During the analysis, although still not at a strategic level, Lancaster station did feature as one of the worst performing locations incurring reactionary station delay. This is a consequence of restrictive functionality at the station for terminating trains and/or where simultaneous moves are needed for accommodating trains in platforms. Although no specific intervention has been developed by the RUS, the issue should be considered when the area becomes due for resignalling.

Although performance levels are improving, the RUS notes that this is an intensively utilised route and the industry strives towards continuous improvements. It is important that future renewals on the route maximise any opportunities to provide incremental improvements to performance.

6. NA: Network availability

The train service on offer during the evening and weekends, and the predicted demand for travel at such times, is considered under this gap.

Following the implementation of the December 2008 and December 2009 timetables, the WCML route saw the introduction of seven day railway principles from London Euston to just south of Warrington Bank Quay. This considered a number of initiatives to increase access to the network for train operators. In line with Network Rail's CP4 Network Availability Plan, the remainder of the route will be included and further initiatives are being developed



within the industry to help reach the level of network availability required at the end of Control Period 4. The initiatives and objectives are described in **Chapter 4**. As there are already initiatives in place to address this gap, no further interventions have been proposed.

7. SC: Station passenger handling capacity

Station capacity gaps are those instances where the existing or future passenger demand cannot be accommodated at stations.

One of the anticipated outputs from the Network RUS: Stations is to provide guidance on crowding and interchange at stations. This is expected to be published early in 2011.

The Stakeholder Management Group advised that Crewe and Preston stations required assessment to understand if they are able to cater for the volumes of demand and offer the interchange the network requires. An interim assessment by this RUS has identified that there are a number of issues with stations that will likely be raised in the Network RUS: Stations document, however these relate to the layout of information, announcements and retail standards which are not generally considered by geographic RUSs. Therefore, no interventions have been considered. However, the gap will be reassessed if necessary following the publication of Network RUS: Stations and the results of any analysis will be reported in the final West Coast Main Line RUS.



6. Emerging strategy

6.1 Introduction

The WCML is an extremely busy mixed usage route connecting some of the major cities and freight terminals in the UK. Continued and sustained growth is expected in the key passenger and freight markets, and the RUS has developed a set of options to accommodate this growth and maximise the associated opportunities to increase the value of the route.

The more recent success of the WCML is a result of the lasting major programme of investment on the route, culminating in the successful implementation of the December 2008 timetable. Under the new timetable, the frequency of long distance high speed (LDHS) services between many of the core cities on the route has increased, end-to-end journey times have decreased, weekend engineering works have reduced in frequency, and punctuality has increased over the two-year period since introduction.

Modern fleets of Class 390, 350 and 321 electric trains and Class 221 diesel trains have replaced older, slower and less reliable fleets, offering more capacity. The London suburban services have recently been extended from three to four-car Class 378 trains. The Class 390 fleet will be further increased by 106 vehicles by 2012, creating four new 11-car trains and lengthening 31 existing sets, resulting in 35 of the total 56 sets being 11-cars in length. This increases the quantity of standard seating on services operated by the 11-car sets by approximately 50 per cent.

Included in the baseline assumptions (and outlined in **Chapter 4**) is the electrification of the North West routes between Manchester Piccadilly and Liverpool Lime Street via Earlestown (by 2014), Liverpool to Wigan North Western via St Helens (by 2014), Manchester Piccadilly to Preston via Bolton and Preston to Blackpool (by 2016), as announced by Government in 2009. The associated rolling stock provision is expected to result in four-car electric trains replacing three-car diesel trains on the Manchester to Scotland services, increasing capacity on this route by around 20 to 30 per cent depending on the exact type and internal layout design of the rolling stock provided.

The availability of additional rolling stock is key to the conclusions on capacity detailed in previous chapters and a fundamental prerequisite to a number of the recommendations presented within this strategy.

A conclusion presented within this Draft for Consultation is that historical and planned future investment in rolling stock means the requirement for further on-train capacity on some parts of the route is less immediate than typically presented in RUSs. Despite this, in the absence of further strategic interventions, overcrowding is anticipated on certain key route sections by the end of the RUS planning horizon in 2024. These include short and medium distance commuter services to and from London Euston, LDHS services to and from London Euston and long distance services between Birmingham and Scotland.

Beyond 2024, the strategy takes cognisance of the Government's policy to develop a national High Speed Network which is expected to provide substantial capacity for LDHS services, thus releasing significant capacity on the WCML for the remaining interurban commuter and freight services. Commentary on these issues is limited in this Draft for Consultation and will be more detailed in the final document following further industry development work.

