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West Midlands and Chilterns Route Utilisation Strategy

NetworkRail





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Foreword

With the nation's finances severely constrained, any investment in transport infrastructure must deliver real benefits for the economy, quality of life and the environment.

This Route Utilisation Strategy (RUS) sets out priorities for rail investment over the next 30 years in the West Midlands and on the Chiltern route between Birmingham and London Marylebone. The industry believes the options recommended provide a robust strategy both to meet the forecast increased passenger and freight demand and help support and grow the regional economy.

The West Midlands sits at the heart of Britain's rail network and more people than ever rely on rail to travel to and through the region. Stations such as Birmingham New Street provide an interchange for services across the UK, while the Chiltern route serves long distance and commuter markets between the West Midlands, Buckinghamshire, and London. The network in the region is also vital for moving goods to and from ports and freight terminals across the country.

In the longer term, a new high speed line to the region and beyond could improve journey times and free up capacity on a number of existing routes.

Passenger growth in the RUS area over the past decade has been significant and this continues despite the economic climate. The rail industry has responded well to this growth with punctuality improvements, longer trains and faster journeys.

Work is already underway on several large projects to increase capacity in the West Midlands. A rebuilt Birmingham New Street will deliver a world class station with a concourse three-and-a-half times its present size, ensuring long-term passenger growth can be accommodated. The proposed Cross City line extension to Bromsgrove, along with more frequent services between New Street and Redditch, will deliver significant improvements on one of the

busiest regional commuter routes. On the Chiltern route, the Evergreen 3 project will deliver more capacity and faster journeys between Birmingham and London Marylebone, as well as new journey opportunities between Oxford and London.

Overall passenger demand in the region is predicted to increase by 32 per cent over the next decade. While Network Rail's Control Period 4 (CP4) Delivery Plan will accommodate much of this demand up to 2019, some gaps are identified and measures recommended to address them. As in all RUSs, a range of options is developed to meet the future requirements on the network. These options are tested to determine which provides the best value for money, and that option then tested for affordability.

Where the RUS identifies a need for interventions, it seeks to make the most efficient use of capacity. Train lengthening is recommended on several peak services to and from Birmingham as well as several long distance routes passing through the West Midlands. Some additional services are also recommended on several regional routes which pass through Birmingham along with further development of the option of re-routeing services between Reading and Newcastle via Coventry. The potential for improved connectivity and new journey opportunities on local and interurban services across Birmingham is also highlighted. In addition, the RUS supports work to explore a new station at Aldridge.

Sufficient freight capacity is crucial for the economy and, while the majority of the network can accommodate forecast growth over the next decade, the need to further develop options to address freight growth, particularly between the South West and Birmingham, is recognised. Options to accommodate future demand will be assessed, including a review of the proposal to reopen the Round Oak – Walsall line.

In the longer term, a new high speed line would improve journey times and free up capacity on a number of existing routes.

Foreword

This RUS was initially published in consultation form in November 2010. Many issues were raised during that consultation that have influenced aspects of the strategy. Network Rail has led production, but the RUS has had input from across the rail industry including passenger and freight operators, the Department for Transport, Centro, Transport for London, Passenger Focus and London TravelWatch. I thank them all for their contribution.

Paul Plummer

Director, Planning and Development



Executive summary

Introduction

This is the penultimate of the geographical 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 West Midlands and Chilterns RUS has been formulated in consultation with industry colleagues through a Stakeholder Management Group (SMG), and it considers the requirements that will be placed upon the rail network over a planning horizon of 30 years. The RUS makes recommendations based on a detailed analysis of passenger and freight demand and is timed to inform the next High Level Output Specification (HLOS) by feeding into the Initial Industry Plan in September 2011.

Scope

The West Midlands and Chilterns RUS interfaces with other parts of the rail network which have been covered in other RUSs, primarily the East Midlands, Great Western, and West Coast Main Line RUSs. Its geographical scope broadly consists of the West Midlands region and the Chiltern Main Line between Birmingham Snow Hill and London Marylebone. It also includes the route from Aylesbury Vale Parkway to London Marylebone incorporating part of London Underground Limited's Metropolitan Line.

Services in the RUS area support a diverse range of markets. These include local commuting into the key employment locations, interurban travel between major urban centres, and long distance journeys within and beyond the boundaries of the RUS area.

The West Midlands rail routes are at the centre of the national rail network, with Birmingham's central stations acting as hubs supporting interchange to many destinations across the United Kingdom. Services across the West Midlands are promoted and developed by West Midlands Integrated Transport Authority (Centro).

The Chiltern Main Line serves long distance markets between the West Midlands and London Marylebone and also supports local commuter and interurban travel between significant towns and tourism destinations within the route.

A considerable number of freight flows also operate across the network and to and from significant freight terminals within the RUS area.

All passenger and freight services that spend all or part of their journey on the routes contained within the RUS area are considered by this strategy.

Committed schemes

The RUS baseline comprises the present network and services, together with a number of committed schemes which will deliver improvements to the current infrastructure and services in the RUS area. These schemes have formed part of the 'do-minimum' scenario in the RUS against which detailed appraisal work for further capacity interventions has been undertaken.

Network Rail's Delivery Plan for Control Period 4 (CP4) is a significant part of this baseline, which aims to provide the infrastructure required to deliver the safety, reliability and capacity targets set by the Government's High Level Output Specification (HLOS) and funded through the Statement of Funds Available (SOFA). The plan includes measures to support train lengthening, service enhancements and performance and journey time improvements. Train operators are responsible for the development of operational plans based on a mixture of rolling stock cascade and the introduction of new rolling stock to strengthen services on busier routes.

Executive summary

Within the RUS area, significant improvements in capacity and connectivity will be delivered through a number of different schemes. These include the extension of Cross City services from Longbridge to Bromsgrove and more frequent services to Redditch, and the Birmingham Gateway project which will substantially rebuild Birmingham New Street station, double its passenger capacity and improve the overall passenger interchange and travelling experience. The CP4 Delivery Plan also includes funding to facilitate the implementation of a Strategic Freight Network (SFN). This national freight strategy aims to develop a network of core and diversionary routes for longer freight trains and enable freight services to operate in a more efficient way.

During CP4, capacity and journey time improvements on the Chiltern Main Line will be delivered through the Evergreen 3 project, which will provide faster journey times between Birmingham and London Marylebone (via Bicester), improved service frequencies at some intermediate stations and new direct journey opportunities from Oxford to London Marylebone.

Major signalling renewals are also planned for a large proportion of the West Midlands area during CP4. These will deliver improved planning headways through modern signalling technology. Further capacity improvements have also been incorporated into the programme through cost-efficient enhancements linked to the renewal activity.

Forecast changes in demand

Passenger

There has been considerable growth in passenger rail journeys in the RUS area over the past decade, and demand has remained relatively resilient during periods of economic recession. This growth is attributed to several factors including increasing population, road congestion in cities and urban centres, and structural changes in travel and employment markets. In light of these factors, and taking into account the investment being made in the rail network during CP4, it is anticipated that this growth will continue during the timescale of the RUS. Passenger journeys to and from Birmingham are predicted to increase by 32 per cent in the peak by 2020, and demand on services to London Marylebone is forecast to grow at a similar rate. This forecast represents the “Do-minimum” situation and does not include the impact of uncommitted schemes.

The aim of the RUS analysis is to assess whether there is sufficient capacity available to meet the forecast demand. A comparison has been undertaken between the anticipated level of demand in 2020 and the committed capacity proposed to be delivered in CP4 across the RUS area. The results show that there is generally sufficient capacity to accommodate demand across the RUS area up to 2020, with some localised crowding predicted during peak hours.

The RUS also considers the longer term capacity requirements to 2030 at a more holistic level.



Freight

In recent years, rail's freight market share has consistently grown and accounts for an 11 per cent share of the UK surface freight market.

The RUS analysis work takes into account the freight forecasts for 2019 and 2030 which were developed by the rail industry for the SFN, and the baseline for each option includes these requirements. It is anticipated that the fastest growing sector will be the non-bulk market with annual growth rates forecast at 11 per cent for domestic non-bulk and six per cent for port-driven non-bulk. The bulk sector is also forecast to grow, albeit at a slower rate. The RUS strategy aims to assess freight requirements during the planning horizon being considered.

Gaps

Following a comparison between forecast RUS demand and the committed baseline, a number of gaps were identified on the routes radiating out of central Birmingham. These gaps have been endorsed by the SMG and consolidated in line with the type of options that would be analysed to address them. The identified gaps related to capacity (freight and passenger), journey time, interchange, connectivity, and station facilities.

Options

Where a committed scheme or initiative was not in place to address an identified gap, the RUS proposes and appraises a number of options as potential solutions. In assessing such options, the RUS seeks to make the most efficient use of capacity. Options include train lengthening (beyond the CP4 Delivery Plan commitments), timetable recast and service and infrastructure enhancements. In some cases one option addresses a number of gaps across different RUS corridors. The results of this option analysis work is summarised below:

Train lengthening

The capacity analysis work undertaken for the RUS has shown that in general the capacity interventions which are proposed in the CP4 Delivery Plan will provide sufficient capacity during peak hours to cater for the demand forecast up to 2020, with standing levels being within train capacity.

The RUS does identify some areas where localised crowding will occur over and above the outputs specified in the CP4 Delivery Plan. Where a gap is based on a mismatch between passenger demand and supply in terms of train service provision, the option of train lengthening has been considered in the first instance. Economic appraisal work to assess the value for money for train lengthening has identified that a medium value for money business case exists for:

- train lengthening on one Hereford to Birmingham New Street morning and evening peak service
- train lengthening on three morning and evening Shrewsbury to Birmingham New Street peak services
- train lengthening on three morning and evening Rugeley to Birmingham New Street peak services.

In view of recent higher than expected growth on the Cannock and Walsall corridor, the RUS proposes that the lengthening of peak services between Rugeley and Birmingham New Street be further assessed as growth emerges to determine the exact number of additional vehicles required and when they will be needed.

The RUS also notes the train lengthening recommendations made in other RUSs on services which pass through the RUS area, principally on the following service groups:

- Manchester Piccadilly – Bournemouth: two to nine additional vehicles
- Manchester Piccadilly – Bristol Temple Meads/ Paignton: up to one additional vehicle
- Edinburgh Waverley – Plymouth: six to nine additional vehicles
- Birmingham New Street – Leicester/Stansted Airport: six additional vehicles.

Timetable interventions and infrastructure interventions

The RUS has considered the option of a timetable intervention to address some of the capacity or connectivity gaps that have been identified. As part of analysis undertaken, consideration has been given to infrastructure options where they are shown to be required in order to address a specific gap.

In order to address peak and all day demand between Tamworth and Birmingham New Street and between Nuneaton and Birmingham New Street, the option to provide an additional service in each hour between these locations has been considered. Analysis has demonstrated that a business case supports an additional train in each hour between Tamworth and Birmingham New Street and between Nuneaton and Birmingham New Street throughout the day. Further assessment showed that both these additional services can be extended through to Worcester (and in some cases Hereford) to provide cross-city connectivity and additional capacity in each hour to address the growth in demand on the route between Birmingham and Worcester. An infrastructure intervention at Tamworth would be required to facilitate this additional service.

Executive summary

The RUS notes that feasibility works have commenced to assess potential infrastructure interventions required on the line between Wichnor Jn and Water Orton West Jn to provide performance resilience in light of the passenger and freight growth anticipated on the route.

A timetable intervention has been considered to address the connectivity gap between the East Midlands, Yorkshire and North East areas and Coventry/Birmingham International. To address this gap and provide direct connectivity to Birmingham Airport, the RUS has assessed the opportunity to re-route the current Reading to Newcastle service (in both directions) from its existing routing via Solihull to the Coventry corridor. Feasibility work is nearing completion to assess the infrastructure requirements on the route between Leamington Spa and Coventry to accommodate forecast freight and passenger growth.

The RUS has assessed options to bridge a new gap raised during consultation which considers inadequate journey times between Nottingham and Birmingham. The RUS notes the opportunities that a timetable recast may present once Derby and Nottingham signalling renewals have been implemented in CP4 and Control Period 5 (CP5) which will create an opportunity to reduce journey times on this route.

The RUS has considered the aspiration by Centro to develop a new station at Aldridge, to accommodate passenger demand which is currently unserved by rail in this area. The RUS analysis demonstrates that a new station could be best served by an extension of the Birmingham New Street to Walsall electric service, which would require infrastructure work to extend electrification to a new station facility at Aldridge. The high level business case undertaken by Centro shows the scheme would offer high value for money. The RUS supports the development of this work by Centro.

The West Coast Main Line RUS has assessed a number of journey time and capacity requirements between Manchester and Birmingham and this RUS recognises the emerging conclusions of that work.

On some routes the RUS recommends that further timetable analysis is undertaken following planned timetable changes or other interventions. On the Chiltern Main Line between Birmingham Snow Hill and London Marylebone, the analysis undertaken for the RUS suggests that the planned Evergreen 3 project timetable interventions will provide generally overall sufficient capacity to meet demand up to 2019. However, the analysis indicates that there may be some on train crowding issues into both Birmingham Moor Street and London Marylebone during peak hours. Further consideration of the timetable on this corridor is therefore recommended following a period of operation of the Evergreen 3 project timetable.

The RUS supports further consideration of timetable options on the Aylesbury line where national rail services and London Underground Limited services both operate. To be effective, this should be a joint exercise involving Network Rail, Transport for London (TfL), London Underground Limited (LUL), and the relevant train operators. It should take into account planned LUL rolling stock changes and the planned LUL Metropolitan Line resignalling proposals.

Network Availability

The need for earlier/later services and increased Sunday services were identified by stakeholders as generic gaps across the RUS area. The RUS recognises that the initiatives being considered within the Network Availability Plan, which forms part of the CP4 Delivery Plan, will help to address these gaps. This plan considers new working methods and strategies which will help to improve late evening and weekend services across the network, both in terms of reducing disruption to current services and, in some cases, providing opportunities to run additional services at times that address suppressed customer demand.

Options to address freight gaps

The freight forecasts developed by the Strategic Freight Network (SFN) for 2019 and 2030 have been analysed to identify any gaps in the West Midlands and Chilterns RUS area. Passenger interventions developed by this RUS and those being considered by the West Coast Main Line RUS have also taken into account the need to accommodate these forecasts.

The RUS has analysed freight growth on the baseline infrastructure and timetable based on the SFN forecasts. The RUS acknowledges that the introduction of further passenger services between Bromsgrove and Birmingham during CP4, and the steep prevailing gradient over the Lickey Incline, introduce a constraint on the operation of longer and heavier freight trains on this route. In particular, the proposed Deep Sea Container Terminal at Bristol is expected to generate freight growth which would add further capacity pressures on the route via Bromsgrove. In light of the uncertainties regarding the exact volume, lengths and timing of future freight traffic that may be transported via this route, the RUS supports the development in CP4 of a feasibility study to address this issue. This study will address the overall capacity requirements on this part of the network for both passengers and freight services.

Analysis of forecast freight growth has also identified the need for signalling interventions between Kingsbury and Water Orton and improved access to Kingsbury Terminal. The RUS notes that feasibility work to develop the interventions necessary in light of anticipated passenger growth on this route (eg. the West Midlands and Chilterns RUS recommendation of additional Tamworth

services and the medium term strategy outlined in the Yorkshire and Humberside RUS for an additional long distance high speed service between Yorkshire and Birmingham) is nearing conclusion.

Operational impact of RUS recommendations at Birmingham New Street

The RUS has undertaken analysis to consider the impact of all interventions recommended in this RUS and other established RUSs and committed schemes on platform capacity at Birmingham New Street. This work has indicated that there is sufficient capacity to accommodate these changes. It is recognised that the further development of any RUS recommendations will include more detailed analysis work.

Longer-term vision

In the longer term beyond 2019, the RUS recognises that a number of major developments are currently being considered to address future capacity requirements both within the RUS area and for the national rail network as a whole. The RUS notes the potential capacity benefits that would be provided and also takes into consideration the wider implications that may result if these developments become committed schemes.

The RUS acknowledges that there are several candidate electrification infill schemes which were proposed for further analysis in the Network RUS: Electrification Strategy. The RUS acknowledges the diversionary and timetable benefits that further electrification would offer. The option analysis undertaken to support rail demand in the Aldridge/

Brownhills area supports extending electrification as the preferred option to be considered as part of the stakeholder development work.

As part of its consideration of wider stakeholder aspirations, the RUS recognises the work being developed by Centro to connect the Camp Hill lines with Birmingham Moor Street. This development would facilitate aspirations to introduce new stations along the route which would help to address wider transport requirements in the West Midlands. It would create opportunities to divert some services from Birmingham New Street into Birmingham Moor Street which would release capacity at Birmingham New Street and deliver train service reliability and performance benefits.

The RUS notes the opportunities that may be delivered as part of the East-West Rail project in the medium to long term. The delivery of new passenger services and the option of diverting freight services may assist in releasing capacity on established routes and create alternative freight routing opportunities.

The RUS recognises the preferred industry strategy for High Speed Line 2 (HS2) and notes the recent announcements with regard to the proposed strategic HS2 network, which will provide both significant additional capacity and journey time benefits between London and the West Midlands and beyond. The RUS acknowledges that this will create additional capacity on existing routes, and the industry will need to assess opportunities and plans to further optimise its use.



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 (and further amended in April 2009) to require the establishment of Route Utilisation Strategies (RUSs) across the network. Simultaneously, the ORR published guidelines on RUSs. A RUS is defined in Condition 1 of the revised network licence as, in respect of the network or a part of the network¹, 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. This explains the processes used to comply with the licence condition and the guidelines. This manual and other documents relating to individual RUSs and the overall RUS programme are available on Network Rail's website at www.networkrail.co.uk

The process is designed to be inclusive. Joint working is encouraged between industry parties, who share ownership of each RUS through its industry Stakeholder Management Group (SMG). The SMG includes Passenger Focus and London TravelWatch to represent the passengers' interests.

There is also extensive informal consultation outside the rail industry by means of a Wider Stakeholder Group (WSG). The roles and members of both the SMG and WSG are detailed further in **Chapter 2**.

The ORR guidelines require options to be appraised. This is initially undertaken using the Department for Transport's (DfT) appraisal criteria, though bespoke analysis may 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 use available input from processes such as the DfT's Regional Planning Assessments, the Wales Rail Planning Assessments, and for the period to 2014, the 2007 High Level Output Specification. The recommendations of a RUS, and the evidence of relationships and dependencies revealed in the work to reach them, in turn form an input to decisions made by industry funders and suppliers on issues such as franchise specifications and investment plans.

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 also take account of established RUSs and those in preparation when exercising its functions.

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.

1.2 Document structure

This document starts by outlining in **Chapter 2** the dimensions of the West Midlands and Chilterns RUS, and the geographical context within which it developed. It also describes the linkage to other associated work streams and studies which relate to the RUS.

Chapter 3 summarises the current capabilities and usage of the strategic routes within the RUS area detailing passenger and freight demand and the capability of the infrastructure to meet that demand.

In **Chapter 4** the committed and uncommitted schemes proposed for the future are explained along with the known train service amendments for future timetable revisions.

Chapter 5 summarises the main planning documents of relevance to the RUS together with their vision for the role of the railway over the next 30 years and analyses the rail passenger demand and freight traffic that is likely to arise.

In **Chapter 6** gaps between forecast demand and current capability are identified. Industry options for bridging the gaps pinpointed in the previous chapters are listed, discussed and appraised of their likely costs and benefits. The conclusions from this option analysis are also presented here.

Chapter 7 describes the consultation process and the themes of the feedback received following the Draft for Consultation.

Chapter 8 explains and summarises the strategy of this RUS and describes the longer-term vision for the West Midlands and Chilterns area.

Chapter 9 describes how the RUS becomes established strategy and what circumstances may require the strategy to be reviewed in the future.

Supporting data is contained in the appendices to this document. All information is available at www.networkrail.co.uk



2. Dimensions

2.1 Introduction

This chapter describes the dimensions of the West Midlands and Chilterns 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 from RUSs 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 Midlands and Chilterns RUS area
- the development of a future service specification and timetable structure for the West Midlands and Chilterns RUS area.

The West Midlands and Chilterns RUS will therefore:

- propose options to achieve the most efficient and effective use of the existing rail network for both passenger and freight services and identify cost-effective opportunities to improve it where appropriate
- enable Network Rail to develop an informed renewals, maintenance and enhancements programme in line with the Department for Transport's (DfT) aspirations 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.

The need for the industry to make more effective use of existing resources is especially important in light of the changing economic climate. The industry faces the challenge of balancing the need to respond to growing rail demand, with the need to further promote more sustainable transport systems in a way that provides value for money.

2.3 Stakeholders

The West Midlands and Chilterns RUS has been managed through a Stakeholder Management Group (SMG), which has acted as the steering group for the strategy. The SMG met at key stages during the development of this RUS. The group included train operating companies (Arriva Trains Wales, Chiltern Railways, CrossCountry, First Great Western, London Midland and Virgin Trains, freight operating companies (specifically DB Schenker, Freightliner and GB Railfreight), Network Rail, the Association of Train Operating Companies (ATOC), Rail Freight Group (RFG), the DfT, Transport for London (TfL), London TravelWatch, Centro (West Midlands Integrated Transport Authority), Passenger Focus and the Office of Rail Regulation (as an observer).

During the baseline and gap analysis process, separate sub-groups were set up alongside the main SMG to focus on key issues:

- a Passenger Demand Modelling Sub-group was convened to identify current demand for passenger services in the RUS area, and provide an informed view of future passenger growth. The group included members from Network Rail, ATOC, Centro, Passenger Focus and representation from the relevant train operating companies.
- several option appraisal sub-groups were established to provide more comprehensive analysis during the gap identification and optioneering process. Groups were set up and met on a number of occasions to focus on:
 - the central Birmingham urban passenger network
 - the Chiltern passenger network
 - freight operations and network
 - individual corridor based options review
 - performance.

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 given to growth forecasts, franchise commitments, potential housing and regeneration programmes and future rail demand.

Once a baseline was established, the group identified and analysed the gaps in detail and proposed potential options to be evaluated.

A Wider Stakeholder Group (WSG) was also established, which included representatives from local authorities, statutory bodies, community rail partnerships, rail user groups and other stakeholders. Several stakeholder briefings were held throughout the RUS process, the purpose of which was to inform the WSG of the developments and progress of the RUS, and to obtain input on local based issues.

In April 2008, introductory briefings took place in Birmingham and Aylesbury where the context, scope and objectives of the RUS were outlined along with the standard RUS processes and programme. In July 2008, baseline exhibition events were held in Birmingham and High Wycombe to enable stakeholders to review the results of the baseline exercise, and share their ideas and insights on the current and future network. This, along with subsequent feedback and further documentation submitted, provided valuable input into the process of gap identification. The baseline information from these exhibitions is available at www.networkrail.co.uk.

Passenge Focus facilitated a workshop in July 2009 which provided Rail User Groups with the opportunity to review the identified gaps and suggest any further areas for consideration.

Following the launch of the Draft for Consultation, presentations were given to Rail User Groups in December 2010 and to other wider stakeholders in January 2011 in Birmingham and High Wycombe. In addition to the above, several individual meetings were held with various stakeholders, both with SMG and WSG members, to discuss their aspirations, obtain their input and update them on RUS developments.

In addition, several one-to-one meetings were held with various stakeholders, both with SMG and WSG members, to discuss their aspirations, obtain their input and update them on RUS developments.

2.3.1 West Midlands Integrated Transport Authority

Centro is responsible for specifying public transport within the West Midlands region. Centro promotes and develops public transport services across the West Midlands and encourages their use. Centro makes a contribution to the planning of rail initiatives within the region, particularly the provision of facilities at stations, the specifications of service levels and the delivery of a fully integrated and sustainable public transport network. It is actively involved in planning station enhancements at the 63 stations that it supports.

2.4 Geographic scope

In geographical terms, the West Midlands and Chilterns RUS will consider the area covered by the West Midlands Region and parts of the South East Region. The scope area includes the rail routes within Network Rail's Strategic Route M (West Midlands and Chilterns). This is depicted in geographic and schematic format in **Figures 2.1** and **2.2** respectively.

For the purpose of analysis within the RUS, the area has been divided into the following individual corridors, as shown in **Figure 2.3**. The relationship between each corridor, and the routes beyond the RUS area, will be considered during the analysis.

- Aylesbury line
- Camp Hill line
- Cannock and Walsall corridor
- Coventry corridor
- Cross City and Lickey Incline
- Derby and Nuneaton corridor
- Leamington Spa and Chiltern corridor
- Leamington Spa and Nuneaton line
- Shrewsbury line
- Stafford and Wolverhampton corridor
- Stourbridge line
- Stratford-upon-Avon line
- Sutton Park line
- Worcester and Hereford line

There are also some disused or mothballed routes within the RUS area, specifically between Round Oak and Pleck Jn, Ryecroft Jn and Lichfield City, and Aston South Jn to Vauxhall Jn including Duddeston.