This chapter comments on the effects of the impending refranchising on the WCML before setting out the standard RUS principles for recommending interventions to address identified gaps and then outlines the assumptions underpinning the strategy for generic groups of gaps, before going on to describe the RUS strategy. Although 2014 is the last year of Control Period 4 which forms the baseline for this RUS, the levels of capacity, crowding and network capability are dependent on delivery of initiatives in this period which therefore forms the short-term strategy for this RUS. The strategy then includes the medium-term period from 2014 to 2024 and finally the longer-term period beyond 2024.

Effect of refranchising

The period under examination in this RUS begins with a reference timetable for December 2014 provided by the Department for Transport. This reference timetable is the minimum level of service provision the Department envisages, utilising the capacity levels assumed in the baseline which are provided by the increase in rolling stock detailed earlier in this chapter. This reference timetable builds on today's timetable by assuming that services between London Euston and Lancaster are extended onwards to Glasgow Central.

The current intercity West Coast Main Line long distance franchise is scheduled to be renewed during 2012, which will have a major influence on the route. A decision on the successful organisation will be announced in due course. The Government is expected to seek the best value for money from bidders and the best possible return on the recent investment in the route, without constraining the ability of bidders to invest and innovate.

In addition, applications for track access rights from other passenger and freight operators have been received by the Office of Rail Regulation, which has the responsibility for granting track access rights.

The consequence of these potential changes to service patterns early in the RUS period is that the level of service and the timetable which will be in operation in the baseline year of 2014 is not known. Therefore, the gaps, options, operational analysis and recommended strategy are reported recognising that there is an unusually high risk that the circumstances assumed will change.

6.2 Principles

Dealing with passenger and freight growth

The general principle adopted in RUSs has been to consider simpler and lower cost interventions before turning to more complex and expensive solutions. In the first instance, optimising the use of existing infrastructure is examined. Timetabling solutions have always been sought in the first case, subject to there being no unacceptable performance impact on the network. The next step has been to consider the progressive lengthening of trains to the maximum practical size where there are high levels of demand. Where timetabling and lengthening options are not practical the RUS will then look towards targeted infrastructure enhancement. Again, the range of options is considered in order, from simpler schemes such as platform extensions, through to more far-reaching measures such as signalling and power supply upgrades, capability works for longer freight trains or increased loading gauge for intermodal traffic and more comprehensive investment in a particular line of route. In some cases, the provision of additional services may offer a solution to peak and interpeak overcrowding, which offers connectivity benefits that would not be achieved by simple train lengthening.

Rolling stock

As described at the beginning of this chapter, several of the fleets operated by current franchises have been replaced in recent years and there is a committed procurement process underway to supply an additional 106 Class 390 vehicles for the long distance fleet.

The size of the fleet of the main commuter and interurban operator into London Euston is also

expected to be increased. The Government is currently reviewing the proposal to introduce InterCity Express Programme rolling stock on to services between Northampton and London Euston to consider suitability and value for money. The RUS considers that additional rolling stock on this route would be most efficient if it matched the route capability on the fast lines operating at 125 mph enhanced permissible speed, which would minimise the network capacity that the stock will use.

In the North West, the likelihood is that the Manchester to Scotland fleet will be replaced by four-car electric multiple units. Although the final deployment arrangements are yet to be confirmed, this assumption has been included in the RUS study.

Freight capability

Analysis undertaken for the RUS shows that there is adequate capacity to accommodate freight growth on the route if the efficiencies in freight operation assumed in the Strategic Freight Network forecasts for 2019 and 2030 are delivered and there is no significant effect on freight capacity from an increased number of passenger trains or an alternative timetable. As these assumed efficiencies include longer trains, current loop facilities and the planned timetable slots used by freight services will need to be reviewed to establish if they can accommodate trains of up to 640 metres in length. Additionally, the forecasts assume that freight will operate over a six-day week. The analysis is expressed in terms of timetable slots required per day, however, if the required number of timetable slots needs to be delivered over five days, or they disproportionately target day time operation then there will be insufficient freight capacity, particularly north of Lancaster.

In this instance, possible ways of generating capacity may include the routing of intermodal growth from the east coast ports to Scotland via the East Coast Main Line. This would require W10 gauge clearance of the route between Doncaster and Mossend, via the East Coast Main Line. Electric haulage of more freight services offers a further opportunity to increase freight capacity as electrically operated services can run faster over the steeply graded northern section of the route. However, for this to be implemented consideration would need to be given to the linking of key freight terminals to the electrified network, along with further infill electrification to allow electric operation from origin to destination.