There are two major stations within the RUS area: Birmingham New Street and London Marylebone. These stations serve a large number of passengers each day, offering services to key destinations within the RUS area, and providing a link into the wider rail network through the interchange opportunities they provide.

Due to its central geographical location, services from most of the United Kingdom run into Birmingham New Street station, and it acts as a major interchange station as well as a terminating point for some local services. Birmingham New Street is managed by Network Rail and is one of the busiest stations outside London in terms of passenger numbers. In addition to direct interchange between services that run into Birmingham New Street, passengers can also make connections with services from the other two main central stations which are in close proximity: Birmingham Moor Street and Birmingham Snow Hill.

2. Dimensions

Figure 2.1 – RUS Area Geographic map

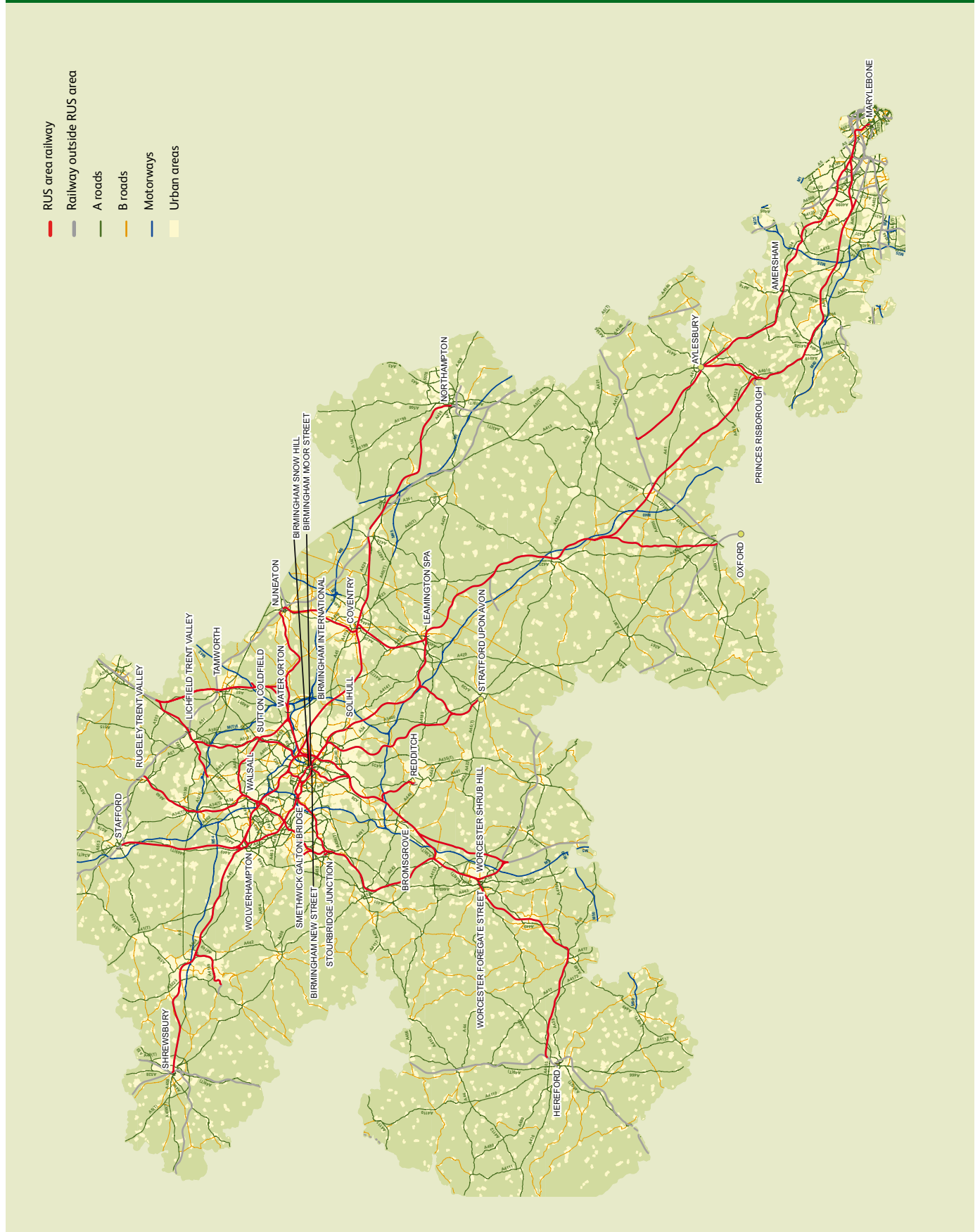
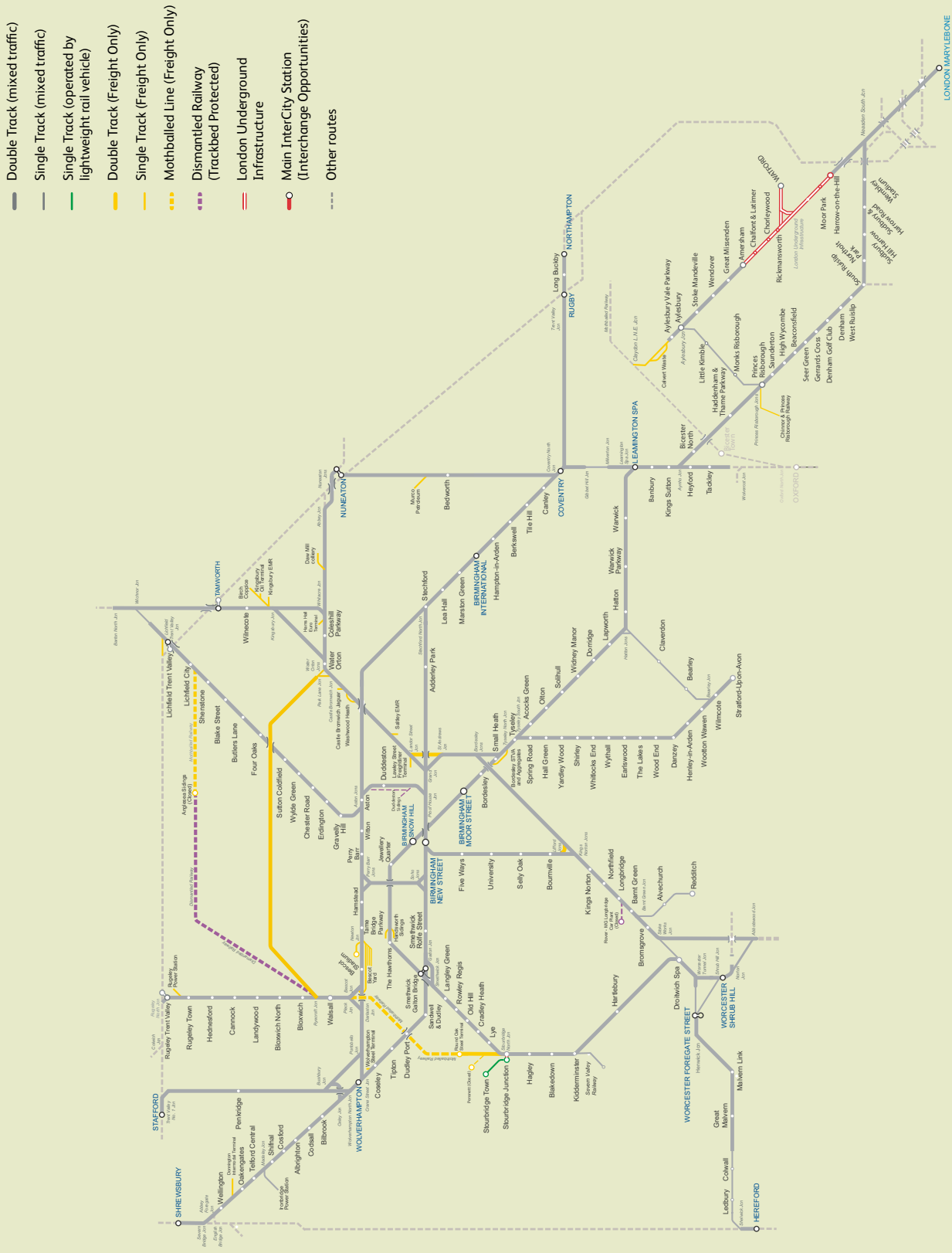
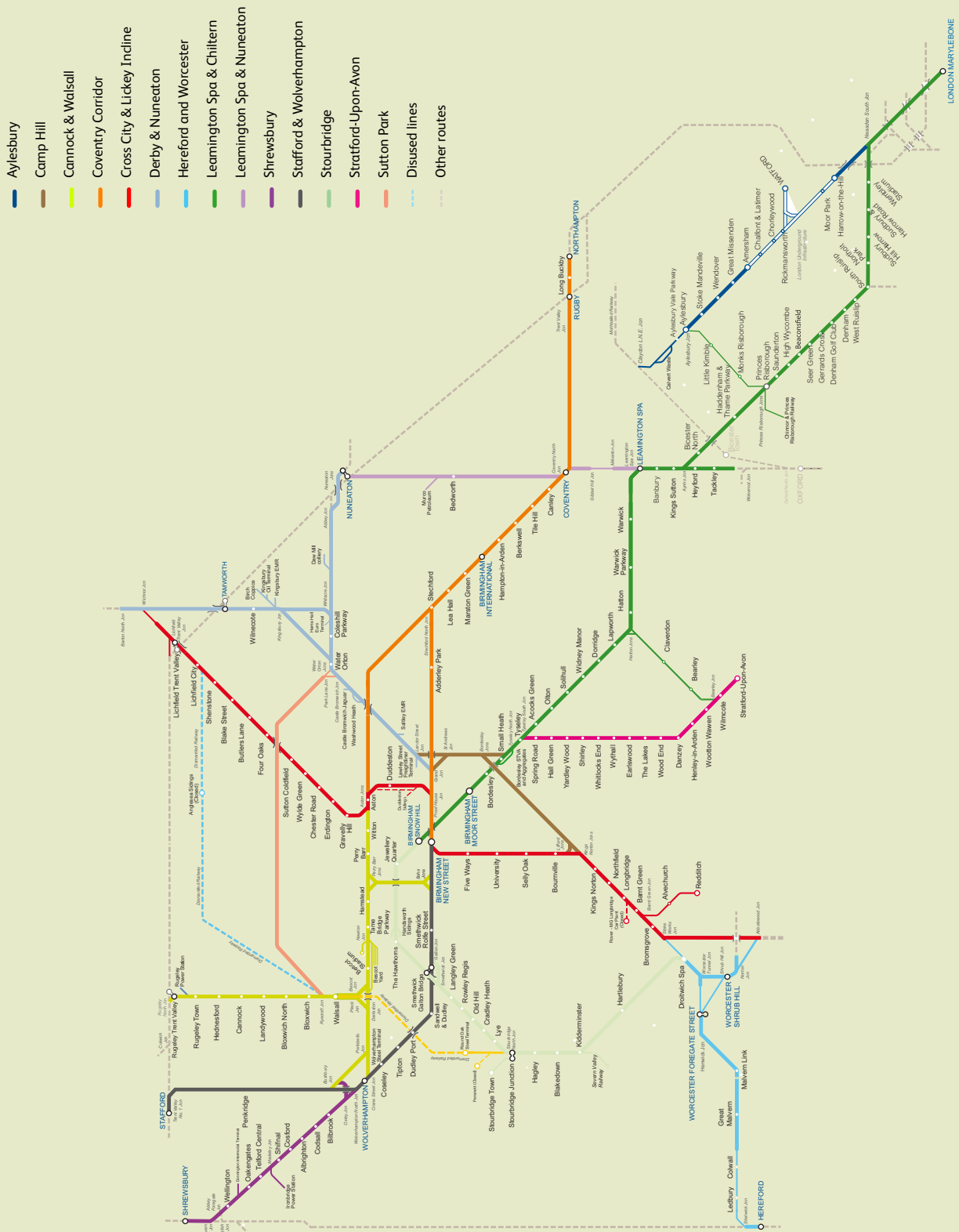


Figure 2.2 – Schematic map of RUS area



2. Dimensions

Figure 2.3 – Corridors



London Marylebone is one of London's main Rail terminus stations, and is served by London Underground's Bakerloo line. Operated by Chiltern Railways, it is smaller than many of the other London terminal stations but a recent expansion in the number of platforms has facilitated an increase in services and the number of passengers using the station. The main services into the station are also operated by Chiltern Railways.

2.5 Scope of services

The RUS will consider all passenger and freight services that make 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 Midlands and Chilterns RUS area.

The RUS will consider passenger flows into the central Birmingham stations – Birmingham New Street, Birmingham Moor Street and Birmingham Snow Hill – and London Marylebone. These stations support key market flows within the RUS area, namely local commuter, interurban and long distance passenger flows. The RUS will analyse the service flows which support these markets and consider the impact of future demand.

Analysis will focus on local commuter services between key locations in the West Midlands and the Birmingham central stations, and between London Marylebone and locations on the Aylesbury and Chilterns lines. The RUS also considers interurban services that operate between Birmingham and other key urban centres including Rugby, Stafford, Worcester, Wolverhampton, Derby, Cardiff, Nottingham and Leicester. Long distance services will also be examined, including services to London Marylebone from Stratford-upon-Avon, Kidderminster and Birmingham, and inter-city services passing through Birmingham New Street, including those from Penzance, Bristol, Liverpool, Manchester, London Euston, Bournemouth, Edinburgh, Glasgow and Newcastle.

2.6 Linkage to other RUSs

Network Rail is continuing to work through a programme of RUSs which, once complete, will cover the rail network of Great Britain. The West Midlands and Chilterns RUS is the penultimate geographical RUS and interfaces with other parts of the network which have been or are being covered in other RUSs, including the East Midlands, Great Western, London and South East, Wales, and West Coast Main Line RUSs.

The East Midlands RUS, established in April 2010, covers the lines on the Midland Mainline strategic route not assessed by the West Midlands and Chilterns or Yorkshire and Humber RUSs. This interacts with the West Midlands and Chilterns RUS area at Nuneaton and Wichnor Jn and the two RUSs interface on the routes from Birmingham to Peterborough, Cambridge and Stansted. The East

Midlands RUS has also considered freight capacity for intermodal journeys from the West Midlands to Yorkshire and the North East markets.

The Great Western RUS, established in May 2010, interfaces with the West Midlands and Chilterns RUS on the Bristol, Great Malvern and Birmingham routes. The Great Western RUS has led the analysis on services from the West Midlands to the South West and South Coast. It has also assessed crowding on interurban services between the South West, South Coast, West Midlands, Manchester and the North East.

The London and South East RUS, launched in 2009 as part of the second generation portfolio of RUSs, provides a broader investigation into capacity in and around London and the South East. The Draft due for Consultation was published in December 2010 and the final document will be published in July 2011.

The Wales RUS, established in January 2009, interfaces with the West Midlands and Chilterns RUS on the lines from Birmingham to central Wales via Shrewsbury, and Birmingham to Hereford.

The West Coast Main Line RUS was launched in late 2008 and was published as a Draft for Consultation in December 2010. The West Coast Main Line (WCML) passes through parts of the West Midlands and Chilterns RUS geography, and although it is not directly within the scope of the study, it has an influence on operations and train services. Due to the relationship between the two RUSs, their development has been closely aligned to provide synergy between the two strategies. The final West Coast Main Line RUS will be published in July 2011.

Due to the interfaces between the West Midlands and Chilterns, East Midlands, and Great Western RUS, these strategies have been interlinked in programme, scope area and services with particular regard to the interurban services currently operated by the CrossCountry franchise.

Due to services operating across several routes, cross-boundary issues have arisen. The West Midlands and Chilterns RUS has led the analysis on the following services:

- Nottingham to Cardiff
- Birmingham to Derby
- Birmingham to Manchester
- Birmingham to Liverpool
- Coventry to Derbyshire, Yorkshire and North East.

The West Midlands and Chilterns RUS considers input and analysis nationally from the Freight RUS established in May 2007 and the Strategic Freight Network (SFN). It also considers emerging strategies from the Network RUS concerning national electrification issues, rolling stock and depots, station development and scenarios and long distance forecasts.

2. Dimensions

The original programme of RUSs is scheduled to be completed during 2011. As part of the ongoing RUS programme, second generation RUSs are being developed so that recommended strategies remain valid and cover the long-term planning framework as set out in Government policy. These strategies will not seek to confine themselves to a particular geographic area and will also not reappraise the recommendations made in established RUSs where these remain valid. Recommendations made in any RUSs will be reviewed when any changes occur which may significantly affect the recommendations of the original strategy.

2.7 Linkage to other studies

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 several 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 is the proposed abolition of the former Regional Development Agencies and the formal documents which they produced, such as the Regional Spatial Strategies (RSS). It is proposed that local authorities will take collective responsibility for determining the appropriate level of growth anticipated in their areas.

Following the abolition of the former regional strategies 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.

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

- Airport Master Plan to 2030 – November 2007 (Birmingham Airport)
- Air Transport White Paper – December 2003 (DfT)
- Connecting Communities – June 2009 (ATOC)
- Delivering a Sustainable Transport System – November 2008 (DfT)
- High Level Output Specification ‘Delivering a Sustainable Railway’ – July 2007 (DfT)
- North-South links in Buckinghamshire – 2008 (Chiltern Railways)
- Rail Technical Strategy – July 2007 (DfT)
- Rolling Stock Plan – January 2008 (DfT)
- South East Plan – May 2009 (South East England Regional Assembly)
- Surface Access Strategy 2006-2012 – November 2007 (Birmingham Airport)
- Thames Valley Regional Planning Assessment – June 2007 (DfT)
- Transport 2025 vision ‘Transport vision for a growing city’ – November 2006 (Transport for London)
- West Midlands Regional Planning Assessment – July 2006 (DfT)
- West Midlands Regional Spatial Strategy – January 2008 revised version (Government Office for the West Midlands)
- West Midlands Region Rail Development Plan – June 2009 (Centro)
- NEC Group Annual Review (Master Plan)– 2008/2009 (NEC Group)

Local development frameworks were established with RSSs and intended to be a folder of local development documents prepared by district councils and unitary authorities to outline spatial planning strategy for each local area. Whilst the RSS is now abolished, the current guidance in relation to the local development framework is that they will continue subject to a review and with reference to regional policy removed.

2.8 West Midlands and Chilterns RUS time horizon

The West Midlands and Chilterns 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 'Delivering a Sustainable Railway' and Rail Technical Strategy (2007).

The RUS covers the 10-year period to 2019 in detail and then describes broad, high level strategic issues and interventions through to 2030. The outputs will form the rail industry's preferred strategy for railway regulatory Control Period 5 (2014 to 2019) and 6 (2019 to 2024).



3. Current demand, capacity and delivery

3.1 Introduction

In this chapter, the current function and capability of the rail network in the West Midlands and Chilterns Route Utilisation Strategy (RUS) area is described. Profiles are provided for passenger and freight operations, as well as information about the current infrastructure, capacity and capability; how it performs and how it is maintained.

3.2 Train operating companies

At present, eight passenger train companies operate in the West Midlands and Chilterns RUS area:

- Arriva Trains Wales is the principal operator within Wales, with services via Shrewsbury extending through the West Midlands to Birmingham International via Birmingham New Street. The franchise is due to run until 2018.
- Chiltern Railways provides long distance services between London Marylebone and the West Midlands. The route also serves significant commuter markets and leisure flows to the main settlements in Buckinghamshire and north Oxfordshire. They also operate services between London Marylebone and Aylesbury Vale Parkway via Amersham and between Princes Risborough and Aylesbury. A small number of services also operate to Kidderminster and Stratford-upon-Avon. The franchise commenced in 1996, and in 2002 a new 20 year franchise was awarded in return for commitments to invest in network enhancements. The final seven-and-a-half years of the franchise term were confirmed for Chiltern Railways in return for the investment commitments made as part of the Evergreen 3 project.
- CrossCountry provides long distance and interurban services on those routes which do not serve London, linking Scotland and the North East with the East and West Midlands, the South West and the South Coast. These include services between Plymouth and Edinburgh, Cardiff and Nottingham, Birmingham and Stansted Airport, Reading and Newcastle, Manchester Piccadilly and Bournemouth and Manchester Piccadilly and Bristol Temple Meads. These services traverse the RUS area and Birmingham New Street is a significant element of their operation for CrossCountry passengers wishing to interchange between them and with other operators' services. The current CrossCountry franchise was awarded in November 2007 and is due to run until April 2016.
- First Great Western operates services on the periphery of the RUS area. Within the RUS area they provide a long distance service between Hereford and London Paddington via Worcester, and local services between Banbury and Oxford. They operate via Worcester to Great Malvern from Bristol and beyond. Their core service operates from London Paddington through Reading to Oxford, Bristol, the West of England, and South Wales and relies on the punctuality of long distance passenger and freight services using the Leamington Spa, Worcester and Cheltenham corridors. The franchise commenced in April 2006 for a period of 10 years, with a possible break point after seven years.
- London Midland is the principal operator of interurban and suburban services across the West Midlands. Local commuter services operate from central Birmingham stations to key destinations in and around the West Midlands region including Worcester, Leamington Spa, Stratford-upon-Avon, Coventry, Wolverhampton, Walsall, Hereford, Redditch, and Stafford. London Midland operates longer distance services between Birmingham New Street and Liverpool Lime Street, and between Birmingham New Street and London Euston. The franchise was awarded in November 2007 for a period of eight years.

- London Underground Limited (LUL) runs services on the Metropolitan line from London through Harrow-on-the-Hill to Amersham and Chesham. Much of the line is shared with the main line railway service operated by Chiltern Railways which runs from London Marylebone.
- Virgin Trains operate long distance passenger services between London, the West Midlands, the North West, North Wales, Glasgow, and Edinburgh. Within the RUS area they operate three trains per hour on weekdays, between London Euston and the West Midlands, via the West Coast Main Line, two to Birmingham New Street with one continuing on to Wolverhampton. One train per hour is also operated between Birmingham New Street and Glasgow or Edinburgh. The franchise was awarded for a 15-year period from 1997 to March 2012.

In addition to the operators outlined above, Vintage Trains also operate seasonal summer steam services, primarily between Birmingham Snow Hill and Stratford-upon-Avon.

There are a number of Community Rail Partnerships who provide marketing and promotional support to parts of the rail network covered by the West Midlands and Chilterns RUS. Members of the Association of Community Rail Partnerships are listed below:

<i>Partnership</i>	<i>Route</i>
Cotswold Line Promotion Group	Hereford to Worcester
Shrewsbury to Chester Rail Partnership	Shrewsbury to Wrexham and Chester

3.3 Current passenger market profile

The West Midlands and Chilterns RUS covers a large geographical area which has a population of around seven million, of which five million live within the West Midlands region and around two million live in the areas in relatively close vicinity to the Chiltern line and the line from Aylesbury to London Marylebone. The rail network in the RUS area links the West Midlands to London and also provides wider connectivity to other large UK cities including Leeds, Liverpool, Manchester, Sheffield, Newcastle, Cardiff, Bristol, Southampton, Glasgow and Edinburgh.

The main passenger markets for rail within the RUS area can be identified as local commuting, interurban, and long distance. The journey demand levels and travel patterns within these markets reflect the concentrations of population and economic and social activity.

3.3.1 Local commuter market

Local commuter services within the RUS area are designed to meet commuter, shopping and leisure needs, particularly into the key centres of economic and social activity. Local rail commuting focuses on the major employment centres within the area and has seen significant growth in recent years. The key employment locations are concentrated in the Metropolitan area which includes the cities and urban centres of Birmingham, Wolverhampton, Coventry, Solihull, Dudley and Walsall.

The West Midlands commuter rail network operated by London Midland is extensive and busy, with services on some corridors running as often as every 10 minutes. For most other corridors there are at least two trains per hour, although some smaller stations may receive a lower frequency of service. Recent analysis has shown that the busiest commuter corridors are the Coventry, Wolverhampton, Stourbridge and Cross City lines.

3. Current demand, capacity and delivery

Chiltern Railways meets the commuter needs of a large sector covering north west London, Buckinghamshire and North Oxfordshire. There has been substantial growth in this market in recent years, and in excess of 11,000 commuters now arrive at London Marylebone in the three-hour morning peak. Smaller commuter markets exist into other towns on the route such as High Wycombe and Aylesbury. Chiltern also supports local commuter demand for travel into Birmingham. The provision of an all day frequency of two trains per hour between Birmingham Moor Street and London Marylebone supports local commuting as well as longer distance business and leisure travel. In the peak hours, the extension of the Chiltern service to Kidderminster and Stourbridge Junction is significant for this market, and in the South East Region the additional commuter services to London Marylebone from High Wycombe and Princes Risborough, and the half-hourly service from Aylesbury via Amersham, are equally important for providing access to employment in London.