Connectivity

A number of stakeholders have aspirations for improved connectivity in and between the many cities and towns in the RUS study area and with cities elsewhere in the UK. This would benefit commuting, business and leisure travellers, and subsequently the economy. Improvements to rail

6. Emerging strategy

journey times, service frequency and the availability of direct services would all contribute to achieving improvements in connectivity for the route. Such improvements can be delivered by making changes to stopping patterns, running additional services, or a combination of these interventions. It should be noted that where additional stops are proposed on a service journey times are likely to increase.

Performance

As with many other parts of the country, issues affecting performance on the rail network in the West Coast Main Line RUS area are complex, given the length of the route, the number of major conurbations served and the mix of services with varying speeds and stopping patterns.

Reactionary delay is a result of an incident causing primary delay elsewhere on the network together with infrastructure or service characteristics which constrain the ability to recover and minimise the impact. Locations with conflicting train moves, two-track sections or complex flat junctions can result in the escalation of the levels of reactionary delay. Although the general level of performance on the route has improved and the level of reactionary delay is relatively low, some specific areas of concern remain over the infrastructure capability:

- in the Stafford area, there are flat junctions at Colwich where the route from London to Manchester diverges from the WCML, at Stafford where the route from Birmingham joins the WCML and at Norton Bridge where the route towards Stoke-on-Trent leaves the WCML
- between Preston and Carlisle there are long two track sections, short loop lengths, steep gradients and high speed capability differentials of planned services
- at Lancaster current track and signalling is restrictive and improvements should be considered when the signalling is renewed
- the inability to accommodate up to 775-metre freight trains at Carlisle without conflicting with other planned train movements through the station will result in trains needing to run direct to Carlisle Kingmoor Yard where there are very restrictive low speeds, to allow faster trains to pass.

Network availability

The industry recognises that there is a benefit in moving towards a timetable in which increasing demand at weekends is provided for by a broadly similar timetable to the Monday to Friday passenger service. Freight operators aspire to match the continuity of service offered by the road network.

Network Rail is leading the seven day railway initiative, the overall vision of which is to deliver the working timetable in full, alongside cyclic maintenance, renewal and enhancement

requirements. This will entail a need to provide more flexible operational layouts at the time renewals are carried out, together with changes in working arrangements. The latter is likely to include introduction of quicker and simpler procedures for managing possessions, combined with altered ways of working to allow greater adjacent line open or single line working train operations, which is likely to be facilitated by the installation of bi-directional signalling when renewal opportunities arise.

In many cases in the RUS area, key towns and cities can be accessed by more than one route, enabling a reasonable continuation of service at times of engineering work or perturbation, albeit with some journey time extension. A key issue, particularly for freight, is that comparable capability exists on diversionary routes, notably in relation to loading gauge clearance and route availability. Work in this area continues to be developed as part of the Strategic Freight Network workstream. It will also be important to make sure that arrangements to accommodate long distance services on alternative routes in times of disruption or any infrastructure works do not disproportionately affect users of local passenger services, which make up a significant proportion of operations in the RUS area on diversionary routes.

Electrification

The RUS notes the consideration given in the Network RUS: Electrification Strategy to future electrification schemes across the national rail network. The electrification strategy outlined a number of possible electrification infill schemes within the West Coast Main Line RUS area to be taken forward for further analysis to evaluate benefits to help establish affordability. The key routes defined included:

- Water Orton to Nuneaton – as well as providing a valuable diversionary route between Birmingham and London Euston, potentially the route could be used to provide capacity which is not available along the Coventry corridor
- Walsall to Rugeley Trent Valley would provide WCML diversions when the Stafford to Wolverhampton line is not available
- Crewe to Chester would allow electric haulage of the London to Chester services throughout, potentially allowing the Class 221 fleet to be utilised elsewhere
- Oxenholme Lake District to Windermere would allow further diesel units to be allocated on other non-electrified routes.

Electrification schemes which provide diversionary capability for services from other electrified routes improve maintenance accessibility, potentially enabling operators to avoid the need for rail replacement bus services and providing passengers with an uninterrupted journey. The RUS supports

further analysis to consider funding availability, affordability and rolling stock requirements for the key routes which have been identified.

Power supply

The announced electrification of additional routes in the North West and the associated deployment of additional electric fleets suggest that there will be an increase in power supply demand. Upgrades to the power supply in the area are being developed by Network Rail as part of the electrification scheme and no further consideration is given to this issue in the West Coast Main Line RUS.

6.3 Short-term strategy 2011–2014 (Control Period 4)

Background

As the baseline for the RUS is 2014 this section is almost entirely a statement of the existing industry strategy, rather than a commentary on the work developed in the RUS.

The key elements of the existing industry strategy are the work detailed in Network Rail's Control Period 4 (CP4) Delivery Plan, DfT rolling stock programmes and the imminent refranchising of the long distance operator on the route. Successful implementation of all of these initiatives has a fundamental impact on the future of the route.

Franchising

The new franchise for the main intercity long distance route will commence in April 2012, with track access rights being confirmed 12 months earlier by the Office of Rail Regulation. In addition, it is anticipated that the ORR will determine any further track access changes in relation to the registered aspirations of any other franchised, open access or freight operator, at a similar time.

The long distance services between Manchester and Scotland are part of the First TransPennine franchise which runs to 2012 with a potential extension of up to five years.

Train services

The timetable for implementation by the new franchise operators and any additional track access changes will be developed with industry parties towards the end of 2011.

The reference timetable assumed for the baseline is, with the exception of non RUS initiated changes, the December 2009 timetable with the London Euston to Lancaster services extended to Glasgow Central resulting in an hourly service between London Euston and Glasgow Central.

It is understood that services in the North West will largely become operated by electric multiple units in stages with completion of the Manchester

to Liverpool route via Earlestown due in 2013. Therefore the RUS assumes that Manchester to Scotland services will be operated by electric trains.

Rolling stock

The RUS recommends that the Class 390 eleven-car sets be deployed to services with the heaviest crowding. Also, some nine-car sets could be deployed on the Birmingham to Scotland services currently operated by Class 221 vehicles. In turn the Class 221 trains would then be used to provide the less busy services into and out of London Euston.

There is also the possibility of an increase in the size of the Class 350 suburban fleet which is currently under discussion between the DfT and the train operator.

Infrastructure

The schemes detailed in Network Rail's CP4 Delivery Plan are assumed in the baseline.

Particularly important to future capacity requirements are:

- platform lengthening for Class 390 vehicles to accommodate 11-car sets at eight stations as outlined in **Chapter 4**
- WCML power supply upgrade
- Bletchley remodelling: platform lengthening to accommodate 12-car sets, and a 775 metre bi-directional freight loop
- Stafford area capacity and performance schemes which should continue to be developed in CP4 for delivery in 2017 to provide necessary capacity for passenger and freight service growth
- electrification of the Manchester to Liverpool route via Earlestown as outlined in the Government announcements of 2009.

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

Background

This part of the strategy represents the majority of the interventions recommended in the previous chapter, based on the RUS baseline assumptions in 2014, including committed schemes, the reference timetable and rolling stock assumptions as previously detailed. It aims to inform the strategy for Control Periods 5 and 6.

Passenger train services

Some of the worst overcrowding on the WCML is expected to occur on the commuter and interurban service between Northampton, Milton Keynes Central and London Euston during the peak hours. As time progresses this crowding is expected to become more severe, extending into the period between the morning and evening peaks. Analysis in **Chapter 5** has identified that an additional 40 vehicles (including those proposed in the High Level Output Specification allocation for CP4) will be required to alleviate crowding to 2024. This will result in the majority of the services running to their maximum lengths in the three-hour peak. By 2024, in the high-peak hour, an additional 1500 seats are required to alleviate crowding. Most of the services arriving into London Euston in the morning high-peak hour are already at their maximum length and lengthening beyond the maximum 12-cars would require large scale infrastructure changes on platforms along the route.

A short-term measure to provide limited additional train capacity at London Euston in the high-peak hour is to reduce the speed differential for services operating on the fast lines to/from London Euston. This is where the route permits the operation of 125mph rolling stock, but some of the current operation is at 100mph. Removing the speed differential will reduce the time required between subsequent trains and allow an additional timetable slot to be utilised, resulting in two additional timetable slots per hour being available from London Euston. Although this potentially offers the opportunity to provide more train capacity, with the increased service pattern already in operation in the peak there is a high risk that performance issues could be created and there is a concern that the level of service operation and mix of train lengths could not be accommodated at London Euston where a number of platforms cannot accommodate 12-car trains. The RUS recommends further consideration is given to evaluating capacity at London Euston to establish the number of additional services that can be accommodated to increase on train capacity on this corridor.