The significant growth in local commuter travel within the West Midlands and into London Marylebone can also be attributed to the long-term investment and service improvements provided by the rail industry, supported by local authorities and the Integrated Transport Authority. In recent years faster and more frequent trains have been delivered on many of the busier West Midlands commuter routes, with associated improvements in station facilities and customer information. Recent investment on the Chiltern route, under the stewardship of Chiltern Railways, has concentrated on the development of new stations, providing additional platforms and car parking, and improving track and signalling on the route. These improvements have resulted in faster journey times, more regular timetables and additional services which support current demand and encourage passenger growth.

3.3.2 Interurban market

Interurban services operate to destinations within and beyond the RUS area boundaries and aim to support business, wider commuting and leisure travel. The considerable growth in this market in recent years is seen as a reflection of changing employment structures and travel patterns. Traditionally interurban rail services have primarily supported business and leisure travel, but in recent years they have also become more popular for commuters due to enhanced frequencies and faster journey times, and the increasing desire to avoid road congestion in towns and cities.

The interurban market between London and the surrounding urban centres has grown consistently in the last few decades, reflecting economic and demographic trends. The areas of the South East covered by this RUS are significant residential areas for London commuters, with London being the largest employment centre and one which can be accessed quickly by rail.

Interurban travel to major cities outside London has also grown in recent years, with Birmingham New Street station acting as a significant interchange point at the centre of the interurban network within the RUS area. CrossCountry is a key operator of regional services connecting major cities and towns outside London. The majority of CrossCountry's services pass through Birmingham New Street providing regional links to key destinations including Derby, Nuneaton, Leicester, Stansted Airport, Cheltenham, Cardiff and Nottingham. London Midland also offers semi-fast interurban services, with half-hourly services operating from Birmingham New Street to Liverpool Lime Street, one an hour to Hereford via Bromsgrove, and two services an hour operating to Northampton. There are also two trains per hour to Shrewsbury, provided by London Midland and Arriva Trains Wales. The journey times between Birmingham and these cities and towns are generally competitive with or better than those available by car and bus due to road congestion.

Interurban services are also operated from the other central Birmingham stations in the RUS area, with Chiltern Railways providing connectivity to Birmingham from other urban centres via the Chiltern Main Line. Commuting into Birmingham from Banbury and Leamington Spa, in particular, has increased in recent years with Birmingham acting as a key employment centre.

3.3.3 Long distance market

The Chiltern Main Line, referred to in this strategy as the Leamington Spa and Chiltern Corridor, connects the UK's two largest cities. In addition to the local and interurban travel outlined earlier, services on the Chiltern route also support long distance business, leisure and commuter travel. Chiltern Railways operates half-hourly services from London Marylebone to Birmingham Snow Hill and Birmingham Moor Street stations, and five trains per day from London Marylebone to Stratford-upon-Avon.

In addition to the services between Birmingham and London, the RUS area also supports long distance travel beyond its geographical boundaries. Due to its central location, the West Midlands area acts as a hub of the national rail network with many long distance services passing through Birmingham New Street, which is a primary interchange station for many destinations across the network. CrossCountry operates a network of long distance services between cities outside London, linking Plymouth and Penzance to Edinburgh via Bristol Temple Meads, Leeds and York, Bournemouth and Bristol Temple Meads to Manchester Piccadilly, and Reading to Newcastle. First Great Western also provides services from Hereford and Worcester to Oxford and London Paddington. Virgin Trains operates an hourly service between Birmingham New Street and Glasgow or Edinburgh.

3.3.4 Leisure and tourism market

The tourist and leisure attractions within the RUS area attract a substantial number of visitors, and rail provides an increasingly attractive mode of access both to local, interurban and longer distance travellers. Within the West Midlands region visitor attractions include Shakespeare's Stratford-upon-Avon, Warwick Castle, Cadbury World, Edgbaston cricket ground, the Bullring Centre and the National Memorial Arboretum near Alrewas. Various special events are also held on a regular basis at the National Exhibition Centre, National Indoor Arena, International Convention Centre and LG Arena. Within the South East region, leisure travel has also increased in recent years with passengers regularly travelling by train to visit major tourist attractions and places of interest in London, as well as other locations accessible via the Chiltern and Aylesbury routes such as Bicester Village, the Chiltern Area of Outstanding Natural Beauty, and events at Wembley Stadium and Arena.

3.3.5 Airport Access

Rail also provides surface access to some key UK airports, both within the RUS area and beyond its geographical boundaries. These include:

- **Birmingham Airport** – In a standard hour, nine direct services are operated via Birmingham New Street station to Birmingham International station, which is located via the Air-Rail Link people mover system, only 500 metres from the passenger terminals. These services are provided by a number of train operators, and provide air passengers from both the local area and locations outside the RUS area, with direct access to Birmingham Airport.
- **East Midlands Airport** – There are no direct links to East Midlands Airport from within the RUS area but connections can be made from services which call at Derby and Nottingham. A Skylink bus connects these stations to the airport on a 30-minute frequency.
- **Liverpool John Lennon Airport** – London Midland provides two direct services an hour from Birmingham New Street to Liverpool South Parkway. There is an express bus service which runs from the station to the airport.
- **London Heathrow Airport** – There is currently no direct surface access from the RUS area to London Heathrow Airport. Current access is provided by connecting services at London Paddington station or by London Underground services. An alternative mode of access is provided via bus or coach links from High Wycombe and Reading.
- **Manchester Airport** – There are no direct links to Manchester Airport station from within the RUS area but connections can be made from services which call at Crewe and Manchester Piccadilly stations.
- **Stansted Airport** – CrossCountry provides an hourly service from Birmingham New Street station to Stansted Airport via Leicester, Peterborough and Cambridge. Stansted Airport station is located under the terminal building.

3.4 Current passenger services

3.4.1 Current passenger service provision

The following diagrams depict a standard (off-peak) hour service provision, divided into the following segments:

- Aylesbury corridor (**Figure 3.1**)
- Coventry corridor (**Figure 3.2**)
- Cross City North and Walsall corridors (**Figure 3.3**)
- Cross City South and Derby and Nuneaton corridors (**Figure 3.4**)
- Leamington Spa, Stratford-upon-Avon and Chiltern corridors (**Figure 3.5**)
- Birmingham Snow Hill-Worcester corridor (**Figure 3.6**)
- Wolverhampton and Shrewsbury corridor (**Figure 3.7**).

Figure 3.3 – Cross City North and Walsall corridors – standard off-peak hour service provision

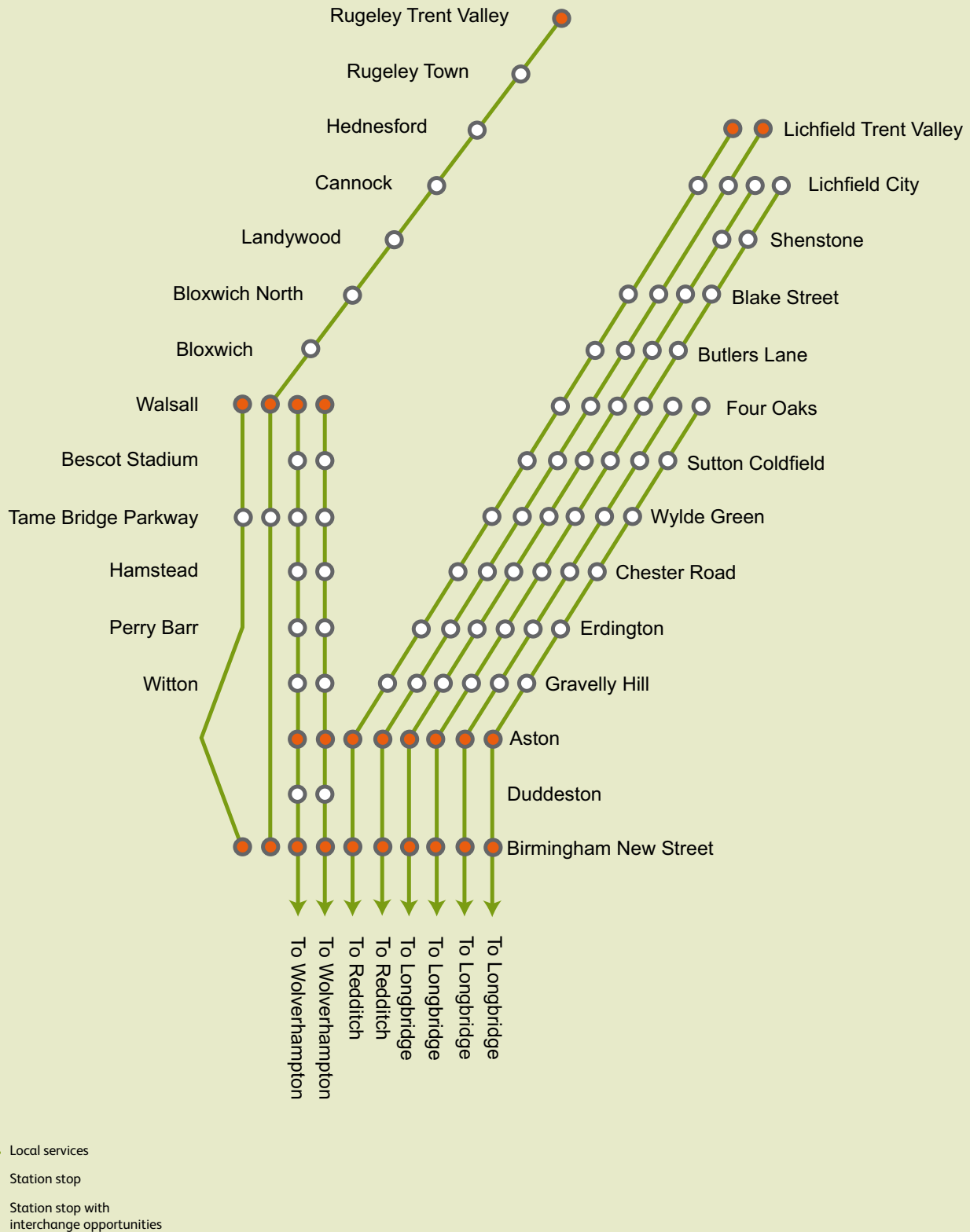
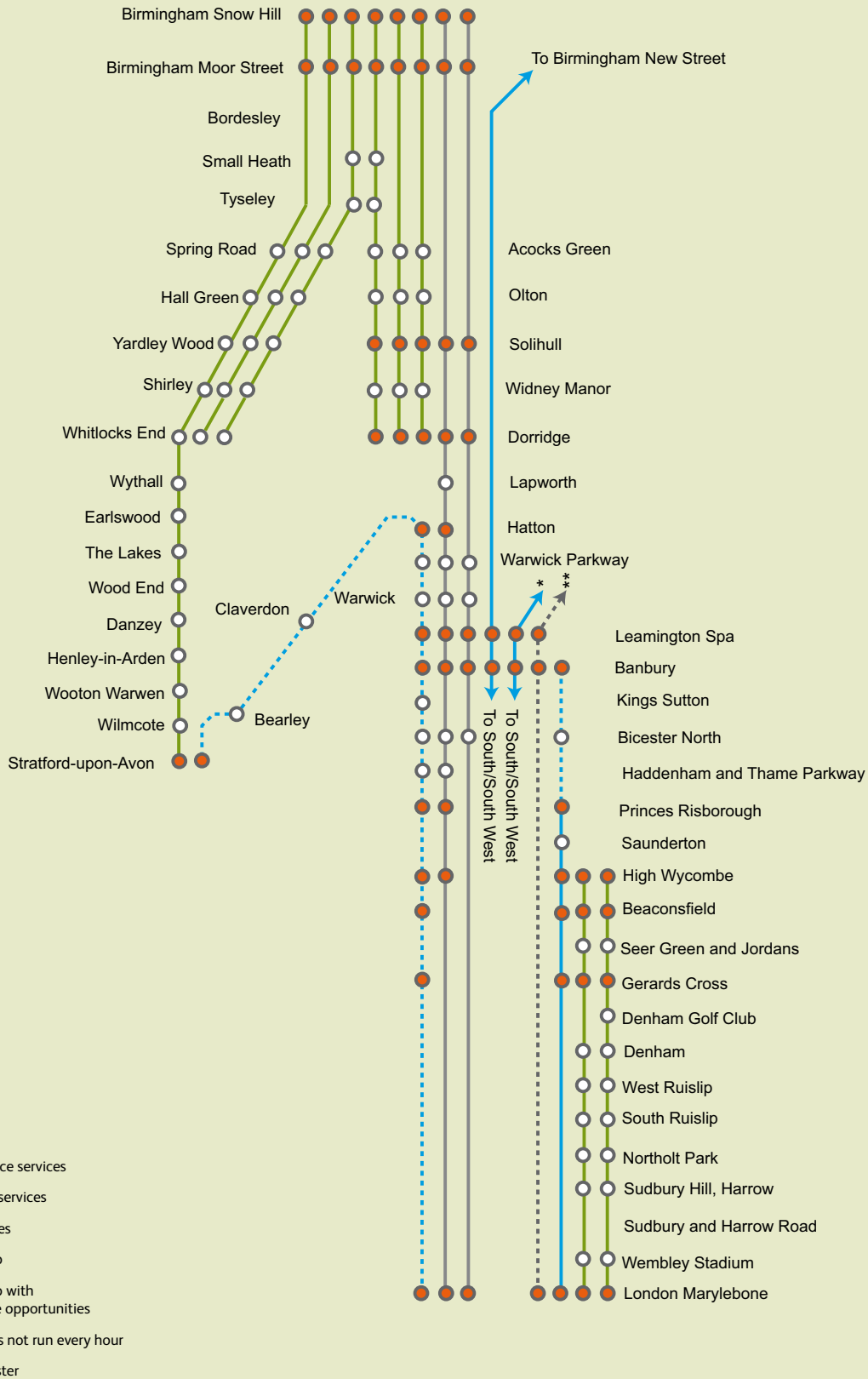
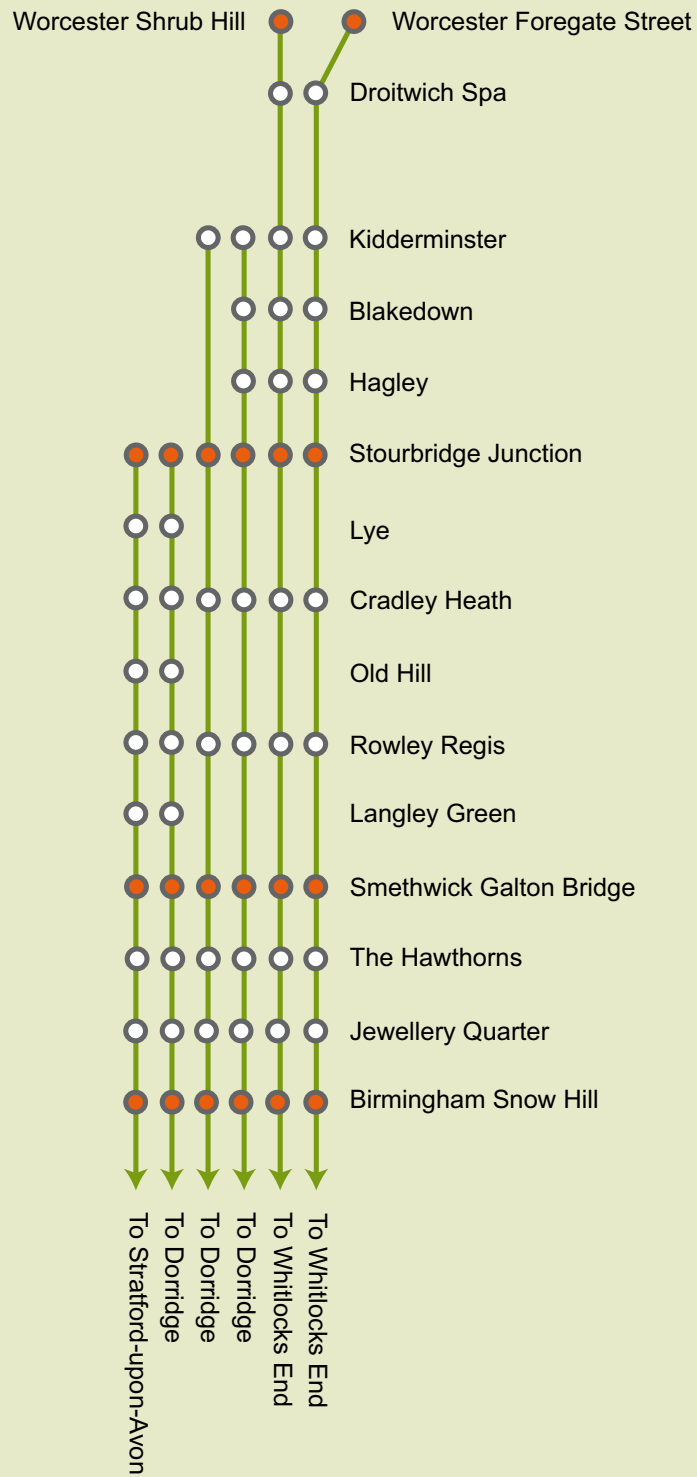


Figure 3.5 – Leamington Spa, Stratford-upon-Avon and Chiltern corridors – standard off-peak hour service provision



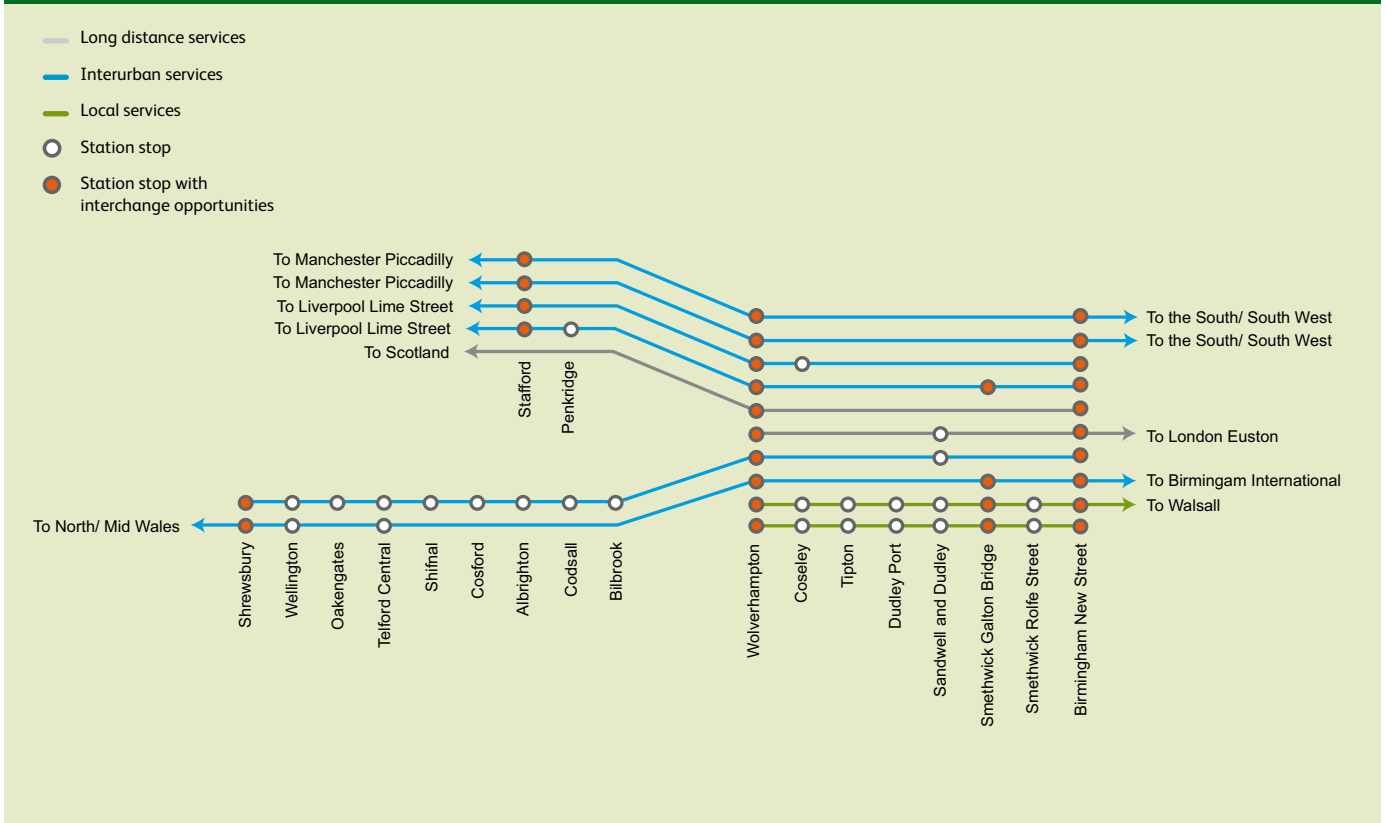
3. Current demand, capacity and delivery

Figure 3.6 – Birmingham Snow Hill – Worcester corridor – standard off-peak hour service provision



- Local services
- Station stop
- Station stop with interchange opportunities

Figure 3.7 – Wolverhampton and Shrewsbury corridor – standard off-peak hour service provision



3. Current demand, capacity and delivery

3.4.2 Current passenger service journey times

Table 3.1 presents the fastest journey times for rail services operated on key long distance routes into Birmingham and London Marylebone and their average speeds. It outlines the fastest direct journey time available to passengers for arrivals in the

morning high peak hour (between 08:00 and 08:59) and the inter-peak hours (10:00 and 16:00).

The average speed of the fastest train service and the number of stops it makes, are also presented. As shown in the table, the average speeds of rail journeys vary substantially in the RUS area. The number of stops made during the journey affects the average speed that can be achieved.

Table 3.1: Fastest journey times into central Birmingham and London Marylebone								
Origin and destination		Route miles	High-peak hour (08:00 – 08:59)			Inter-peak (10:00 – 16:00)		
From	To		Journey time	No. of stops	Average speed by rail (mph)	Journey time*	No. of stops	Average speed by rail (mph)
Into central Birmingham								
London Euston	Birmingham New Street	117	1 hr 22 mins	3	84	1 hr 22 mins	3	84
Derby	Birmingham New Street	42	39 mins	2	64	34 mins	Direct	74
Sheffield	Birmingham New Street	78	1 hr 11 mins	5	66	1 hr 4 mins	1	73
Milton Keynes Central	Birmingham New Street	66	55 mins	2	72	55 mins	2	72
Preston	Birmingham New Street	103	1 hr 38 mins	4	63	1 hr 38 mins	4	63
Bristol	Birmingham New Street	89	1 hr 26 mins	2	62	1 hr 26 mins	2	62
Leeds	Birmingham New Street	116	2 hrs 9 mins	6	54	1 hr 52 mins	5	62
Manchester Piccadilly	Birmingham New Street	82	1 hr 26 mins	4	57	1 hr 24 mins	3	59
Banbury	Birmingham Moor Street	43	55 mins**	5	47	44 mins**	3	59
Crewe	Birmingham New Street	53	54 mins	1	58	54 mins	1	58
Stoke-on-Trent	Birmingham New Street	44	48 mins	1	55	47 mins	1	56
Cambridge	Birmingham New Street	138	2 hrs 50 mins	14	49	2 hrs 38 mins	9	52
Northampton	Birmingham New Street	50	1 hr	7	50	1 hr	7	50
Leicester	Birmingham New Street	40	55 mins	5	43	49 mins	2	49
Shrewsbury	Birmingham New Street	43	55 mins	4	47	54 mins	4	48
Nottingham	Birmingham New Street	57	1 hr 17 mins	6	45	1 hr 14 mins	6	46

Table 3.1 (continued): Fastest journey times into central Birmingham and London Marylebone

Origin and destination		Route miles	High-peak hour (08:00 – 08:59)			Inter-peak (10:00 – 16:00)		
From	To		Journey time	No. of stops	Average speed by rail (mph)	Journey time*	No. of stops	Average speed by rail (mph)
Into London Marylebone								
Banbury	London Marylebone	69	53 mins	0	78	54 mins**	0	77
Leamington Spa	London Marylebone	89	1 hr 12 mins**	1	74	1 hr 11 mins**	1	75
Solihull	London Marylebone	105	1 hr 21 mins**	1	78	1 hr 29 mins**	3	71
Aylesbury	London Marylebone	43	54 mins	4	48	1 hr	8	43

* Based on a sample of journey times on Wednesdays between 10:00 and 16:00 hours

** Based on Evergreen 3 project December 2011 timetable

Table 3.2 outlines other journeys between key locations within the RUS area including airports of relevance to the West Midlands and Chilterns RUS area. The fastest rail journey times possible during the high peak hour and inter-peak are indicated. For some pairs of locations, there are no direct rail services between them. The end to end rail journey time, including rail interchange time, is presented

instead, along with the interchange station(s). In the case of Worcester Shrub Hill to Bristol Temple Meads and Birmingham New Street to Stansted Airport, the journey time for the fastest direct service and the fastest service requiring interchange are outlined due to the fact that a significant journey time saving can be made by interchanging.

Table 3.2: Journey times between other key locations

From	To	High-peak hour (08:00 - 08:59)		Inter-peak hour (10:00 - 16:00)	
		Fastest journey time	Interchange point(s)	Fastest journey time*	Interchange point(s)
Coventry	Leicester	1 hr 9 mins	Nuneaton	1 hr 3 mins	Nuneaton
Shrewsbury	London Euston	2 hrs 21 mins	Wolverhampton,	2 hr 38 mins	Crewe
Walsall	London Euston	2 hrs 1 min	Birmingham New Street	2 hrs 3 mins	Birmingham New Street
Walsall	Liverpool Lime Street	2 hrs 43 mins	Wolverhampton	2 hrs 30 mins	Birmingham New Street
Walsall	Manchester Piccadilly	2 hrs 3 mins	Rugeley Trent Valley, Stoke-on-Trent	2 hrs 19 mins	Birmingham New Street
Wolverhampton	London Euston	1 hr 38 mins	Direct	1 hr 49 mins	Direct
Worcester Shrub Hill	Bristol Temple Meads	1 hr 49 mins	Direct	1 hr 29 mins	Direct
		1 hr 21 mins	Cheltenham Spa		
Worcester Shrub Hill	London Paddington	2 hrs 25 mins	Direct	2 hrs 21 mins	Direct
Worcester Foregate Street	Hereford	51 mins	Direct	47 mins	Direct

3. Current demand, capacity and delivery

Table 3.2 (continued): Journey times between other key locations

From	To	High-peak hour (08:00 - 08:59)		Inter-peak hour (10:00 - 16:00)	
		Fastest journey time	Interchange point(s)	Fastest journey time*	Interchange point(s)
Derby	Birmingham International**	1 hr 7 mins	Direct	1 hr 2 mins	Birmingham New Street
Leeds	Birmingham International**	2 hrs 39 mins	Birmingham New Street	2 hrs 27 mins	Birmingham New Street
York	Birmingham International**	2 hrs 59 mins	Doncaster, Birmingham New Street	2 hrs 21 mins	Birmingham New Street
Birmingham New Street	East Midlands Parkway**	1 hr 11 mins	Derby	1 hr 1 min	Derby
Birmingham New Street	Liverpool South Parkway**	1 hr 23 mins	Direct	1 hr 23 mins	Direct
Aylesbury	London Heathrow Airport	1 hr 51 mins	Princes Risborough, London Marylebone, London Underground services, London Paddington	1 hr 50 mins	London Marylebone, London Underground services, London Paddington
High Wycombe	London Heathrow Airport	1 hr 26 mins	London Marylebone, London Underground services, London Paddington	1 hr 22 mins	London Marylebone, London Underground services, London Paddington
Birmingham New Street	Stansted Airport	3 hrs 16 mins	Direct	3 hrs 23 mins	Direct
		2 hrs 40 mins	London Euston, London Underground	2 hrs 35 mins	London Euston, London Underground

* Based on a sample of journey times on Wednesdays between 10:00 and 16:00 hours

** Additional time needs to be added to the rail journeys to reach the airports from the rail stations:

Birmingham International station – Birmingham Airport : <5 mins by Air-rail link

East Midlands Parkway – East Midlands Airport: approximately 10 minutes by taxi

Liverpool South Parkway – Liverpool John Lennon Airport: opportunity 10 minutes via bus link

Based on an examination of journey times and average speeds, and taking into account journey time issues raised by stakeholders, the RUS has identified journey time gaps to be considered as part of its analysis. Journey time gaps and options are presented in **Chapter 6**.

3.4.3 First and last services

Table 3.3 and **3.4** show the early and late services (including weekends) to and from Birmingham and to and from London Marylebone. This analysis will help to inform the prioritisation of routes which may require earlier and later services. Where stakeholders have highlighted the first and last services as a gap, further analysis has been undertaken to determine any constraints on service times. The RUS presents this analysis in **Chapter 6**.

Table 3.3 – First and last service analysis

Station	Weekday		Saturday		Sunday *	
	First arrival in Birmingham	Last departure from Birmingham	First arrival in Birmingham	Last departure from Birmingham	First arrival in Birmingham	Last departure from Birmingham
Regional destinations to and from Birmingham New Street / Moor Street						
Birmingham International	06:19	23:53	06:32	23:13	09:06	23:14
Bromsgrove	06:46	23:00	07:19	20:59	15:37	21:00
Cannock	06:57	23:18	07:28	23:18	10:46	22:40
Cheltenham Spa	07:56	22:12	07:56	21:12	10:36	22:12
Coleshill Parkway	07:15	22:22	06:43	22:22	12:15	21:52
Coseley	06:43	23:09	06:44	23:08	08:46	23:09
Coventry	06:19	23:53	06:39	23:13	09:06	23:14
Hereford	08:37	20:59	09:11	20:59	15:30	21:00
Kidderminster	06:28	22:59	06:45	22:59	10:20	22:55
Leamington Spa	06:33	23:33	07:12	23:40	10:26	21:18
Lichfield City	06:49	23:15	07:01	23:15	10:12	23:06
Longbridge	06:34	23:34	06:34	23:34	10:03	23:15
Marston Green	06:19	23:53	06:39	23:13	09:06	23:14
Northampton	06:19	23:10	07:01	23:53	10:30	23:00
Nuneaton	07:15	22:22	06:43	22:22	12:15	21:52
Redditch	07:03	23:14	07:02	23:14	10:03	23:15
Shirley	06:48	23:28	07:22	23:30	10:12	18:22
Shrewsbury	06:17	23:32	06:20	23:35	09:15	23:24
Solihull	06:17	23:33	07:12	23:40	10:26	21:18
Stafford	05:58	23:09	05:55	22:36	09:58	22:55
Stourbridge Junction	06:28	23:22	06:45	23:23	10:20	22:55
Stratford-upon-Avon	07:15	20:30	07:54	20:30	10:12	18:22
Sutton Coldfield	06:31	23:15	06:31	23:15	09:42	23:06
Tamworth	06:52	23:09	06:50	22:49	12:26	22:03
Telford Central	06:17	23:32	06:20	23:35	09:15	23:24
Walsall	06:28	23:18	06:26	23:18	10:27	23:17
Warwick	06:33	23:33	07:12	23:40	10:26	21:18
Wolverhampton	05:26	23:32	05:55	23:35	08:24	23:24
Worcester Shrub Hill	06:28	22:59	06:53	22:55	10:24	22:52

3. Current demand, capacity and delivery

Table 3.3 (continued) – First and last service analysis						
Station	Weekday		Saturday		Sunday *	
	First arrival in Birmingham	Last departure from Birmingham	First arrival in Birmingham	Last departure from Birmingham	First arrival in Birmingham	Last departure from Birmingham
Long distance destinations to and from Birmingham New Street						
Bristol	07:56	22:12	07:56	21:12	10:36	22:12
Cardiff	08:45	22:12	08:45	20:30	13:41	19:30
Leeds	08:09	21:03	08:08	21:03	10:21	22:03
Leicester	07:15	22:22	06:43	22:22	12:15	21:52
Liverpool Lime Street	08:17	21:36	08:17	20:01	13:16	19:35
London Euston	07:27	23:10	07:45	21:30	10:47	23:00
London Marylebone	07:33	21:18	08:59	21:18	10:26	21:18
Manchester Piccadilly	06:58	22:28	07:00	22:31	09:58	22:01
Milton Keynes Central	08:03	23:10	09:08	21:30	10:47	23:00
Nottingham	07:24	23:09	07:24	22:10	12:26	20:49
Reading	08:16	22:15	07:51	21:03	10:50	21:03
Sheffield	07:27	21:03	08:08	21:03	10:21	22:03
Stansted Airport	08:45	19:22	08:38	19:22	13:39	19:22

Table 3.4 – First and last service analysis

Station	Weekday		Saturday		Sunday	
	First arrival in London Marylebone	Last departure from London Marylebone	First arrival in London Marylebone	Last departure from London Marylebone	First arrival in London Marylebone	Last departure from London Marylebone
First and last service analysis to and from London Marylebone**						
Amersham	06:25	23:57	07:05	23:57	08:35	23:27
Aylesbury	06:12	00:10	06:30	00:10	08:35	23:45
Banbury	06:35	00:05	07:18	23:45	10:25	23:45
Bicester North	06:35	00:05	07:18	23:45	09:43	23:45
Birmingham Moor Street	07:33	23:07	08:19	22:10	10:50	22:00
Birmingham Snow Hill	09:06	21:07	09:18	21:00	10:50	22:00
High Wycombe	06:12	00:10	06:30	00:10	08:42	23:45
Kidderminster	09:06	20:10	09:18	NDS	NDS	NDS
Leamington Spa	07:06	23:07	08:19	22:10	10:50	22:00
Princes Risborough	06:21	00:10	06:30	00:10	08:42	23:45
Solihull	07:33	23:07	08:19	22:10	10:50	22:00
Stratford-upon-Avon	08:41	19:43	10:04	18:33	12:16	17:36
Sudbury Hill Harrow	07:00	20:40	NDS	NDS	NDS	NDS
Warwick	07:33	22:37	08:19	22:10	10:50	22:00
Warwick Parkway	07:06	23:07	08:19	22:10	10:50	22:00

Notes:

* Sunday 8th August sample (sample sense checked 5 September 2010)

Northbound services on the Leamington and Chiltern and Stratford-upon-Avon corridors – time taken to Birmingham Moor Street
Southbound services on the Stourbridge corridor – times taken to Birmingham Snow Hill

** Based on December 2010 timetable

NDS – no direct service

3. Current demand, capacity and delivery

3.5 Current passenger demand

In 2009/10, approximately 73 million passenger rail journeys were made within, to, and from the West Midlands and Chilterns RUS area and it is estimated that about 25 per cent of these journeys were made using Centro tickets¹. Passenger demand in the RUS area increased by around 60 per cent between 1998 and 2009², equating to an average growth rate of 4.5 per cent per annum and **Figure 3.8** plots the growth rates over this period.

This strong historic growth was attributed to several factors, including improved timetable, faster rail journey time, rail performance improvements, and growth in housing and retail developments in the Birmingham conurbation area and in the Chiltern region.

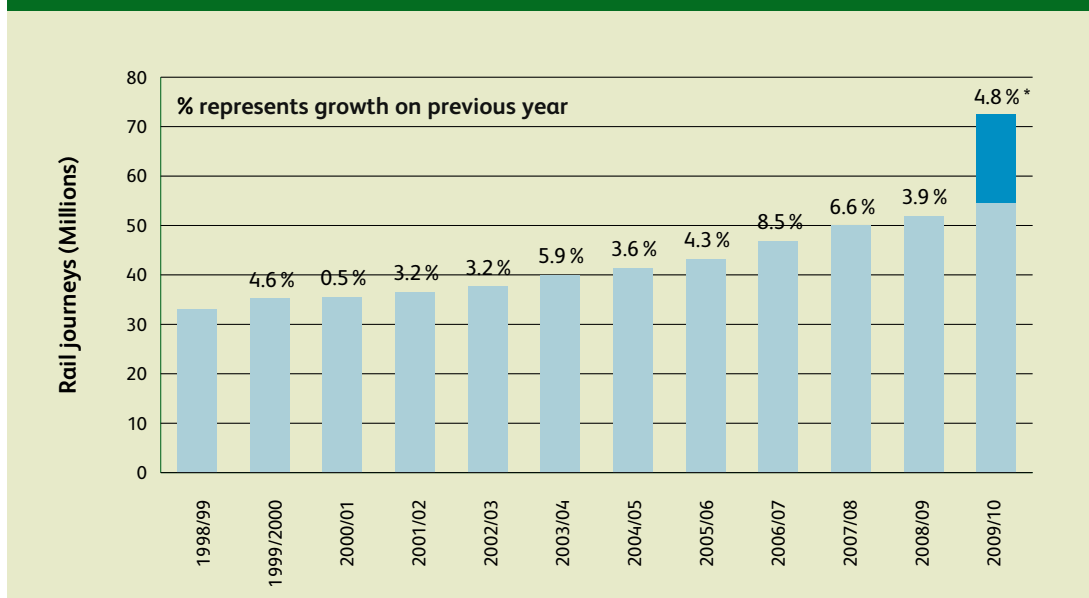
Of the 73 million RUS total journeys in 2009/10, around 18 million journeys were made to, from and within the Chiltern region (including London Marylebone) and demand has almost doubled between 1998 and 2009. The infrastructure investment made in the Evergreen I and II projects, rolling stock refurbishment, new stations and station facilities have stimulated rail demand in the Chiltern region.

Of the RUS area total journeys, around 70 per cent were made from entirely within the West Midlands and Chilterns RUS area and the remainder were made to/from areas outside the RUS area, predominantly to and from the North West, East Midlands and the South East region.

Despite the recent economic recession which saw Gross Domestic Product contract for six consecutive quarters during 2008 and 2009, passenger rail demand has remained relatively resilient. In the RUS region the number of rail passenger journeys, as shown in **Figure 3.8**, has continued to grow, albeit at slightly lower rates than the strong ones seen before the recession and this is consistent with other rail sectors across the UK. The reasons for this growth are complex, but several factors less directly linked to the economy have been working in favour of rail, such as a growing population, road congestion in cities and urban centres, fuel costs, car parking charges and structural changes in travel and employment markets.

Figure 3.8 – Growth in passenger rail journeys to/from/within the RUS area between 1998/99 and 2009/10

■ Rail journeys excluding Centro tickets
 ■ Rail journeys on Centro tickets

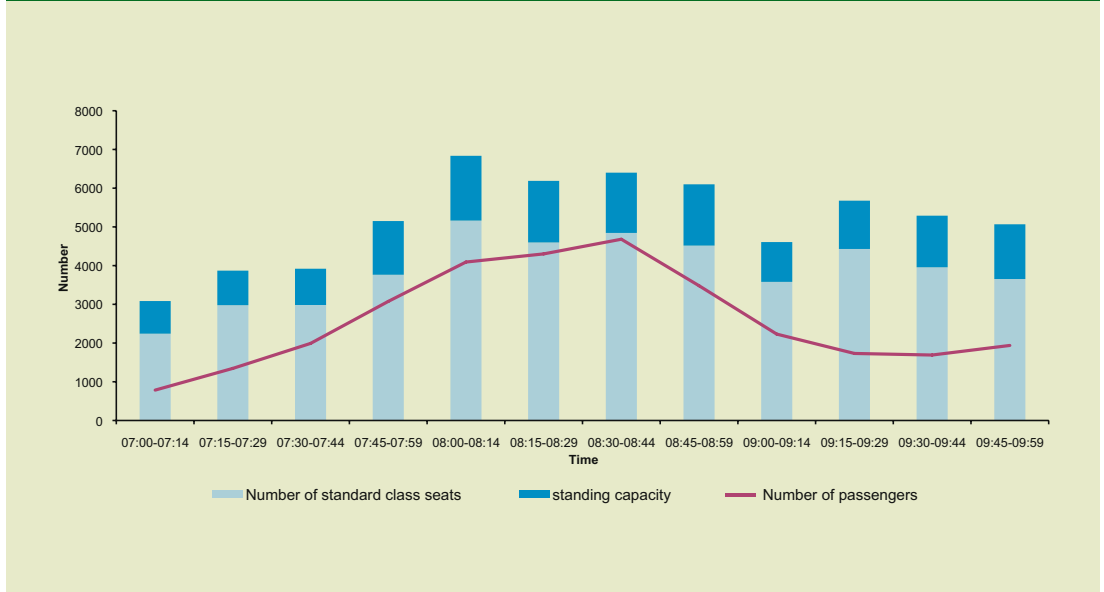


Source: MOIRA OR 25 (Midlands version) and Riff V5.

Note: The 4.8 per cent increase between 2008/09 and 2009/10 represents growth in rail journeys excluding Centro tickets. The number of rail journeys made on Centro tickets has not been estimated between 1998 and 2008. The number of rail journeys made in 2009/10 is split between rail journeys made on Centro tickets and non-Centro tickets. Figures include journeys made on London travelcards.

- 1 Centro ticket here refers to the products offered by Centro, the Integrated Transport Authority for West Midlands. There are four main ticket types offered by Centro. These are the zonal season ticket which is for rail use only, the zonal season ticket for all modes, the daily zonal ticket for all modes and the free travel pass for those over 60. These tickets are not included in pre-2009 MOIRA (LENNON rail ticket) data. An exercise undertaken as part of the MOIRA Upgrade project estimates the volume of rail journeys made on Centro tickets and their origin and destinations which are known as Centro inflits. This Centro inflit is available in MOIRA for 2009/10 data. MOIRA is the industry standard forecasting model which contains rail ticket sales data.
- 2 The number of rail journeys made using Centro tickets between 1998 and 2008 is not available. The 60 per cent increase in rail demand between 1998 and 2009 does not include Centro tickets and compares the number of rail journeys excluding Centro tickets in both years to allow a like-for-like comparison over the 11-year period.

Figure 3.9 – Passenger loadings and capacity on arrival at Birmingham central stations by corridor in the morning three-hour peak in 2009



3.5.1 Key passenger flows and station footfall

Station footfall

The busiest station in the RUS area, measured in terms of rail passenger volume, is Birmingham New Street followed by London Marylebone. **Table 3.5** shows the top 10 stations in the RUS area.

In 2009, over 26 million rail passenger journeys started or ended at Birmingham New Street station, a 75 per cent increase over 1998³. Another five million passengers interchange at the station. The top 10 origins and destinations of Birmingham New Street passengers are presented in **Table 3.6**. Birmingham Moor Street and Birmingham Snow Hill are the other main railway stations in Birmingham city centre which together have an annual passenger footfall of around seven million.

Figure 3.9 shows the number of passengers arriving into Birmingham central stations in the morning three-hour peak (07:00 to 09:59) by 15-minute intervals. This is compared against the number of standard class seats provided and the nominal train

capacity that includes both standard seats and the standing allowance, which is in accordance with the Department for Transport’s (DfT) allowance.

The high growth in rail demand at Birmingham central stations also reflects the increased modal share of rail particularly during the peak hour. In 2007, about 24 per cent of all journeys into Birmingham city centre in the morning peak hours were made by rail, in contrast to 17 per cent in 1999. During the same period, the modal share of car has decreased to 44 per cent from 52 per cent.⁴ The improved train service, increased road congestion and car parking costs, and structural changes in travel and employment markets have increased rail’s modal share of a growing transport market, particularly for commuting purposes.

London Marylebone is the second busiest station in the RUS area with approximately 11 million passengers using the station in 2009. Its top five origins and destinations are presented in **Table 3.7**. These locations are within an hour of London Marylebone highlighting the demand for commuting travel to London.

3 The number of rail journeys made in 2009 includes the estimated journeys made on Centro ticket. The 75 per cent increase reflects a like-for-like comparison between 1998 and 2009 whereas both periods do not include rail journeys on Centro tickets.

4 Data is sourced from the Birmingham Cordon Reports by Centro.

3. Current demand, capacity and delivery

Key passenger flows

Within the RUS area, the main markets for rail are identified as local commuting to Birmingham and to London Marylebone, interurban and long distance travel to Birmingham and to London Marylebone. The high level of demand to these two places is illustrated in **Table 3.6** and **Table 3.7**.

Tables 3.8 and **3.9** show the top five non-London passenger flows within and outside the RUS area respectively. All of these flows either started or

ended at Birmingham central stations, reflecting the key role Birmingham has in supporting the economic and employment growth in the West Midlands region. Moreover, all top five external flows (non-London) from the RUS area are between Birmingham and East Midlands and between Birmingham and the Manchester conurbation area, reflecting the size and significance of these major conurbations, with the transport links between them being of regional economic importance.

Table 3.5 – 10 busiest stations in the RUS area

Stations	Rail passengers (0,000s) in 2009/10
Birmingham New Street	26,460
London Marylebone	10,910
Coventry	4,810
Wolverhampton	4,280
Birmingham International	4,230
Birmingham Snow Hill	4,205
Birmingham Moor Street	3,411
Worcester stations	2,340
High Wycombe	2,150
University	2,060

Source: Data extracted from MOIRA OR25 (Midlands version). Includes estimates of rail journeys made on Centro tickets and excludes interchange. Note: Worcester stations include Worcester Foregate Street and Worcester Shrub Hill.

Table 3.6 – Top 10 passenger flows to or from Birmingham New Street

Stations	Passenger journeys (0,000s) in 2009/10
London Euston	2,315
Coventry	1,710
Wolverhampton	1,675
Birmingham International	1,535
Selly Oak	1,015
University	893
Walsall	494
Sutton Coldfield	440
Leicester	438
Bournville	425

Source: Data extracted from MOIRA OR25 (Midlands version). Includes estimates of rail journeys made on Centro tickets and excludes interchange.

3.5.2 Train loadings

Birmingham

The rapid growth in the local commuter, interurban and long distance markets has significantly increased the number of rail passengers travelling to and from Birmingham during peak periods. As a result several services are currently operating at or beyond the seating capacity of the rolling stock, and in some cases passenger loads exceed the nominal train capacity. Train capacity includes both standard class seats and the standing allowance, which is in accordance with the Department for Transport's (DFT) allowance⁵.

Tables 3.10 and 3.11 show the total number of passengers carried as a proportion of the number of standard class seats provided and as a proportion of nominal train capacity, for each corridor, in the high-peak hour (08:00 to 08:59) and in the three-hour peak (07:00 to 09:59). The number of services with passengers standing and in excess of capacity are also presented in the tables. Services are considered as in excess of capacity when passenger loads exceed the nominal train capacity or when there

are passengers standing for more than 20 minutes. This is consistent with DFT's policy. The loading numbers are based on passenger counts conducted by train operating companies in 2009/10 for services that arrive at Birmingham central stations in the three-hour peak.

The build up of demand on the local commuter services against the seating and train capacity in the high-peak hour, for each corridor, is presented in Figures 3.10, 3.11, 3.12 and 3.13. It should be noted that on the busiest trains, the seat and train capacity utilisation are much higher than the average figure and standing tends to start earlier than illustrated. For example, when the average load factor (compared to seats) in any hour exceeds 70 per cent, this generally indicates that there are individual services with passengers standing. When the average load factor exceeds 90 per cent, it normally implies that on the busiest services there are more passengers than nominal train capacity (including standing allowance).

Table 3.7 – Top five passenger flows to or from London Marylebone

Station	Passenger journeys (0,000s) in 2009/10
High Wycombe	1,459
Beaconsfield	1,045
Gerrards Cross	910
Amersham	889
Bicester North	836

Source: Data extracted from MOIRA OR25 (Midlands version). Includes estimates of rail journeys made on London travelcards.

⁵ In general, standing allowance is estimated at 0.45 square metres per passenger, in accordance with the DFT High Level Output Specification for Control Period 4. For typical commuter rolling stock, its standing allowance is 40 per cent of standard class seats although this can vary significantly by rolling stock type. The standing allowance of typical interurban and long distance train is around 20 per cent.

3. Current demand, capacity and delivery

Table 3.8 – Top five non-London passenger flows within the RUS area

Station	Passenger journeys (0,000s) in 2009/10
Coventry – Birmingham	1,710
Wolverhampton – Birmingham	1,675
Birmingham International – Birmingham	1,535
Selly Oak – Birmingham	1,015
University – Birmingham	893

Source: Data extracted from MOIRA OR25 (Midlands version). Includes estimates of rail journeys made on Centro tickets. Birmingham includes Birmingham New Street, Moor Street and Snow Hill stations.

Table 3.9 – Top five non-London external passenger flows to/from the RUS area

Station	Passenger journeys (0,000s) in 2009/10
Leicester – Birmingham	438
Derby – Birmingham	336
Manchester – Birmingham	330
Nottingham – Birmingham	289
Stoke-on-Trent – Birmingham	242

Source: Data extracted from MOIRA OR25 (Midlands version). Includes estimates of rail journeys made on Centro tickets. Birmingham includes Birmingham New Street, Moor Street and Snow Hill.

All corridors into Birmingham have some passengers standing in the morning three-hour peak, particularly on the local commuter trains, although standing on most services is for less than 20 minutes and passenger loads are generally below the nominal train capacity (including standing allowance). However, on the busiest local commuter services to Birmingham, some passengers stand from as far as Coventry and Stourbridge, which are more than 20 minutes from central Birmingham. It should be noted that the commuter services on some corridors, such as Coventry, use high capacity rolling stock that offers more standing room (such as Class 350 rolling stock) allowing more passengers to be accommodated.