Substantial overcrowding occurs between Watford Junction and the West London Line to the extent

that the service has experienced a reduction in passenger journeys due to there being insufficient capacity to board during the high-peak hour. The option to lengthen these services from four cars to eight cars has been developed in the London and South East RUS and is recommended as soon as rolling stock becomes available.

Due to the high levels of crowding in the peak and the unbalanced frequency of the timetable the RUS considers a high level of suppressed demand exists. Further work is therefore recommended during the consultation period to identify an operationally viable solution to increase the frequency to two trains per hour in the peaks.

As a consequence of the impact on timetable capacity on both the WCML and the West London Line, these options are being developed jointly by the WCML and London and South East RUSs. Progress and any recommendations will be reported in the final RUS.

The increase in Class 390 rolling stock in CP4 can accommodate the majority of the anticipated crowding on long distance high speed services to and from London Euston. As with all operations it is firstly recommended that the longest train sets are deployed to the busiest services. The strategy to alleviate the remaining crowding is to optimise the use of rolling stock to provide capacity for an additional hourly off-peak service between London Euston and the North West. Of the three options **JT1.2**: Improved journey times between London and Scotland and **JT2.1**: Improved journey times between London and Manchester have high value for money business cases.

Option **JT1.2** reduces the number of station stops in the London Euston to Glasgow off-peak services resulting in a reduced journey time of 254 minutes. This is supported by the running of an additional hourly off-peak service between London Euston and the North West with a calling pattern to cater for the loss of stops from the Glasgow service and additional stops to suit demand.

Option **JT2.1** increases the frequency of service between London Euston and Manchester Piccadilly to four trains per hour. This option is better able to meet the capacity gap whereas option **JT1.2** is developed to reduce the journey time between London and Scotland and to meet a number of other regional connectivity gaps.

The increase to four trains per hour between London Euston and Manchester requires a recast of the timetable and analysis of capacity at Manchester Piccadilly and London Euston stations. As a consequence the strategy to address crowding on the long distance high speed services from London Euston in this period will be developed in more detail during the consultation period and presented in the final RUS.

The overcrowding on many of the long distance high speed services between Birmingham New Street and Scotland, is forecast to worsen by 2024. The short-term strategy notes that deployment of some nine-car Class 390 vehicles on the busier Birmingham to Scotland services would alleviate crowding. In the event that it is not possible to match these Class 390 trains to the most crowded services, analysis suggests that there is a high value for money business case for 16 additional vehicles to alleviate crowding. The services are currently operated using diesel traction, which is inefficient given that the entire route is electrified and if the solution to provide additional vehicles is adopted then consideration should be given to providing vehicles that are compatible with electric traction. This will provide the added benefit of enabling the trains to be capable of bi-mode operation on both electrified and non electrified routes.

The strategy also notes that although the analysis does not warrant any capacity intervention for the Manchester to Scotland services during the weekdays, further work is required to understand crowding issues on these services on Fridays and weekends. This work will be undertaken during the consultation period and the analysis and strategy will be discussed in the final RUS document.

As part of the package of interventions to address a number of regional links and journey time gaps identified in **Chapter 5**, the interurban service operated between London Euston and Crewe should be altered to run along the WCML directly from Stafford to Crewe and not call at Stone, Stoke-on-Trent, Kidsgrove and Alsager and then be extended to Liverpool Lime Street via Runcorn (subject to platform capacity at Liverpool Lime Street being available), calling additionally at Winsford, Hartford, Runcorn and Liverpool South Parkway.

The rerouting of one of the long distance services between Bournemouth and Manchester to operate via Wilmslow is recommended to enable faster journey times between Birmingham and Manchester. As a consequence Macclesfield, Stoke-on-Trent and Stafford lose connectivity and capacity to Manchester, Birmingham and beyond and the options to rectify this, such as the extension of the Manchester Piccadilly to Stoke-on-Trent service south to Stone, Stafford and Birmingham will be explored during the consultation period.

Rail links between towns in the Potteries and Manchester Airport are poor and the RUS recommends that the Derby to Crewe via Stoke-on-Trent service should be extended through to Manchester Airport. The current service is operated by a single car train and there are concerns that this would be inadequate given the diversion of the London Euston to Crewe interurban service. It is recommended that further work is undertaken during the consultation process to assess whether a one-car unit will be sufficient to accommodate demand in the off-peak hours.

The current interurban service between Manchester and Scotland does not operate to a strict hourly pattern. Once rolling stock becomes available, the RUS recommends that the service frequency is increased, resulting in a one train per hour provision on this corridor.