Some of the long distance services to Birmingham are heavily loaded in the peak when they are also used by commuters. In the morning peak hour, there are passengers standing on the long distance services on the Coventry, Stafford and Wolverhampton, and Derby and Nuneaton corridors. The Wolverhampton and Stafford corridor is one of the busiest corridors in the RUS area with train services connecting key urban centres in the Birmingham, Manchester and Liverpool conurbation areas. On this corridor, some passengers stand from

Wolverhampton to Birmingham in the peak. On the Coventry corridor, currently there is one long distance morning peak service with more passengers than the nominal train capacity highlighting the high level of demand for commuting, business and leisure travel including demand to or from Birmingham Airport and the National Exhibition Centre. On the Derby and Nuneaton corridor, several interurban and long distance services that call at local stations such as Tamworth and Water Orton have passengers standing in the peak hour and some have to stand for more than 20 minutes. High levels of seat and capacity utilisation are also observed in the inter-peak and on weekends. Providing sufficient capacity on the interurban and long distance services to meet demand for commuting, business and leisure markets is an issue the RUS needs to address, and this is discussed further in **Chapter 6**.

Table 3.10 – High-peak hour (08:00 to 08:59) load factors on arrival at central Birmingham stations, average weekday in 2009/10

Corridor	Passenger market	Load factor: The number of passengers compared to seats	Load factor: The number of passengers compared to train capacity	Number of services	Number of services with passengers standing	Number of services in excess of capacity
Coventry	Local commuting	108 %	75 %	4	3	1
	Interurban and long distance	58 %	49 %	5	0	0
Cross City North	Local commuting	85 %	69 %	6	2	0
Cross City South	Local commuting	85 %	69 %	6	2	0
	Interurban and long distance	72 %	50 %	4	0	0
Cannock and Walsall	Local commuting	76 %	47 %	4	1	0
Derby	Interurban and long distance	73 %	60 %	4	1	1
Nuneaton	Interurban and long distance	87 %	72 %	3	2	2
Worcester and Hereford	Interurban	73 %	44 %	2	0	0
Leamington Spa & Chiltern	Local commuting	101 %	77 %	4	2	0
	Interurban and long distance	101 %	70 %	3	1	0
Shrewsbury	Interurban and long distance	93 %	59 %	3	1	0
Stafford & Wolverhampton	Local commuting	83 %	63 %	3	1	0
	Interurban and long distance	80 %	59 %	6	1	0
Stourbridge	Local commuting	109 %	77 %	7	4	1
Stratford-upon-Avon	Local commuting	96 %	74 %	4	3	0

Source: 2009/10 passenger counts conducted by Arriva Trains Wales, Chiltern Railway, CrossCountry, London Midland and Virgin Trains.
Note: Train capacity includes both standard class seats and standing allowance. Services are in excess of capacity when passenger loads exceed the nominal train capacity or when there are passengers standing for more than 20 minutes. This is consistent with DfT policy.

3. Current demand, capacity and delivery

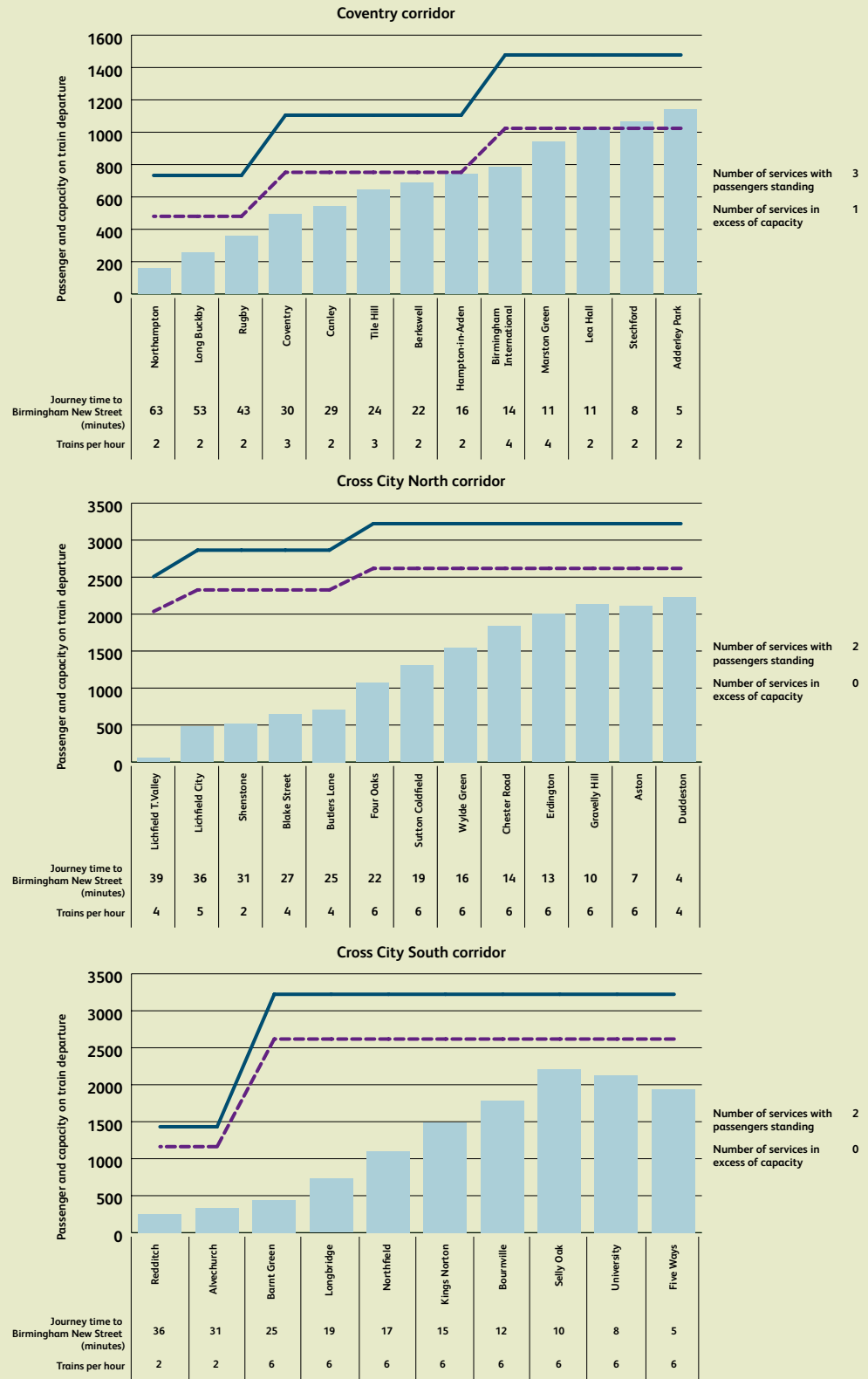
Table 3.11 – Morning three-hour peak (07:00 to 09:59) load factors on arrival at central Birmingham stations, average weekday in 2009/10

Corridor	Passenger market	Load factor: The number of passengers compared to seats	Load factor: The number of passengers compared to train capacity	Number of services	Number of services with passengers standing	Number of services in excess of capacity
Coventry	Local commuting	71 %	50 %	13	4	1
	Interurban and long distance	52 %	44 %	14	2	1
Cross City North	Local commuting	64 %	52 %	18	3	0
Cross City South	Local commuting	66 %	54 %	18	2	0
	Interurban and long distance	66 %	43 %	7	1	0
Cannock and Walsall	Local commuting	56 %	36 %	11	1	0
Derby	Interurban and long distance	69 %	58 %	10	1	1
Nuneaton	Interurban and long distance	76 %	65 %	7	3	3
Worcester and Hereford	Interurban	72 %	43 %	6	2	1
Leamington Spa & Chiltern	Local commuting	82 %	63 %	10	3	0
	Interurban and long distance	71 %	47 %	6	1	0
Shrewsbury	Interurban and long distance	57 %	37 %	8	1	0
Stafford & Wolverhampton	Local commuting	65 %	51 %	6	1	0
	Interurban and long distance	69 %	50 %	14	1	0
Stourbridge	Local commuting	79 %	56 %	17	6	1
Stratford-upon-Avon	Local commuting	70 %	53 %	10	3	0

Source: 2009 passenger counts conducted by Arriva Trains Wales, Chiltern Railways, CrossCountry, London Midland and Virgin Trains.
Note: Train capacity includes both standard class seats and standing spaces. Services are in excess of capacity when passenger loads exceed the nominal train capacity or when there are passengers standing for more than 20 minutes. This is consistent with DfT policy.

Figure 3.10 – Passenger loadings and capacity for commuter services into Birmingham stations by corridor in the morning high-peak hour in 2009

- Train capacity (seating and standing capacity)
- - - Seats
- Passenger loadings 2009



3. Current demand, capacity and delivery

Figure 3.11 – Passenger loadings and capacity for commuter services into Birmingham stations by corridor in the morning high-peak hour in 2009

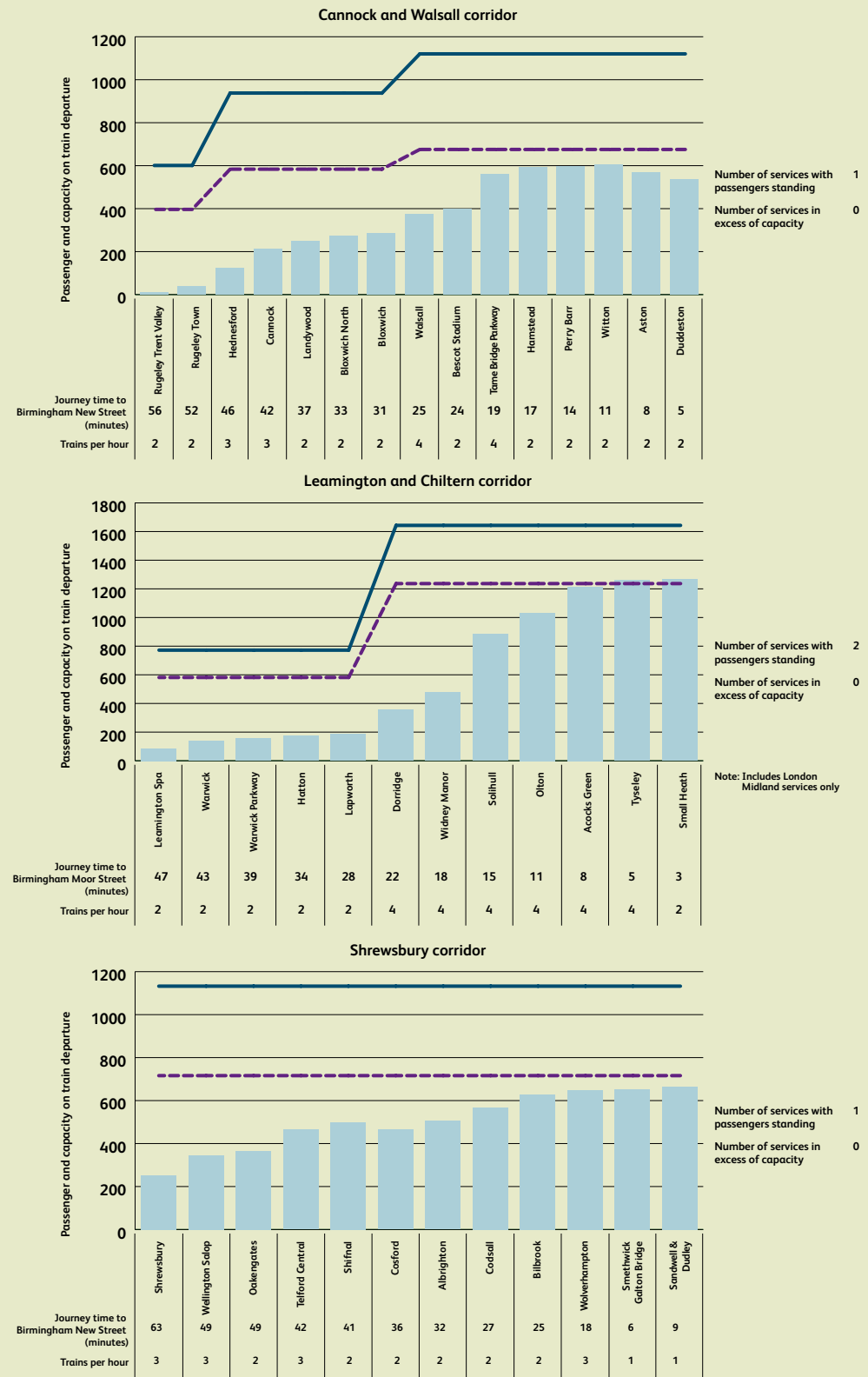
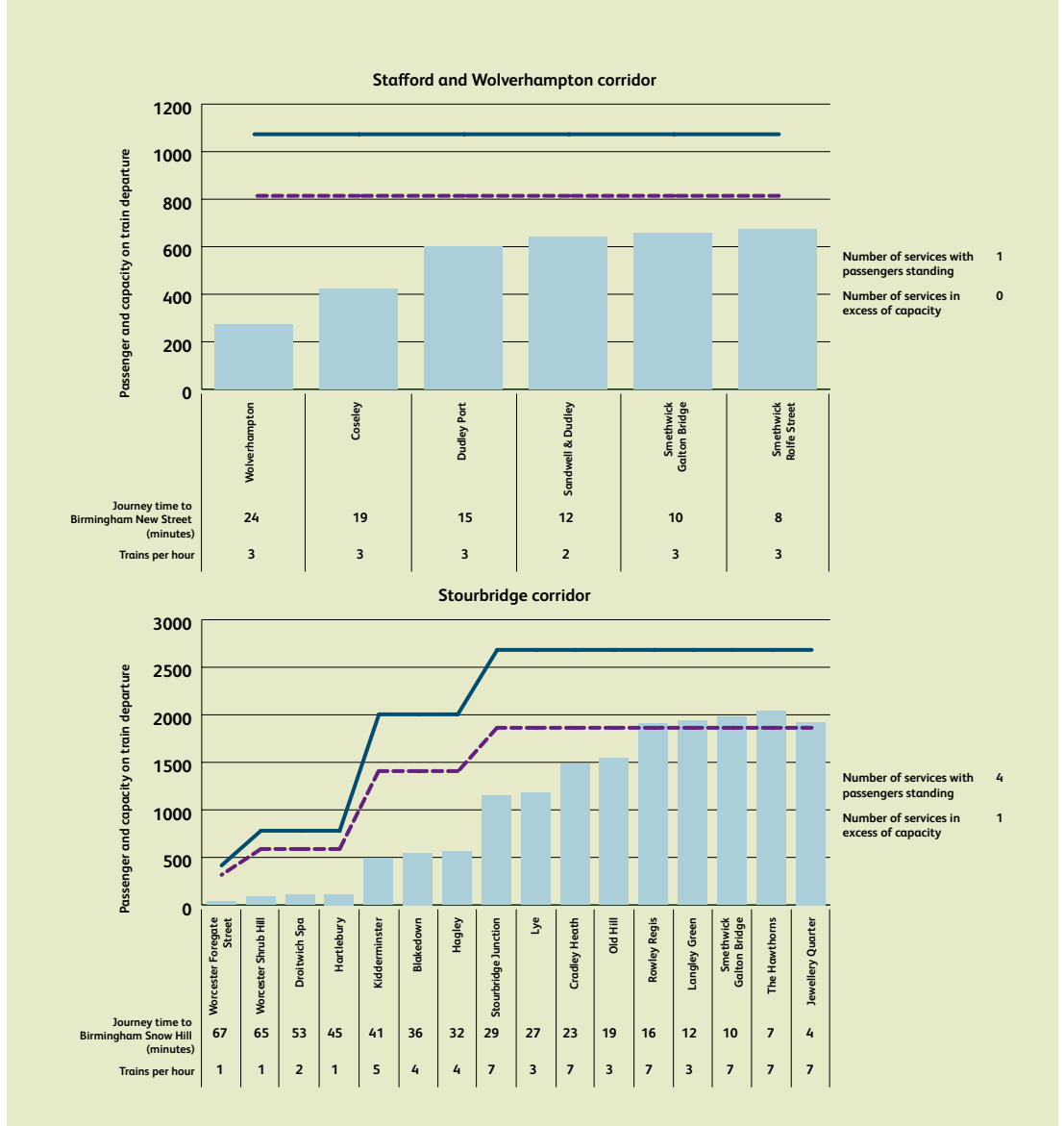


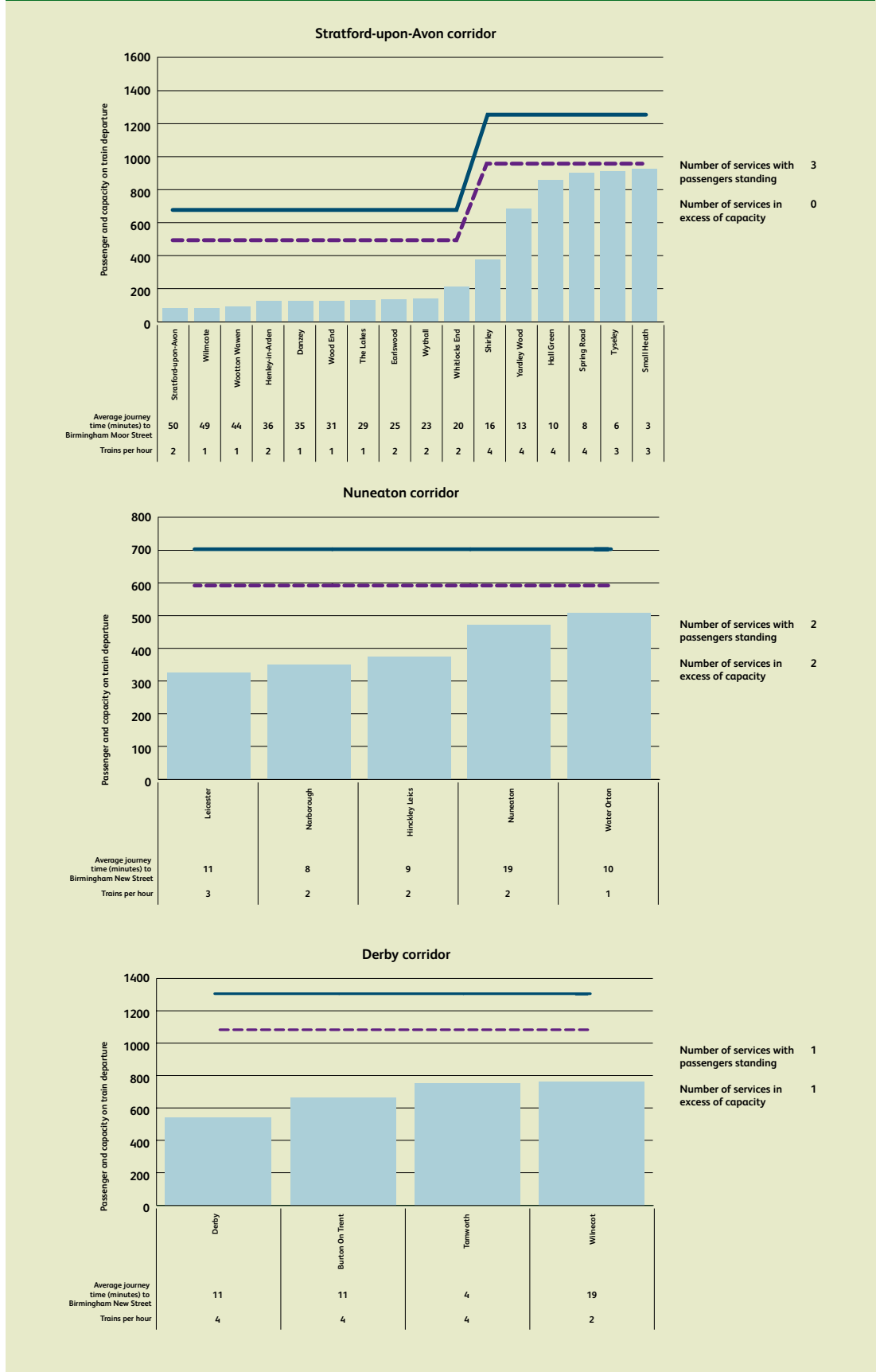
Figure 3.12 – Passenger loadings and capacity for commuter services into Birmingham stations by corridor in the morning high-peak hour in 2009



3. Current demand, capacity and delivery

Figure 3.13 – Passenger loadings and capacity for local commuter services into Birmingham stations by corridor in the morning high-peak hour in 2009

- Train capacity (seating and standing capacity)
- - - Seats
- Passenger loadings 2009



London Marylebone

The level of rail demand to London Marylebone station varies considerably by time of day and day of the week, with demand at its highest in the morning three-hour peak on a weekday. The proportion of passengers carried as a proportion of seats and nominal train capacity (including standing capacity) in the morning high-peak and three-hour peak, by service groups⁶, are illustrated in **Tables 3.12** and **3.13** respectively, along with

the number of services with passenger standing. They show that the average load factor, relative to nominal train capacity, over the three-hour peak is 81 per cent when all services are included, increasing to 90 per cent in the high peak hour. Aylesbury services via Amersham have the highest utilisation both in terms of seating and train capacity with all three services in the high-peak hour having passengers standing and two of these are in excess of train capacity.

Table 3.12 – Morning high-peak hour (08:00 to 08:59) load factors on arrival at London Marylebone, average weekday in 2009/10

Corridor and service group	Load factor: The number of passengers compared to seats	Load factor: The number of passengers compared to train capacity	Number of services	Number of services with passengers standing	Number of services in excess of capacity
Aylesbury (via Amersham)	113 %	102 %	3	3	2
Leamington Spa and Chiltern: suburban	100 %	79 %	5	2	0
Leamington Spa and Chiltern: long distance	98 %	91 %	7	2	2
Total	102 %	90 %	15	7	4

Table 3.13 – Morning three-hour peak (07:00 to 09:59) load factors on arrival at London Marylebone, average weekday in 2009/10

Corridor and service group	Load factor: The number of passengers compared to seats	Load factor: The number of passengers compared to train capacity	Number of services	Number of services with passengers standing	Number of services in excess of capacity
Aylesbury (via Amersham)	108 %	91 %	10	7	2
Leamington Spa and Chiltern: suburban	91 %	69 %	15	5	2
Leamington Spa and Chiltern: long distance	92 %	86 %	14	5	4
Total	96 %	81 %	39	17	8

Source: Passenger count conducted in Spring 2010 by Chiltern Railways.

Note: These counts do not include passengers on the London Underground Limited Metropolitan lines. Train capacity includes both standard class seats and standing allowance. Services are in excess of capacity when passenger loads exceed the nominal train capacity or when there are passengers standing for more than 20 minutes. This is consistent with DfT policy. For the Aylesbury via Amersham service group, Rickmansworth and stations north of it are more than 20 minutes from London Marylebone. For the suburban service group, in general Northolt Park and stations north of it are 20 minutes from London Marylebone and for the long distance service group, it tends to be Denham and stations north of it. The 20-minute boundary varies by service groups due to different calling patterns.

6 On the Leamington Spa and Chiltern corridor, generally services starting from High Wycombe and south of it are grouped to form the suburban services with the remainder being grouped in long distance.

3. Current demand, capacity and delivery

Metropolitan line: Amersham to central London

The Metropolitan line services, relevant to the scope of this RUS, operate between Amersham and Baker Street with some continuing to Liverpool Street in the City of London and beyond, along with the train services operated by Chiltern Railways from Aylesbury to London Marylebone. Chiltern services offer faster journey times than Metropolitan services as fewer stops are made, although Metropolitan services give direct access to Liverpool Street in central London, one of the main employment locations in the City. The infrastructure between Amersham and Harrow-on-the-Hill is owned by London Underground Limited (LUL) and shared by them and Chiltern Railways.

Around 800 passengers use the Metropolitan line at Amersham in each morning three-hour peak (07:00 to 09:59) on a typical weekday. Patronage on the Amersham to central London services increases along the route when it approaches central London. In 2009, overall there was sufficient train capacity, including seats and standing space, on the Amersham to central London Metropolitan line services to meet demand between Amersham and Baker Street. In the morning three-hour peak, average load factor compared to train capacity, of the Amersham services, is less than 50 per cent increasing to 60 per cent after Baker Street. This is an average figure and can mask the busiest trains. In the high-peak hour, the busiest services operate close to train capacity (including standing spaces). The interior of LUL's Metropolitan line trains are designed to accommodate a higher volume of passengers and offer more standing space than the rolling stock used on the national rail services. As part of the wider sub-surface line upgrade, LUL plans to increase capacity on the Metropolitan line through increased service frequency and the introduction of higher capacity rolling stock (known as S-stock). This would help to meet increasing demand.