The announced electrification of additional routes in the North West enables electric operation of services between Liverpool and Preston. The RUS has analysed the case for extending some of these services to provide a direct link between Liverpool and Scotland by attaching them to the Manchester to Scotland services at Preston. The outcome of this appraisal is sensitive to the level of demand and the RUS recommends that such a service should be introduced incrementally as demand increases, to initially provide one train every two hours between Liverpool Lime Street and Edinburgh Waverley

Freight services

As mentioned previously in this study, there is insufficient timetable detail available to establish the locations of any particular constraints and analysis suggests that freight growth can be accommodated throughout the route. However, should growth occur at a higher rate, or should the assumptions made with regard to freight operation not materialise then infrastructure interventions will be likely to be required, particularly north of Preston and potentially between Northampton and Nuneaton. This could provide capacity for both additional freight services and to assist in the development of both passenger and freight services where the differentials in the speed of services are most prevalent. In such circumstances timetable development processes would identify specific interventions to be considered.

The highest levels of freight growth are expected in the domestic intermodal sector and the terminal at Daventry is expected to grow significantly throughout the RUS period. The RUS recommends that the terminal is designed such that there is no impact on main line services caused by the additional volume of freight trains to and from the site. Domestic intermodal services are also likely to require more tightly defined timetable slots, as demand for time-sensitive traffic increases. This will place further pressure on constrained sections of the route and may prompt the development of interventions.

The RUS also notes that the provision of W12 loading gauge on the route is being taken forward as a Strategic Freight Network aspiration.

Infrastructure

Although no infrastructure enhancements have been recommended to accelerate services following the major investment in the West Coast Main Line Route Modernisation Programme, opportunities to reduce point-to-point journey times should be exploited when track and signalling renewals are due. Specific locations where the most valuable improvements

6. Emerging strategy

could be undertaken include Crewe, Preston and Carlisle.

For freight services, the assumption that capacity exists for forecast growth is based on assessment of the December 2009 timetable with the constraining effects of any proposed additional services included. The assessment also recognises the future number of trains required for freight services and the need for longer trains to operate. It is also noted that most loop lengths in the North West are too short to accommodate the 775-metre length freight services which operators aspire to. Therefore any further increases in the requirement for passenger train frequency will constrain freight services and loops will need to be able to cater for these longer freight trains. The RUS recommends that proposals should be developed through normal industry planning processes to improve this situation during Control Period 5.

In addition, the very slow speeds for freight services through Carlisle Kingmoor Yard will constrain capacity for the longer freight services which will be required to bypass Carlisle because of the lack of a facility to recess trains of the necessary length in the station area. It is recommended that improvements are considered for submission for Control Period 5.

6.5 Long-term strategy (2024 and beyond)

Background

The medium-term strategy demonstrates that crowding issues on passenger services continue to grow over the RUS period and that there is potential to operate a small number of additional long distance high speed services off-peak, and very fast commuter services during the peak but that thereafter the WCML, particularly at the southern end of the route is effectively full and subsequent additional capacity could only be provided by exceptionally expensive infrastructure solutions. There will be an increased requirement for freight paths and the RUS demonstrates that freight growth can be accommodated, subject to the caveats noted in **Chapter 5**.

The RUS therefore supports the development and implementation of a high speed line initially between London and the West Midlands, and subsequently onwards to Manchester and beyond as the best intervention to free up capacity on the WCML. The next section describes the opportunities and challenges that this would create.

New lines /High Speed Two

In 2008 Network Rail commissioned a study to consider the case for a new rail line in the UK. As the forecast growth in passenger demand required extensive additional capacity, the study examined the various routes into London and established that the WCML would require earlier strategic intervention to provide capacity. The study proposed

the construction of a new high speed line, serving London, the West Midlands, the North West and Scotland. Further work reported the benefit of high speed services between London, Yorkshire and the North East.

Later in 2008, the Government formed High Speed Two (HS2) Limited to continue to consider the case for high speed rail services from London. The company has now reported a preference for a 'Y' shaped network from London to the West Midlands before diverging with a route to Manchester and beyond.

Government is supportive of proposed new high speed network strategy and is expected to launch public consultation on the scheme between London and Birmingham in early 2011.

Both the construction and operational phases of phase one and eventual Y-shaped schemes would have fundamental implications for the existing WCML and adjacent parts of the network.

The opportunities that are created by the new strategy for high speed rail will need to be considered, and where required, evaluated, as part of the overall development process.

Stakeholder aspirations include:

- enhanced passenger services on the existing WCML once the HS2 route is open to provide faster commuting journeys at the southern end of the route and enhanced frequencies between the major towns and cities along the WCML
- the possibility of extending westbound Crossrail services that are currently proposed to terminate at Ladbroke Grove onto the WCML via a short stretch of new line in the Old Oak Common area, potentially taking over some of the shorter distance commuter services (ie as far as Tring and Milton Keynes Central). This concept would enable direct services from the Milton Keynes corridor to the City of London and beyond
- extra capacity created for additional freight services.

Network Rail and the rest of the rail industry will consider HS2 implications and how the RUS area is affected in more detail during the RUS consultation period and beyond. Where appropriate, an update will be reported in the final RUS document.

7. Consultation and next steps

7.1 Introduction

Consultation with stakeholders, both within and outside the rail industry, is essential to the successful development of a RUS. Close involvement of stakeholders helps to:

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

According to the RUS guidelines:

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

Extract from ORR Guidelines on Route Utilisation Strategies – April 2009

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

7.2 Stakeholder groups

7.2.2 Stakeholder Management Group

The West Coast Main Line RUS is managed through a Stakeholder Management Group, which has acted as the steering group for the strategy and has met at key stages of the development of this RUS. The group comprises:

- Department for Transport
- Transport Scotland
- passenger train operating companies (Arriva Trains Wales, Chiltern, CrossCountry, East Midlands Trains, First Scotrail, First TransPennine Express, London Midland, London Overground Rail Operations Limited, Northern Rail, Southern and Virgin Trains)
- passenger train operators who have aspirations to operate over the route during the period of the RUS (Alliance Rail and Grand Central)
- freight operating companies (specifically DB Schenker Rail (UK), Direct Rail Services Ltd, Colas Rail, GB Railfreight and Freightliner Group)
- Association of Train Operating Companies
- Transport for London
- Passenger Transport Executives (Centro (West Midlands Integrated Transport Authority), Merseytravel, Greater Manchester Passenger Transport Executive)
- London Travel Watch
- Passenger Focus
- Office of Rail Regulation (as an observer).

7. Consultation and next steps

7.2.3 Subgroups

During the gap analysis process, separate subgroups were set up alongside the main SMG to focus on key issues. A long distance subgroup met on several occasions to identify current demand for long distance passenger services in the RUS area, and provide an informed view of future passenger growth. The group identified and implemented methodologies to assess the effect of RUS options on long distance passenger demand.

A freight subgroup met to consider the future requirements for freight services on the route. The group analysed the future freight demand provided by the Strategic Freight Network forecasts for 2019 and 2030. The freight subgroup also considered to what extent the Strategic Rail Authority's 2003 strategy for freight services on the WCML had been delivered by the WCML Route Modernisation Programme.

A WCML south passenger service subgroup met to consider commuting demand over the RUS period into London and a WCML north passenger service subgroup met to consider interurban passenger markets at the northern end of the route.

The groups were responsible for defining the baseline infrastructure and train service provision. They also specified the committed changes and assumptions that would be incorporated into the baseline analysis. Consideration was also given to growth forecasts, franchise commitments, potential housing and regeneration programmes, and future rail demand. Once a base was established, the group members identified and analysed the gaps in detail and proposed potential options to be evaluated. All the groups listed above were merged for the purpose of option analysis and appraisal.

7.2.4 Wider stakeholder briefings

Wider stakeholder briefings were held during 2009. In addition, a number of individual briefings were organised for various local authority transport

officers together with workshops for rail user groups and Community Rail Partnerships facilitated by Passenger Focus and Network Rail.

In May 2009, a series of baseline exhibitions were held, enabling stakeholders to review the results of the baseline exercise. This provided valuable input into the gap analysis and subsequent option appraisal. The baseline information can be found on the relevant RUS pages at www.networkrail.co.uk

In addition, a number of individual meetings were held with various stakeholders to seek their views. Further stakeholder briefings will take place during the consultation period.

7.3 How you can contribute

We welcome contributions to assist us in developing this RUS. Specific consultation questions have not been set as we welcome comments on the document as a whole.

Consultation responses can be submitted either electronically or by post to the addresses below:

westcoastmainlinerus@networkrail.co.uk

West Coast Main Line RUS
RUS Programme Manager
Network Rail
Kings Place
90 York Way
London N1 9AG

This RUS will have a formal consultation period of 90 days and the date for receiving responses is Friday 11th March 2011. Earlier responses would be very much appreciated in order to maximise the time available to us to react and respond in the final RUS document.