3.5.3 Birmingham Airport

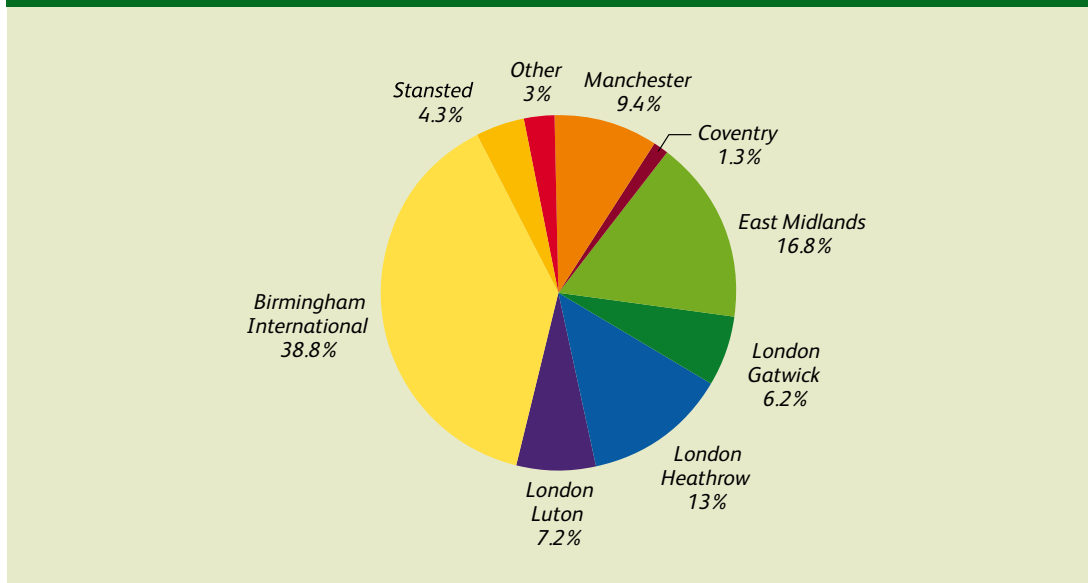
In 2009, Birmingham Airport was the second busiest airport in the UK outside London. In 2009, the airport handled approximately 9.1 million passengers and the volume of air passengers at Birmingham Airport is forecast to grow to 27 million passengers per year by 2030⁷. The airport, which has recently been renamed, is located in the Metropolitan Borough of Solihull, adjacent to the National Exhibition Centre and eight miles south east of Birmingham's city centre. It has a catchment area of approximately nine million people living within a 60-minute car journey of the airport. **Figure 3.14** shows where air passengers in the Midlands flew from in 2008 and its proportion. In 2008, it is estimated that about 30 per cent of air passengers in the Midlands flew from Birmingham Airport and about 30 per cent flew from London airports.

Birmingham Airport has good public transport links and is connected by bus, coach and rail. To support the ongoing development of the airport, it is important to ensure that public transport links are continually reviewed and sufficient for future demand predicted, been highlighted as a key objective to support the ongoing development of the airport. In terms of rail service provision, the airport terminal can be accessed from Birmingham International station via the Air-Rail Link, which is a shuttle service that connects the rail station with the airport passenger terminals. In 2009, approximately 27 per cent of air passengers travelled to the airport by public transport (where public transport is defined as non-car and non-taxi) and rail accounting for 15 per cent of all journeys. Analysis of passenger surveys conducted at the airport in 2008 indicated that routes with direct rail services to the airport (such as Shrewsbury and Stafford and Wolverhampton) tend to have more than 20 per cent of air passengers travelling to the airport using rail, highlighting that good rail linkage helps to stimulate rail's modal share. The Airport Surface Access Strategy published in 2007 has set a Passenger Public Transport Mode Share target for the airport of 25 per cent by 2012 with a mode share target of 12 per cent of all journeys.

Since 2008, there were approximately 7,000 people employed at the airport. Approximately 24 per cent of staff employed at the airport travelled to work by public transport (defined as non-car and non-taxi), but with rail accounting for approximately five per cent only, partly due to a large proportion of staff starting shifts in the early morning when rail services are not available or not as frequent. The new Airport Surface Access Strategy has set an Employee Public Transport Mode Share target for the airport of 25 per cent by 2012 with a rail mode share target of six per cent.

7 Source: Airport Master Plan published by Birmingham Airport. Forecast is unconstrained and assumes provision of the Runway Extension by 2012

Figure 3.14 – Airports used by people in the Midlands in 2008



Source: Facts and Statistics, 2009 by Birmingham Airport

3.6 Freight operating companies

There are currently five freight operators operating regular services on the route but others may operate irregular services, and new operators may emerge from time to time.

3.6.1 DB Schenker

DB Schenker is a logistics company, which is a wholly owned subsidiary of Deutsche Bahn AG. The company is involved in a wide range of markets including air, land and sea freight, with a rail division encompassing a variety of European rail freight companies. DB Schenker is the largest freight operator in the UK and also has a licence to operate European services.

3.6.2 Freightliner Group

Freightliner Group has two freight operating companies: Freightliner Limited and Freightliner Heavy Haul. Freightliner Limited is the largest rail haulier of containerised traffic in the UK, 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.

3.6.3 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.

3.6.4 Direct Rail Services Limited

Direct Rail Services operates traffic for the power industry in the UK. In the last few years the company has expanded into running services in the domestic intermodal and short sea intermodal markets. Key traffic flows for domestic container products are between Daventry and Grangemouth, Aberdeen and Mossend.

3.6.5 Colas Rail

Colas Rail provides rail freight haulage for all market sectors throughout the United Kingdom and Europe.

3. Current demand, capacity and delivery

3.7 Current freight market profile

3.7.1 Overview

Rail freight plays a vital role in Britain's economy. In recent years rail's freight market share has consistently grown and now accounts for an 11 per cent share of all surface freight transport in the UK. The Government has openly welcomed and encouraged this growth in light of significant economic and environmental benefits.

There is a significant level of freight traffic in the RUS area. In general freight demand in the West Midlands area and across the route remains steady. Due to its population, the West Midlands Regional Freight Strategy (2007) emphasises the role of the region as a major market for buying and selling goods and services and the importance of sustainable freight for its economic prosperity and quality of life. In addition to the large quantity of freight which is transported to and from terminals and freight yards in the West Midlands, a significant volume of freight passes through the region.

A significant focus for rail freight movements within the RUS area is between the West Midlands and the East of England (especially Felixstowe), the South and the South West. These movements originate at the East Coast ports. Between 1997 and 2006 the West Midlands region has seen a 420 per cent increase in inbound trains from UK deep-sea ports and this growth is expected to continue in the long term as further terminal expansion takes place.

Figures 3.15, 3.16 and 3.17 illustrate the principal freight flows and the locations of freight sites within the RUS area. The key freight markets within the West Midlands and Chilterns RUS area are :

- intermodal
- coal
- metals
- petroleum
- automotives
- aggregates.

The main freight routes are

- Birmingham - Nuneaton (- Leicester)
- Birmingham - Solihull - Leamington Spa - Banbury
- Leamington Spa - Coventry
- Coventry - Nuneaton, and onto the West Coast Main Line
- Birmingham - Tamworth (- North East)
- Sutton Park line - Walsall
- Bromsgrove - Camp Hill - Water Orton corridor - Stafford - Bescot-Stechford - Coventry - Rugby.

3.7.2 Major flows

There are significant flows of freight traffic to local terminals and marshalling yards within the West Midlands, and a substantial volume of freight traffic also traverses the route to and from locations outside the region. The main freight markets within the RUS area are described below.

Coal

Coal remains a dominant fuel used for generating electricity in the UK. Taking into account the continuing uncertainty in gas and oil prices and the time it takes to build nuclear power stations, coal is expected to remain in demand for the foreseeable future. Coal traffic in the West Midlands originates from Daw Mill Colliery to serve the Power Stations at Ratcliffe and Drax. The power stations at Ironbridge and Rugeley are served by longer distance coal flows from deep sea ports and loading facilities in Scotland, Liverpool, Bristol and the east coast. As the Power Station at Ironbridge is not fitted with Flue Gas Desulphurisation (FGD) it is not expected to continue operating beyond 2015.

Intermodal

There is high demand for container and intermodal freight transport, and rail is increasing its modal share of this market. The West Midlands region is critical for Freightliner Limited, who generate around 200,000 container movements per year, and Lawley Street in Birmingham is a key intermodal terminal. There are third-party terminals located at

- Hams Hall
- Birch Coppice (BIFT)
- Daventry (DIRFT)
- Rugby
- Telford.

Traffic at these terminals comes from deep sea ports, especially the east coast ports and Southampton, and from mainland Europe via the Channel Tunnel. A high proportion of traffic at DIRFT is domestic traffic.

There was an increase in services to Hams Hall, Daventry and Birch Coppice within the West Midlands area in 2009. Since the completion of loading gauge clearance to W10 from Southampton to the West Midlands in March 2011 further increases in freight traffic have been stimulated with new services already having commenced. Further expansion is also taking place at Daventry. Daventry International Rail Freight Terminal (DIRFT) 2 is due to open in Summer 2011 and DIRFT 3 within the next 10 years.

3. Current demand, capacity and delivery

Figure 3.16 – Rail freight operators and flows

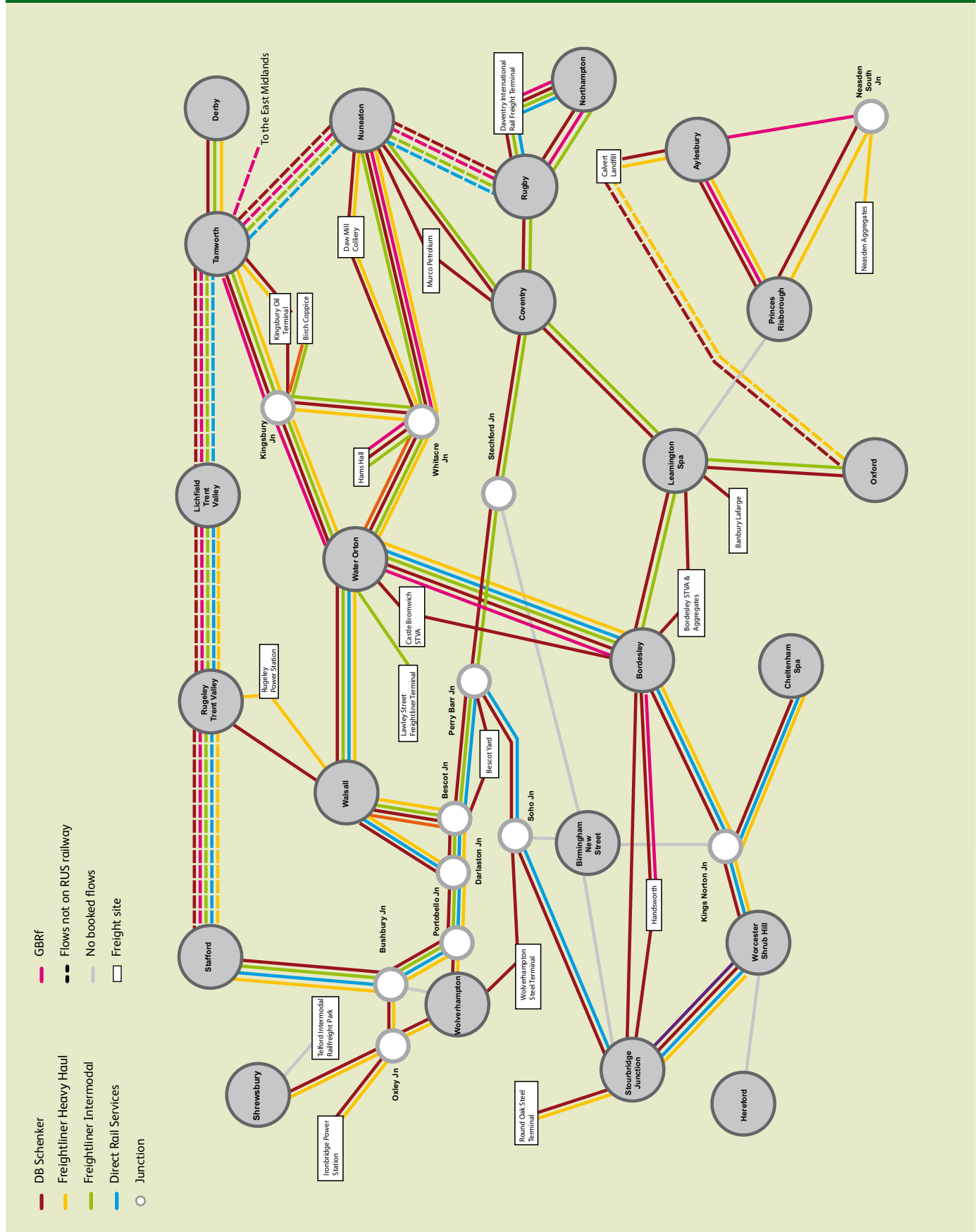


Figure 3.17 – Freight sites by commodity

- Intermodal
- Metal
- Coal
- Construction
- Oil
- Landfill

- 1 Telford Intermodal Railfreight Park
- 2 Wolverhampton Steel Terminal
- 3 Handsworth scrap
- 4 Rugeley Power Station
- 5 Bescot Yard
- 6 Lawley Street Freightliner Terminal
- 7 Castle Bromwich STVA
- 8 Bordesley STVA and Aggregates
- 9 Hams Hall
- 10 Kingsbury Oil Terminal
- 11 Birch Coppice (Birmingham Intermodal Freight terminal)
- 12 Kingsbury EMR
- 13 Daw Mill Colliery
- 14 Round Oak Steel Terminal
- 15 Neasden Aggregates
- 16 Banbury Lafarge
- 17 Ironbridge Power Station
- 18 Rugby (DB Schenker)
- 19 Saltley EMR
- 20 WWH Cemex
- 21 Murco Petroleum
- 22 Coventry Prologis Park
- 23 Calvert Landfill
- 24 Daventry (DIRFT)
- 25 Worcester Metal Box
- 26 Walsall Cement (Tarmac)
- 27 Northampton Lafarge



3. Current demand, capacity and delivery

Automotive

Automotive flows transport time-sensitive high value products, for which the transit forms part of the production process. Within the RUS area automotive services that provide finished products operate to/ from Hams Hall (car components), Bescot and the Jaguar car plant at Castle Bromwich provides export cars to Southampton.

Metals

The West Midlands remains the key UK centre for metal processing and consumption, and as a result there are significant flows of products both into and out of the region. In addition, substantial tonnages, particularly of steel, pass through the area. All these flows also have balancing movements of empty wagons, adding considerably to the overall capacity utilisation of the network.

Large volumes of semi-finished and finished steel products from both UK manufacturing sites and from a number of ports around the country are moved into terminals at Round Oak and Wolverhampton. In addition, metals for recycling are also despatched to a range of UK destinations from terminals at Handsworth, Saltley and Kingsbury.

Flows that pass through the West Midlands include large tonnages of steel from South Wales to both the North East and to Corby, and also from the North East and into South Wales and Washwood Heath.

Construction/aggregates

Aggregates services are operated to terminals at Walsall, Castle Bromwich, Bordesley and Banbury within the RUS area. Freightliner Heavy Haul Limited also operates from Leicestershire to Neasden.

Other freight flows within the RUS area include oil and petroleum to the Kingsbury Terminal near Tamworth and the Murco Terminal at Bedworth, and domestic/industrial waste traffic to the landfill site at Calvert from Cricklewood, Willesden, Bristol and Northolt. Demand is determined by the operating hours at the landfill sites imposed due to environmental restrictions on site operators which dictate the hours of rail operation.

Infrastructure services

The RUS area accommodates significant engineering haulage flows from the virtual quarry at Bescot and concrete sleeper plant at Washwood Heath. These sites support Network Rail infrastructure maintenance and renewal activities. Additionally, commercial freight traffic also operates from Washwood Heath plant conveying sleepers for use on the London Underground network. In addition, engineering trains operate to and from Bordesley Yard in connection with the Birmingham Gateway project where all materials are delivered to site by rail.

Freight capacity and capability

The rise in freight traffic in recent years has placed further pressure on network and terminal capacity in and around the RUS area. The increase in freight flows traversing already busy rail corridors around the RUS area has driven modest network enhancements and expansion at many of the freight terminals and yards – primarily on the Birmingham to Derby and Nuneaton corridors. Some terminals also cause performance-related issues, with difficult access and egress at Kingsbury Terminal. Bescot Yard (via Bescot Jn from the Walsall direction) and Wolverhampton Steel Terminal are all significant in this respect. This is further compounded by the fact that there remains a limited number of terminals within the RUS area situated upon busy rail corridors and these are now operating close to, or at their design capacity. Other problems and constraints on freight growth include lack of suitably gauge-cleared diversionary routes to support 24 hour 7 days a week operation. The recently completed W10 gauge clearance project from Southampton to the WCML has partly alleviated this constraint. The lack of high-speed looping facilities of sufficient length to accommodate the desired future maximum length of train of 775 metres is also a constraint.

Whilst it is recognised that there are a number of corridors which are reaching saturation, network capability has the potential to become a significant constraint as the demand for longer and larger freight services steadily increases. The Oxford to Leamington Spa corridor is a key freight route from Southampton to the West Midlands and beyond, which is restricted in its ability to regulate services due to inadequate looping facilities and the single line section between Leamington Spa and Coventry. Based on the immediate aspiration for further train lengthening following the recently completed W10 gauge clearance the facilities on this corridor are being reviewed. Capacity on the Stour Valley line heading north between Coventry, Birmingham and Stafford is constrained especially access to and egress from Wolverhampton steel terminal. Significant capital investment to support expansion of the port of Bristol will drive growth in container traffic to the West Midlands and beyond.

The Birmingham to Derby and Nuneaton corridors act as central arteries for the movement of freight in and around the West Midlands area. This is due to the number of hub-based freight terminals strategically located along the two routes, most of which benefit from main-line access and are in close proximity to major trunk roads and the main motorway network. Freight flows that serve these terminals can affect overall capacity on these sections. This is particularly true of the Kingsbury and Saltley areas.

3.8 Network capacity and utilisation

3.8.1 Capacity utilisation

There is a diverse mix of traffic operating throughout the RUS area, and most of it has to navigate through critical junctions at key locations. Therefore, the effective use of this capacity is a vital consideration for this strategy.

The RUS has measured capacity using the Capacity Utilisation Index (CUI) which is one way of demonstrating how much capacity is utilised by the current timetable and how congested a line is. This is helpful in understanding the scope for additional services, spare capacity and how this may have a negative impact on performance.

The method was developed by the former Strategic Rail Authority in order to provide a useful indication of remaining plain line capacity. The method is less effective when measuring capacity constraints at junctions and termini.

There is a high level of planned capacity utilisation on most radial routes into central Birmingham and on the lines into London Marylebone, partly due to the high service density and the mix of traffic types.

Figures 3.18 and **3.19** show the CUI for the RUS area. In general, where CUI is greater than 75 per cent accommodating growth becomes challenging and may have a negative impact on performance as the resilience of the timetable decreases.

During the busiest morning period between 06:00 and 09:00, high CUI is experienced on most of the corridors into central Birmingham. Track capacity utilisation is at 100 per cent between Kings Norton and Birmingham New Street at this time, and it is greater than 80 per cent between Birmingham New Street and Wolverhampton, Walsall and Hednesford, Water Orton and Tamworth, Stechford and Coventry and Henley-in-Arden and Wilnecote. This suggests that there is very limited scope for additional train paths within the timetable plan.

3.8.2 Capacity constraints

Capacity constraints exist at a number of locations within the RUS area. These may restrict the ability to operate more trains, and can exacerbate delays during times of perturbation. The following are significant issues to note on the RUS corridors:

- the two track section between Birmingham New Street and Kings Norton, due to the dense mix of traffic, station calling patterns and junction layout at Kings Norton
- only two out of the four lines between Kings Norton and Longbridge are electrified, limiting operational flexibility
- the steep gradient of the Lickey Incline, between Bromsgrove and Barnt Green impacts on capacity utilisation (particularly freight traffic)
- access arrangements at Kingsbury terminal for services from the North East
- the short section of three aspect signalling between Wichnor Jn and Water Orton West Jn (within a prevailing section of four aspect signalling)
- the single line section between Coventry (Gibbet Hill) and Leamington Spa (Milverton Jn)
- the layout between Worcester and Hereford, including headways, turnback facilities and single line sections between Great Malvern and Hereford and in the Worcester stations area
- the mix of planning headways between Worcester and Birmingham Snow Hill
- the timetable structure and operating interface between London Underground and national rail services between Amersham and Harrow-on-the-Hill.

3. Current demand, capacity and delivery

Figure 3.18 – Capacity utilisation index, 08:00 – 09:00 hours

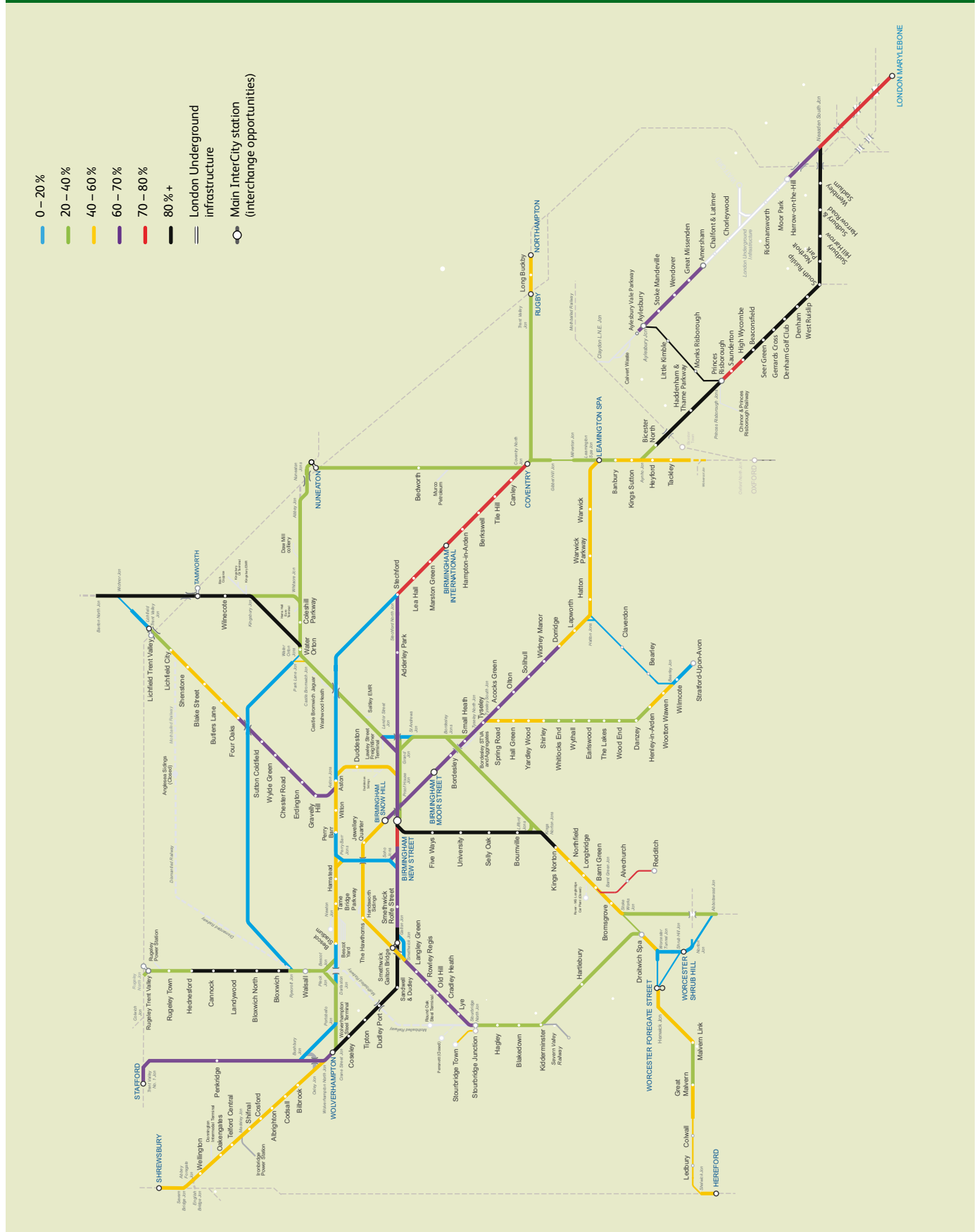
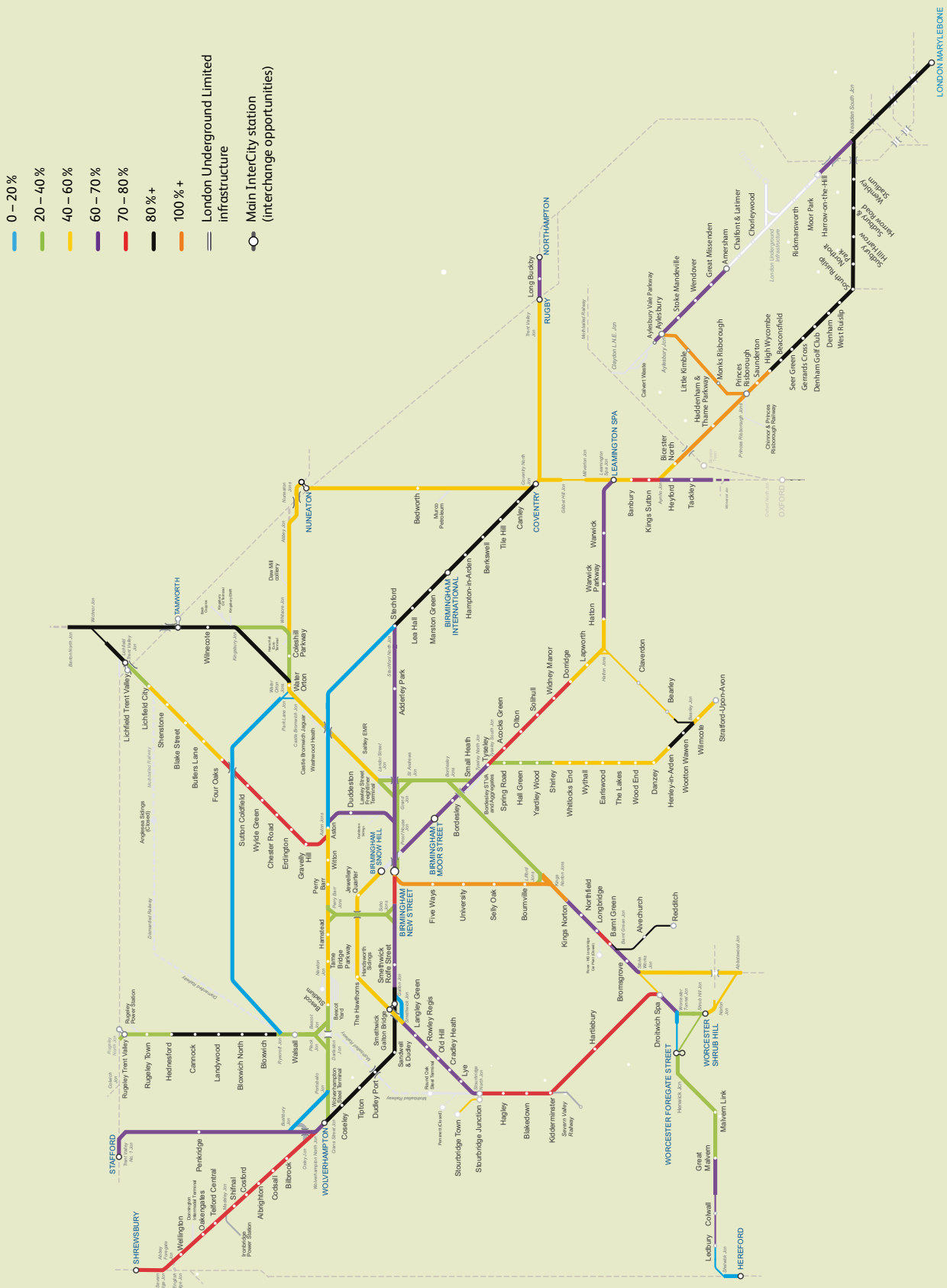


Figure 3.19 – Capacity utilisation index, 06:00 – 09:00 hours



3. Current demand, capacity and delivery

3.9 Rail network

The infrastructure characteristics in the scope area of the West Midlands and Chilterns RUS vary depending on the location, historical service demands and recent developments. This has resulted in different levels of route capability. The principal infrastructure characteristics that have been analysed to establish the current route capability and capacity are:

- planning headways
- linespeeds
- junction speeds
- electrification
- loop lengths
- platform lengths
- loading gauge
- route availability.