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



Glossary

Term	Meaning
AC	Alternating current – eg 25kv (25,000 volts overhead electrification lines).
ATOC	Association of Train Operating Companies.
ATW	Arriva Trains Wales – a train operating company.
BCR	Benefit cost ratio – a tool used in financial appraisal of options to assess its economic benefit.
bi-directional signalling	Signalling that allows trains to run in both directions on one line.
bi-mode train	A train that can operate with both electric and diesel traction.
CP4	Control Period 4 – five-year funding period 2009 – 2014.
CP5	Control Period 5 – five-year funding period 2014 – 2019.
CP6	Control Period 6 – five-year funding period 2019 – 2024.
CUI	Capacity utilisation index.
DaSTS	Delivering a Sustainable Transport System – a formal consultation document published by the DfT in November 2008 setting out their long-term transport priorities.
DBS	DB Schenker Rail (UK), a freight operating company.
DC	Direct current.
DfT	Department for Transport.
DMU	Diesel multiple unit.
down	The direction i.e. Down direction, Down peak, Down line, Down train, Down fast, Down slow, Down main, this generally (but not always) refers to the direction that leads away from London.
DRS	Direct Rail Services – a freight operating company.
dwelt time	The time a train is stationary at a station.
ECML	East Coast Main Line.
efficient engineering access (EEA)	A railway term that relates to the time on the railway network when no trains operate. This provides the means by which maintenance, renewals and enhancement works are undertaken.
EPS	Enhanced permissible speed – this allows trains equipped with tilt technology to travel at higher speeds specifically round curves, and also on sections of straight track due to the higher speed capability of this type of rolling stock. Currently EPS capability is only found on the West Coast Main line route in the United Kingdom.
EMU	Electric multiple unit.
EU	European Union.
FOC	Freight operating company.
FTA	Freight Transport Association.
GBFM	Great Britain Freight Model – The GBFM is designed to forecast freight moved within Great Britain, including freight to and from the ports and the Channel Tunnel. It covers different modes such as rail and road and produces a matrix of all forecast freight flows. This provides a 'top down' view based on economic modelling.
GBRf	GB Railfreight – a freight operating company.
GDP	Gross domestic product.
Generalised journey time	A measure of total travel time which can include: in vehicle time, service frequency and interchange.
GMITA	Greater Manchester Integrated Transport Authority.
GMPTe	Greater Manchester Passenger Transport Executive.

Term	Meaning
gravity model	The gravity model is a modelling tool that forecasts the number of trips between two places, taking into account their population size and their distance. It is based on the fact that larger places attract people, journeys, and commodities more than smaller places.
GRIP	Guide to Railway Investment Projects.
headway	The minimum timing interval possible between trains on a particular section of track.
high peak	Between 08.00 and 09.00 and 16.00 and 17.00.
HLOS	High Level Output Specification.
HS2 Ltd	High Speed Two Ltd – a company formed by the Government in 2008 to consider the case for possible high speed rail services from London in the United Kingdom.
ITA	Integrated Transport Authority.
intermodal trains	Freight trains which convey traffic which could be moved by road, rail or sea (eg container trains).
interpeak	Between the morning and evening peaks (10.01 to 15.59).
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.
Loading gauge	Loading gauge is the profile for a particular rail route within which all vehicles or loads must remain so that there is sufficient clearance is available at all structures.
LOROL	London Overground Rail Operations Limited – a train operating company.
MOIRA	An industry standard passenger demand forecasting model that uses many of the principles published in the Passenger Demand Forecasting Handbook.
MAA	The moving annual average measures the Public Performance Measure each four weekly period over the course of a year, including the most recent 13 periods in the average.
Northern Hub	Network Rail's connectivity study for Manchester and the north.
NPV	Net present value.
NRDF	Network Rail Discretionary Fund – a source of funding for enhancement projects to be developed and delivered.
NSIP	National Stations Improvement Programme – a DfT funded cross-industry programme designed to enhance approximately 150 medium sized stations across routes in England and Wales.
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 such as behaviours and trends.
peak	Morning peak between 07.00 and 10.00 and evening peak between 16.00 and 19.00.
PLANET	A demand forecasting model developed by the former Strategic Rail Availability.
possession	Where part of the infrastructure is closed to services to carry out maintenance, renewal or enhancement works.
PPM	Public Performance Measure – this measures the performance of individual trains against their planned timetable and is a good indication for performance.
PS	Permissible speed – the maximum speed of the route.
PTE	Passenger Transport Executive.
PV	Present value.
Railsys	A computer model used for timetable modelling.
RFG	Railfreight Group.
RFOA	Railfreight Operators Association.