The current baseline for each of these sections assumes that the committed projects that are outlined in **Chapter 4** will have been successfully completed.

3.9.1 Planning headways

Planning headways specify how closely one train can be timetabled to follow another on a given route. **Figure 3.20** illustrates the planning headways in the RUS area. Within the RUS area, headways vary from three minutes along core sections in the West Midlands area and on the Leamington Spa and Chiltern line, to 9 -12 minutes on parts of the Aylesbury line. While the majority of the RUS area has a double track configuration, there are several single line sections which have headways as high as 18 minutes. Single lines restrict the number of services that can run on the route and are generally a performance risk. Principal amongst these in the RUS area are the lines between Princes Risborough and Aylesbury, Barnt Green and Redditch, Gibbet Hill and Milverton junctions on the Leamington Spa and Coventry line, and between Stoke Works Jn on the Cross City line and Droitwich Spa. There are also several single line sections on the route between Worcester and Hereford which restrict service frequency and operational flexibility.

At present some of the corridors within the West Midlands area are controlled by older signalling technology which typically requires longer headways, limiting opportunities for additional train paths during peak times. This is especially true on the periphery of a number of the routes, notably in the Worcester area, where there are a number of older type mechanical signal boxes. The mechanical signalling south of Kidderminster restricts capacity, particularly during peak times, making it difficult to enhance the service frequency from Worcester

to Birmingham and imports a performance risk to the Bromsgrove and Stourbridge routes due to the interface between both routes at Droitwich Spa.

The major signalling renewal plans for the radial routes leading into Birmingham will help to address the issue of long headways. Where resignalling schemes are considered to be committed at the time of publication, the proposed enhanced network has been incorporated into the base infrastructure. This is reflected in **Figure 3.20** which shows the planning headways across the RUS area.

3.9.2 Linespeeds

Linespeeds vary greatly across the RUS area, from the high speed sections of 100-125mph to the lower speed sections of 45mph or below. **Figure 3.21** illustrates the differing linespeeds across the RUS area. Linespeeds have a direct impact on service capacity and achievable journey times. The established linespeeds are generally appropriate to the nature of the service type being operated. Where lower linespeeds exist, these are generally attributable to track condition and signalling constraints. This can cause inefficiency in terms of capacity and journey time, depending on rolling stock types and stopping patterns. This is especially true for the interurban services, which do not stop as frequently as local services. A proportion of the RUS area has linespeeds that are lower than the predominant rolling stock capability, which is generally 100mph.

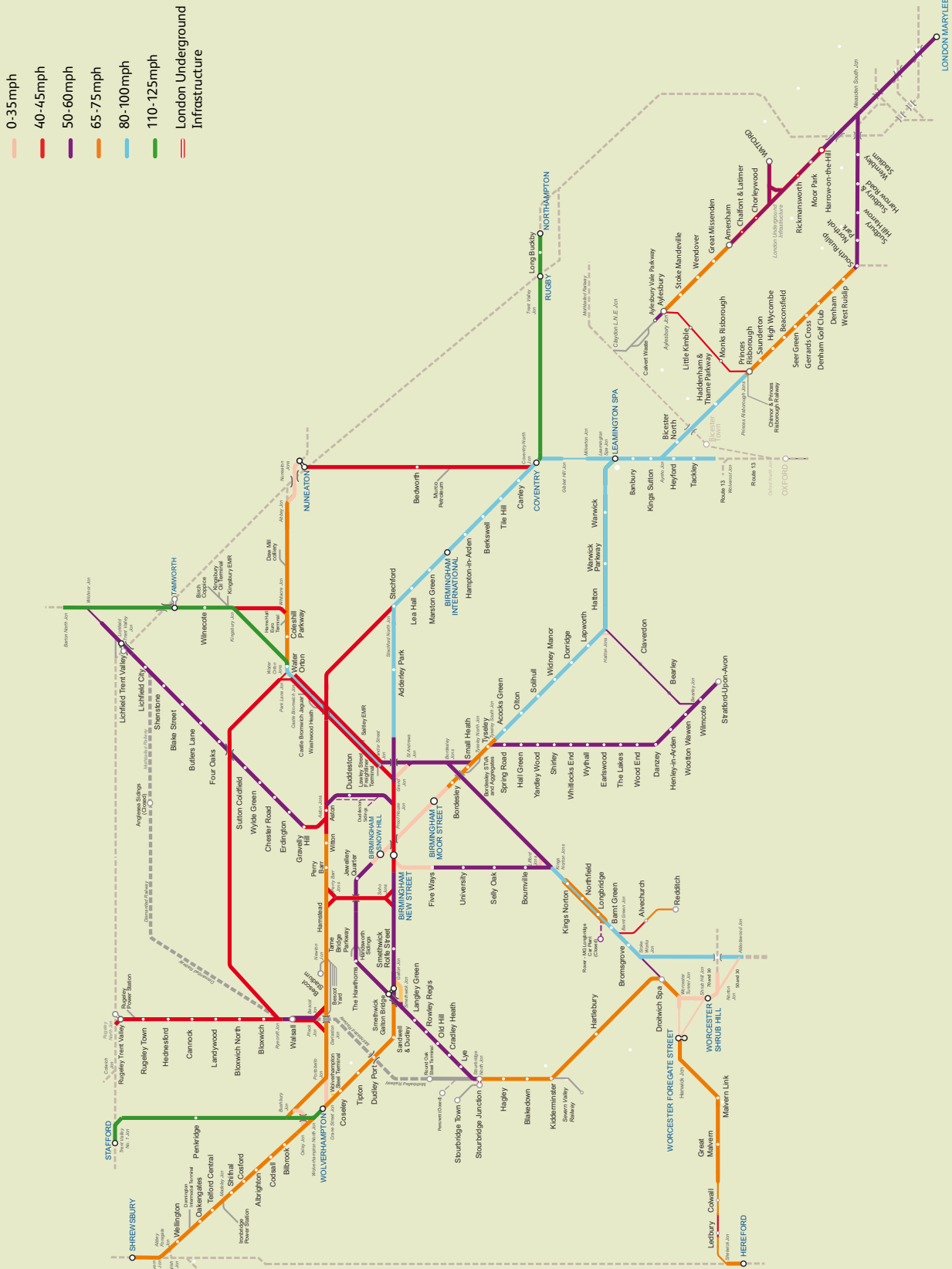
There are several schemes which will improve the linespeed at various locations within the RUS area which have been included in the baseline analysis. These include the linespeed proposals on the Wolverhampton and Shrewsbury line, the Cannock line, and those being delivered as part of the Evergreen 3 project, which involves a suite of enhancements that will improve the journey times between London Marylebone and Birmingham Moor Street. Linespeed improvement works will focus on the area between West Ruislip and Aynho Junction near Banbury, and will increase the extent of 100mph running on the Chiltern route. The programme of resignalling within the West Midlands has also evaluated potential future linespeed enhancements and, where it is considered appropriate, signals have been placed to accommodate these proposals in the scheme plans.

3.9.3 Key junction speeds

Junction turnout speeds in the RUS area are generally 30mph or below, with the majority being 20mph. Some of the lower junction speeds are as a direct result of track geometry. Deceleration from linespeed and subsequent acceleration back to linespeed after traversing a junction creates a penalty both in time and capacity. Equally the arrangements for signal approach control often impacts on journey time and decreases capacity.

3. Current demand, capacity and delivery

Figure 3.21 – Prevailing linespeed



3.9.4 Electrification

Figure 3.22 shows the extent of electrification within the RUS area. The following routes within the West Midlands are electrified using 25kv AC overhead line:

- Rugby to Stafford via Birmingham New Street
- Grand Jn lines via Aston and Bescot and including Walsall (the line between Pleck Jn and Walsall)
- Cross City North as far as Lichfield Trent Valley high-level
- Cross City South (slow lines only – between Kings Norton and Longbridge).

The electrified infrastructure in the RUS area is utilised by Virgin Trains, London Midland and the freight operators. The Chiltern Main Line is not electrified. The Metropolitan line between Amersham and Harrow-on-the-Hill is electrified using 650v dc fourth rail.

The extent of electrification within the RUS area is planned to be extended through Network Rail's commitment in the Control Period 4 Delivery Plan to extend electrification from Barnt Green to Bromsgrove to facilitate the extension of Cross City services.

3.9.5 Loop length and capability

A diverse mix of passenger and freight traffic operates within the RUS area, with differing speeds, formations and market types. Accommodating this traffic is particularly challenging due to the fact that the majority of the RUS area is double track in formation and there is a limited availability of suitable locations to regulate services (allow faster trains to overtake slower ones).

There are several loops located across the RUS area but most of these are located in less than ideal locations and are unable to accommodate intermodal services for which the desired maximum length is 775 metres. This is further compounded by the inadequate entry and exit speeds and the associated approach control signalling restrictions. It is recognised that the optimal method to regulate services in most cases is by an additional stretch of line that is not necessarily adjacent to, but is sufficiently long to avoid the service being regulated being brought to a standstill. However, where this is not possible, the maximum capability of the loop needs to be exploited.

3.9.6 Platform lengths

The lengths of platforms also vary along a line of route. Figure 3.23 shows the platform lengths at stations within the RUS area and indicates the number of vehicles which can be accommodated at each station. The majority of platforms across the RUS area can accommodate six-car train lengths. There are, however, a significant number of stations within the West Midlands, particularly on the Cannock line, which cannot accommodate four-car lengths. It should also be noted that where the platform lengths vary along a line of route, train length and passenger capacity is constrained by the shortest platforms. Where practical, selective door opening or a process of 'skip-stopping' has to be deployed to resolve this issue. However, this may not optimise the timetable or station dwell times.

Platform widths as well as lengths can present issues at some stations. At Birmingham Moor Street and University, for example, the narrow platforms are a problem during times of high passenger demand, and this has been compounded by the continued increase in peak passenger numbers.

3.9.7 Loading gauge

The loading gauge relates to the height and width of rolling stock and freight wagons and defines the size of vehicles which can be carried on a specific route. The gauge within the RUS area has evolved as new flows have emerged. A large portion of the RUS area is W8 gauge cleared, but there are also sections of W6, W7, W9 and W10 gauge.

W9 and W10 are the gauges required to transport the largest containers (9' 6" high) on conventional wagons. The absence of this gauge in parts of the RUS area reduces the flexible routing options for W9 and W10 traffic and is a serious limitation on rail's attractiveness in the intermodal market. The mixture of gauges means that diversionary routes can often be long and circuitous, or trains have to be cancelled when the main route is not available. See Figure 3.24 for the various rail loading gauge profiles. Figure 3.25 shows the gauge in the RUS area.

3.9.8 Route Availability

Route Availability is a system for determining which types of locomotive and rolling stock can travel over any given section of route and is normally determined by the strength of underline bridges in relation to axle load and speed.

Figure 3.26 shows that the Route Availability across the majority of the RUS area is RA8, with the exception of part of the Leamington Spa and Chiltern corridor which is RA7. In order for RA9 and RA10 traffic to be operated, special clearance is required, and this usually requires local speed restrictions to be applied over weaker structures. This also reduces flexibility during perturbation.

3. Current demand, capacity and delivery

3.10 Performance

3.10.1 Reliability and delay

The industry uses two measures to monitor passenger service punctuality and reliability: Public Performance Measure (PPM) and Cancellations and Significant Lateness (CaSL).

PPM is expressed as a percentage and each passenger service that operates across the network contributes to this. PPM measures the number of trains that actually operated punctually as a percentage compared to those that are scheduled to operate in the published timetable. Services operate under one of three sectors (long distance, regional, and London and South East) and dependent on their sector the definition of punctuality varies. Long distance trains are considered punctual if they reach their final destination within 10 minutes of their published arrival time. The regional and London and South East measure of punctuality is that they arrive within five minutes of their published arrival time. Reliability is also included within the PPM metric. A reliability failure under PPM can be a result of deviation from the scheduled calling pattern, failure to reach the final destination or failure to complete any element of the journey.

CaSL is comprised of two principal elements: cancellations and significant lateness. Services are considered cancelled if they fail to complete their full scheduled journey or are cancelled before 50 per cent of the journey is completed. If more than 50 per cent of the journey is completed it is considered to be a partial cancellation. The cancellation metric also takes into account services that miss scheduled calling points, these are classed as 'fail to call'. The 'significantly late' metric is applied if a service arrives at its final destination 30 minutes or more after its scheduled arrival time.

Network Rail and all franchised passenger operators are required, under the Network Code, to create annual Joint Performance Improvement Plans (JPIPs) in which individual operator trajectories, annual targets (moving annual averages), underpinning improvement plans and management processes are defined. The combined JPIPs aggregate to the national trajectory for each metric. JPIP delivery is the joint responsibility of the signatories and the agreed trajectories are closely monitored by an industry governance group known as the National Task Force. Similar arrangements do not apply to freight operators where the only regulatory target within CP4 is a Network Rail delay minutes per 100 kilometres of operation. The target is normalised in this way because of the variable volumes of freight traffic.

Delay minutes are used to determine an individual train's lateness and are captured on a route basis.

The industry recognises and measures two types of delay: primary delay and reactionary delay. Primary delay is the delay caused directly to a train by an incident, whereas reactionary is the delay which is indirectly caused to other trains as a result of such an incident. The RUS process only focuses on ways to minimise reactionary delay as the reduction in primary delay is already managed through established industry processes, eg. individual JPIPs.

3.10.2 RUS area performance analysis

The performance analysis for the RUS area assessed primary delay (delay caused directly to a train by an incident) and reactionary delay (delay indirectly caused to other trains as a result of an incident) on a sample period (Period 13, 2007/8) [doesn't this flatly contradict the last sentence of the previous paragraph]. The performance data analysed illustrated the effects that primary delay had on the individual corridors within the RUS area. Additionally, it assisted in the process of appreciating the performance relationship between each corridor in respect of whether reactionary delay was contained on a corridor or transferred to others. The total delay experienced by a corridor is the corridor contained delay (primary delay and reactionary delay contained within a corridor) and imported reactionary delay imported from other corridors. The results of this analysis for each corridor are presented in the performance charts in **Appendix A**.

The analysis indicated that the top three causes of delay related to points, signalling and other assets. The findings demonstrate that, of the total reactionary delay generated within the RUS area, on average over 80 per cent of this delay remained within the RUS area. The majority of delay within the RUS area during the period of analysis was caused by incidents on the Derby, Nuneaton (including Camp Hill) corridor, followed by the Leamington Spa and Chiltern corridor and the Walsall and Cannock corridor. The Derby and Nuneaton corridor created over 30,000 minutes including corridor contained delay of over 21,000 minutes. The largest portion of the exported delay was to outside the RUS area, with nearly 5,000 minutes exported, showing the importance of the corridor in the wider rail industry.

This analysis has assisted in identifying where there may be performance-related issues and these factors have been factored in the development of options where appropriate.

3.11 Stations

3.11.1 Facilities

Appendix B provides a detailed list of station facilities at the stations located within the West Midlands and Chilterns RUS area and the integration with other modes of transport.

3.11.2 Links with other transport modes

The ease with which passengers can access stations influences the attractiveness of rail travel relative to other transport modes. Rail is often only one stage of a passenger journey, with some passengers using other modes of transport to access the station.

In terms of travel choices, it is generally assumed that passengers would be able to cycle or walk to the station within the half-mile radius. Beyond half a mile, the main modes of access would be by bus or car, with some passengers choosing to cycle where cycle storage facilities are available at the station.

3.11.3 Car parking

Providing car parking spaces at rail stations improves accessibility to the rail network, particularly where walking or cycling is not a feasible option. Car parking facilities in the RUS area are summarised in **Appendix B** along with accessibility to the station and interchange opportunities with other modes of transport. It should be noted that the RUS has not collated data on London Underground car parks or alternative parking facilities near to stations.

The majority of stations within the RUS area have a car parking facility. Within the West Midlands Metropolitan Area, Centro operates over 6,000 spaces at 37 stations and has a policy of providing free parking for rail users, apart from at Solihull and Sutton Coldfield. Parking facilities outside the Centro area comprise a mixture of free and charged, and are generally operated by the appropriate train operating company. While there is some evidence of passengers driving to the Centro area to park and catch a train, passengers generally prefer to use their local station subject to there being adequate parking and train service provision at reasonable cost. There is evidence that at stations where there is a high car parking charge (such as Birmingham International and Warwick Parkway), usage by local commuters is relatively low.

It is recognised that limited car parking capacity is a widespread issue and recent passenger surveys demonstrate that a significant number of car parks in the RUS area are at or very close to capacity on weekdays by the end of the peak period. In recent years, car parking provision has steadily increased, but demand consistently outstrips supply at many stations. This leads to passengers choosing to park on adjacent streets, driving to different stations or choosing not to travel by rail. This is particularly an issue in the late morning and off-peak periods and can act as a barrier to future rail growth.

There are a number of car park expansion schemes in development which aim to address this issue. These are outlined in **Chapter 4**.

3. Current demand, capacity and delivery

Figure 3.22 – Electrification in the RUS area

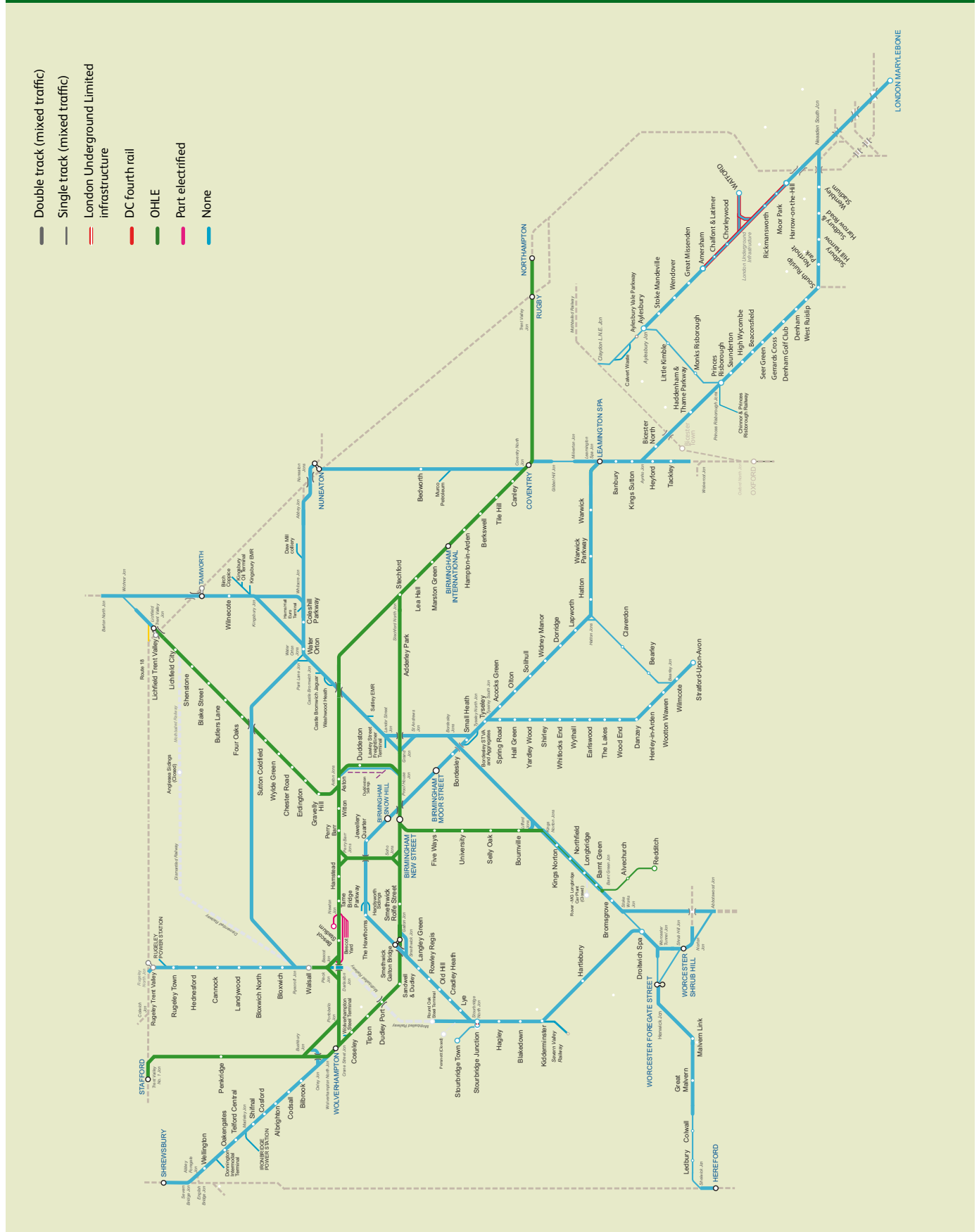
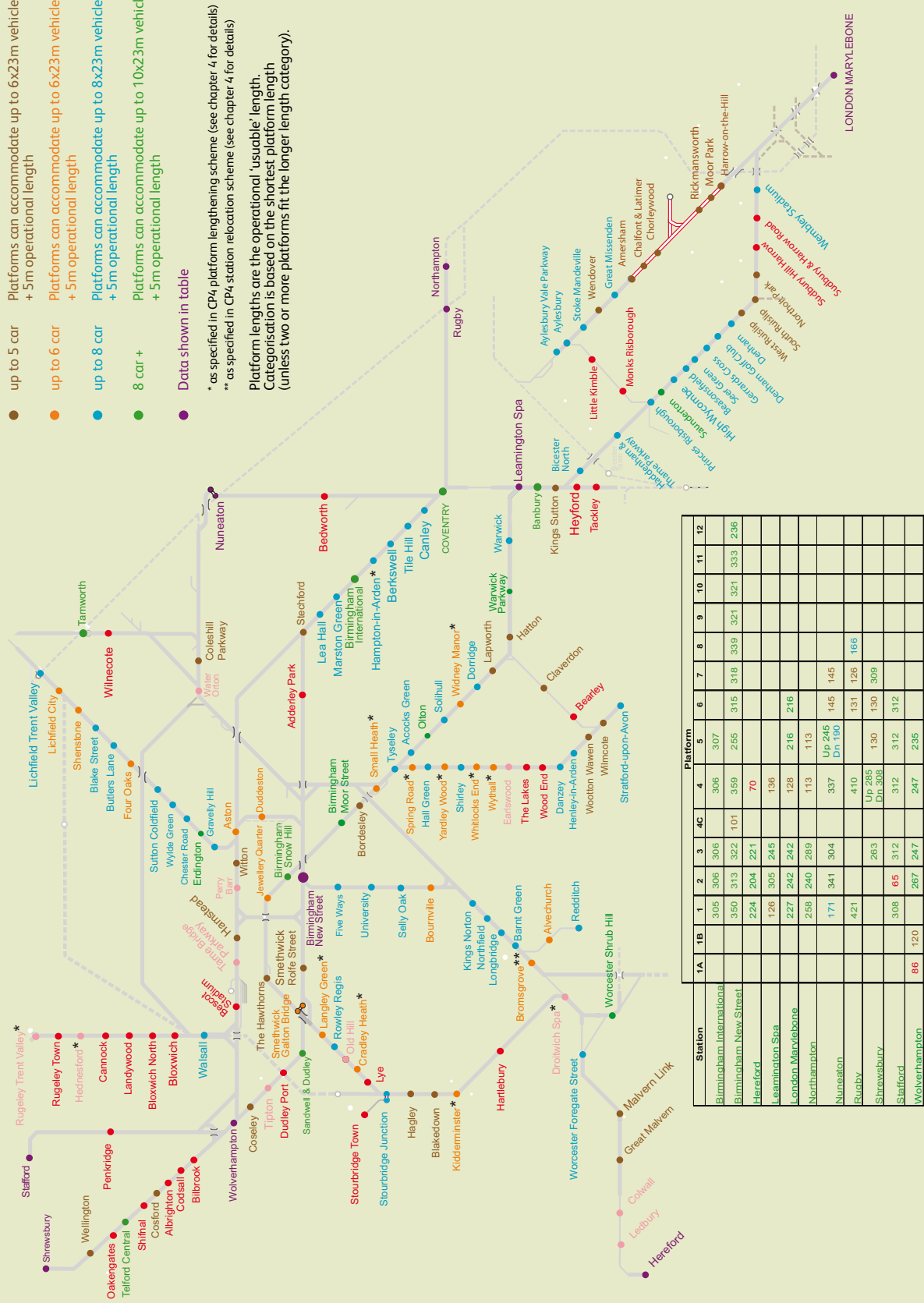


Figure 3.23 – Platform lengths

- 0 - 97m Platforms cannot accommodate 4x23m vehicle + 5m operational length
- up to 4 car Platforms can accommodate up to 4x23m vehicle + 5m operational length
- up to 5 car Platforms can accommodate up to 6x23m vehicle + 5m operational length
- up to 6 car Platforms can accommodate up to 6x23m vehicle + 5m operational length
- up to 8 car Platforms can accommodate up to 8x23m vehicle + 5m operational length
- 8 car + Platforms can accommodate up to 10x23m vehicle + 5m operational length
- Data shown in table

* as specified in CP4 platform lengthening scheme (see chapter 4 for details)
 ** as specified in CP4 station relocation scheme (see chapter 4 for details)

Platform lengths are the operational 'usable' length.
 Categorisation is based on the shortest platform length (unless two or more platforms fit the longer length category).



Station	Platform														
	1A	1B	1	2	3	4C	4	5	6	7	8	9	10	11	12
Birmingham International			305	306	306	306	307								
Birmingham New Street			350	313	322	101	359	255	315	318	339	321	321	333	236
Hereford			224	204	221		70								
Leamington Spa			126	305	245		136								
London Marylebone			227	242	242		128	216	216						
Northampton			258	240	289		113	113							
Nuneaton			171	341	304		337	Up 245 Dn 190	145	145					
Rugby			421				410		131	126	166				
Shrewsbury					263		Up 285 Dn 308	130	130	309					
Stafford			308	65	312		312	312	312	312					
Wolverhampton	86	120	267	247	247		247	236							

3. Current demand, capacity and delivery

Figure 3.24 – Loading gauge envelopes

- GB1
- GB
- GA
- W12
- W10
- W9
- W8
- W7
- W6

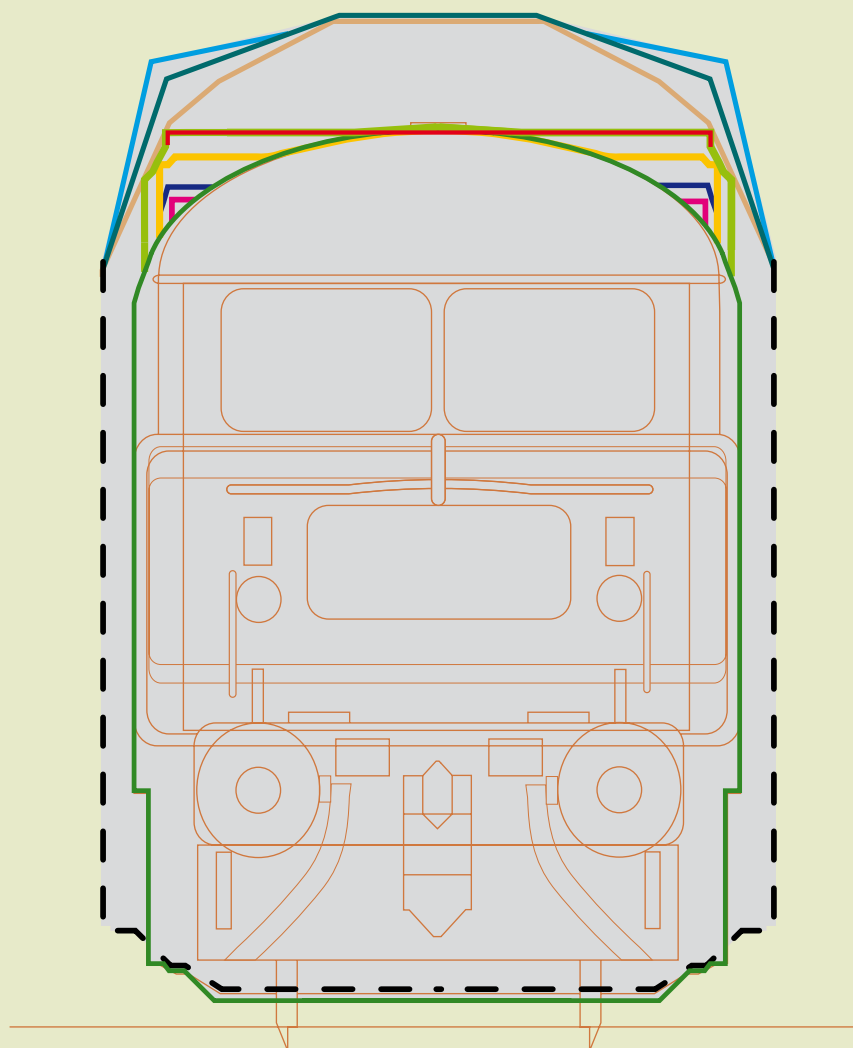
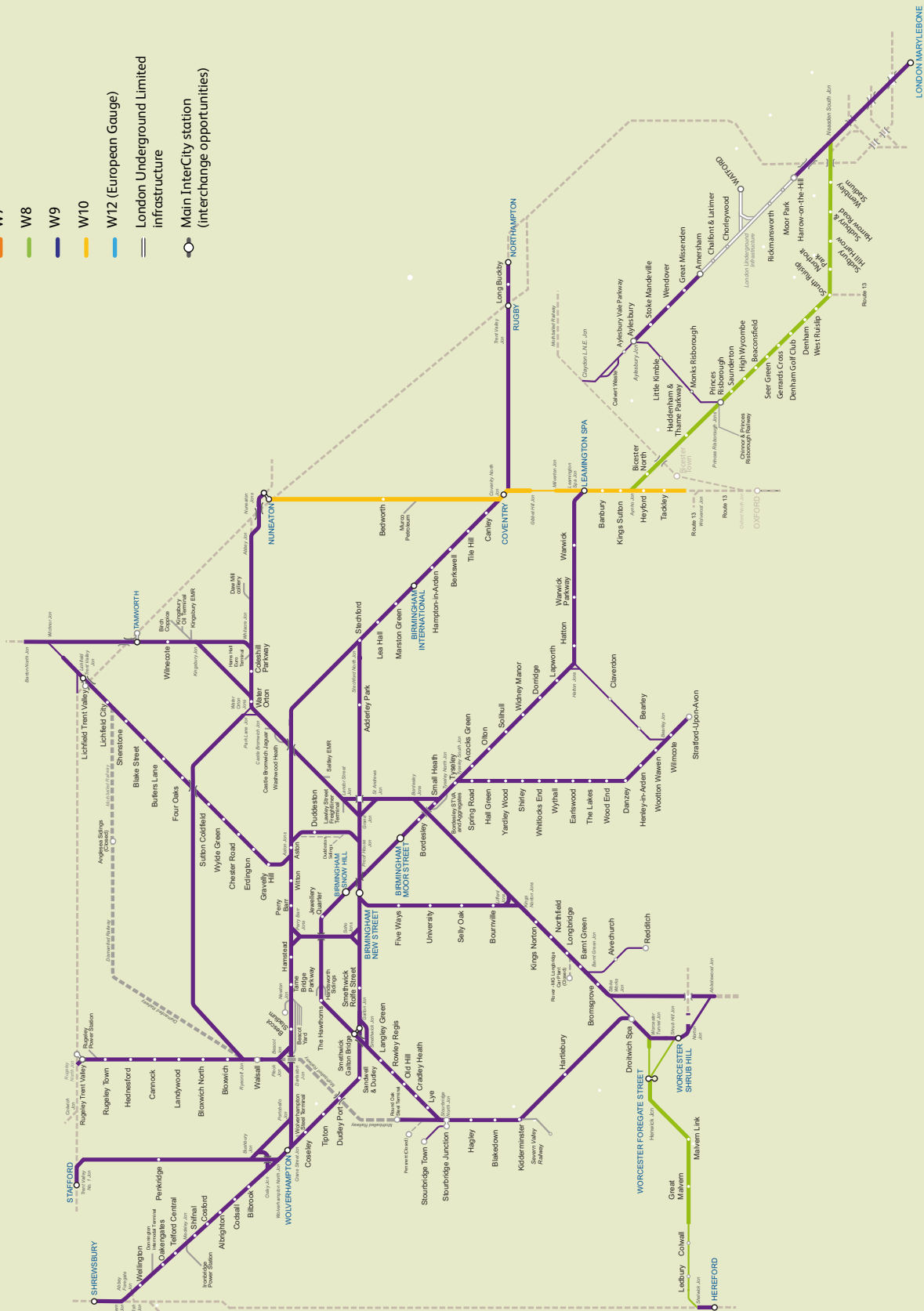


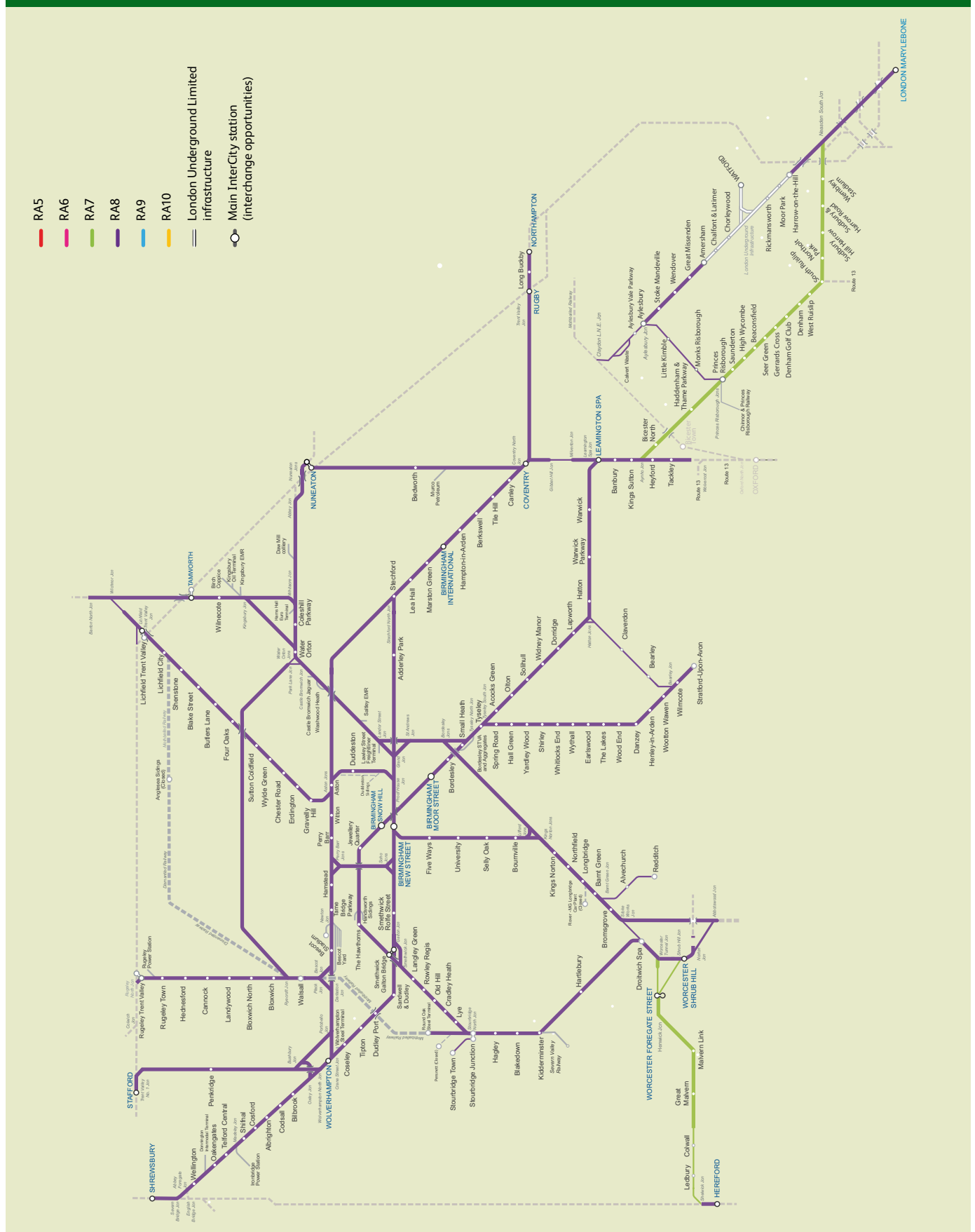
Figure 3.25 – Loading gauge

- W6
- W7
- W8
- W9
- W10
- W12 (European Gauge)
- London Underground Limited infrastructure
- Main InterCity station (interchange opportunities)



3. Current demand, capacity and delivery

Figure 3.26 – Route availability



3.11.4 Interchange with other transport modes

The need to improve other means of accessing the rail network should also be considered for passengers who do not have use of a car. Whilst there are high levels of car ownership in certain parts of the RUS area, particularly in Warwickshire and the areas surrounding the Chiltern Main Line, it is important to consider those who are dependant on alternative modes of transport for part of their end-to-end journey. Promoting alternative modes to car transport also figures prominently in the Government's transport and environmental policies which emphasise the need to reduce road congestion and encourage more sustainable forms of travel.

The London area has the highest usage of public transport in the UK and interchange with London Underground and local bus services is therefore of particular importance. Recent analysis has shown that within the Birmingham area one in three people still do not have access to a car and the dependence of young and old people on public transport across the RUS area should not be overlooked.

There are several locations where the railway intersects or runs close to other modes of public transport, providing passengers with an opportunity to integrate other transport modes into their overall journey. **Appendix B** highlights the stations that have bus, metro, underground and air interchange facilities. It also illustrates the cycle storage capacity. These modes should be considered as an alternative means to access the rail network for passengers who do not have access to a car or wish to use another mode of access. Stations which are considered to have particularly good interchange facilities are:

- Amersham (rail underground, national rail and bus links to London Heathrow)
- Birmingham Snow Hill (rail, tram and bus)
- Birmingham International (air, bus and rail)
- Chalfont and Latimer (rail underground and national rail)

- Coleshill Parkway (bus, rail and park and ride. Bus links are particularly good to Birmingham Airport for links to the NEC).
- Cradley Heath (rail and bus)
- Lichfield City (bus).
- High Wycombe (bus links to London Heathrow)
- Princes Risborough (bus and rail)
- Rickmansworth (bus and coach for London Heathrow Airport).
- Sutton Coldfield (bus)
- Solihull (bus)

3.11.5 Station accessibility

As well as providing easy access to the stations on the network, it is also important to ensure that there is an unobstructed and obstacle-free accessible route available within stations to assist with access to services and to facilitate efficient interchange. The lack of adequate step-free access to platforms or large stepping distances between platforms and trains can act as a barrier to using rail for those with reduced mobility, with young children or carrying luggage. **Appendix B** shows the accessibility levels at stations and indicates that this varies across the RUS area. There are several enhancements in development sponsored by the Access for All and National Stations Improvement Programme (NSIP) funds which aim to address accessibility issues at stations. These are discussed in **Chapter 4**.

3. Current demand, capacity and delivery

3.12 Rolling stock, depots and stabling

The principal maintenance depots in the RUS area which maintain and service rolling stock are located at:

Aylesbury – Chiltern Railways (diesel depot)

Central Rivers – Virgin Trains and CrossCountry (diesel depot)

Neasden – LUL (electric depot)

Northampton – London Midland (electric depot)

Oxley – Virgin Trains (electric depot)

Tyseley – London Midland (diesel depot)

Soho – London Midland (electric depot)

Wembley – Chiltern Railways (diesel depot)

Each of the depots is different and performs a specific role, based on its location, facilities, processes and assigned rolling stock. Each depot has been developed to operate on a variety of activities which include overnight servicing, maintenance, modifications, wheel set attention, repairs, cleaning and differing levels of repair and overhaul. Each depot has a different layout, with variables such as track layout, berths and stabling roads which dictate the workflow through the site.

3.13 Engineering access

Due to the mixture of traffic and routes within the RUS area, engineering access varies within the RUS area. The current access arrangements around the various route sections are briefly described below.

The RUS area has a reasonable availability for diversionary routing over much of its network, and a refined pattern of cyclical midweek night possessions has been applied. A notable exception is between Birmingham and Coventry, where there is no alternative electrified diversionary route. This can cause issues during maintenance work, as the current arrangements on the Coventry corridor, mean that some Euston to Wolverhampton services are prevented from serving the key locations of Coventry and Birmingham International.

Diversions routes can create issues for freight customers as freight diversions are constrained by capability requirements of gauge and weight. While freight operators cannot readily divert their traffic to the roads in the same way as passenger operators, some of the freight services have flexibility surrounding the timing and duration of their journeys and possessions that could affect them are targeted at times of little traffic. Growth will increasingly require a route to be available for more of the time.

On the Chiltern line, engineering access is available through a regular pattern of eight hours on Saturday nights and five hours on Sunday nights, as well as possession opportunities on week nights which are limited due to Chiltern Railways late night services and empty stock movements. Possession planning, which is the closure of a line for engineering works, is carefully integrated on the Chiltern route with the Birmingham to Didcot and West Coast Main Line routes, to enable the route to be used as an alternative for passengers and freight from London to the West Midlands.

The Chiltern route can be used as a diversionary route for Virgin Train services, during West Coast South all-line closures on Bank Holidays, and for First Great Western services during Crossrail and Reading enhancement blockades. The 2010 plan has been carefully planned to ensure that a route through to Birmingham is maintained whenever possible, and the West Coast South and Chiltern Main Line are not blocked simultaneously.

Network Rail has developed a revised approach to possessions planning which seeks to focus maintenance access at times of least value to users of the network, and optimise engineering costs against revenues and economic benefits. The output should then be incorporated into the annual Rules of the Route planning process.

Improvements to maintenance activities have been incorporated into the Network Availability Implementation Plan, which details the next steps towards delivering improvements to network availability in Control Period 4. This plan also includes improvements to track renewal activities, possession strategies to minimise disruption. Further details of the Network Availability Implementation Plan is presented in **Chapter 4** under committed schemes.

4. Planned changes to infrastructure and services

This chapter outlines the planned changes to supply within the rail network over the period of this Route Utilisation Strategy (RUS). These changes 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 recommended by this RUS.

4.1 Committed and uncommitted projects

Where significant renewal and enhancement projects are committed, they form part of the baseline for the RUS. For the purpose of analysis in this RUS, a committed scheme is considered to be one that has confirmed funding and is beyond Governance to Rail Investment Projects (GRIP) stage 4 – single option development. Any interventions proposed by the RUS are assessed against a baseline of today's railway as described in **Chapter 3**, plus committed projects. The baseline is defined as the 'do minimum' scenario in analysis work.

The RUS development process also recognises those renewal and enhancement projects that are in the early stages of development. Projects up to and including GRIP stage 4 are classified as uncommitted and have not been included within the baseline. The RUS cannot assume that these projects will go ahead, but where an output from an uncommitted scheme may deliver a resolution to a gap identified by this RUS, the RUS can recommend the same intervention if it proves to be the optimum way forward from the optioneering process.

4.2 Planned changes to infrastructure

This section presents committed enhancement schemes, which includes those included in the Control Period 4 (CP4) Delivery Plan to meet targets set in the High Level Output Specification (HLOS) and those committed through the GRIP process. It also outlines the uncommitted schemes that have also been taken into consideration.

4.2.1 HLOS and CP4 Delivery Plan

The HLOS specified various metrics (reliability, capacity and safety) which the collective rail industry is required to achieve during CP4. It prescribed 'people' demand metrics for major urban areas

including Birmingham, and the main London termini including Marylebone. 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 are at www.dft.gov.uk

Further details on Network Rail committed CP4 outputs are at www.networkrail.co.uk

The West Midlands and Chilterns RUS is aligned with the delivery of the key outputs specified within the CP4 Delivery Plan. It recognises that many of the 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 CP4 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
- train lengthening
- Birmingham Gateway project
- extension of electrification and Cross City services to Bromsgrove
- Redditch branch enhancement
- West Midlands platform lengthening
- Westerleigh Jn to Barnt Green linespeed improvement
- Network Rail Discretionary Fund
- National Stations Improvement Programme

4. Planned changes to infrastructure and services

These are further described below:

4.2.1.1 Strategic Freight Network and Productivity Transport Innovation Fund schemes

In July 2007 the Government published its White Paper 'Delivering a Sustainable Railway' which outlined its plans for the growth and development of the railway in the context of a long-term strategy for the next 30 years. This White Paper presented a proposal to develop a Strategic Freight Network (SFN), which is envisaged as a network of core and diversionary routes which are designed to enable the efficient operation of more and longer freight trains and resolve conflicts between freight and passenger services. This reflects support for further growth of rail freight as a sustainable distribution system.

Nationally, £200 million has been allocated for the development of the SFN during CP4. This funding supplements those schemes already identified for funding through the Transport Innovation Fund (Productivity) enhancements scheme announced by DfT in October 2007. These schemes are:

- **Felixstowe to Nuneaton loading gauge enhancement (via Peterborough):** loading gauge improvements to provide an alternative W10 gauge route (enabling the movement of 9ft 6in containers on standard height wagons) from the Port of Felixstowe to the Midlands, avoiding the busy routes via London. Work started along the route in July 2009 and gauge clearance was completed in April 2011.
- **Southampton to West Coast loading gauge enhancement:** a scheme to construct a W10 gauge cleared route from Southampton to the West Coast Main Line (WCML) via Basingstoke, Reading, Didcot Parkway and Leamington Spa. Gauge clearance was completed in March 2011.
- **Nuneaton North Chord:** a scheme to construct a mile of new railway linking the Arley Lines at Nuneaton to the WCML, giving Felixstowe to Nuneaton freight traffic a dedicated route onto the WCML in the northbound direction. The Transport and Works Act Order was granted by the Secretary of State in July 2010 and construction work is anticipated to commence in April 2011. Completion is scheduled for Summer 2012.

The SFN funding allows for additional gauge clearance and capacity improvements across the network, to meet industry growth forecasts and prevent this additional freight traffic being forced onto the congested road network. Additionally the following SFN schemes will have an impact on the services to and from the West Midlands and Chilterns RUS area:

- improved capacity between Ipswich and Peterborough on the Felixstowe to Nuneaton route

- Water Orton – Yorkshire loading gauge enhancement
- other infill gauge and infrastructure improvements across the network.

The SFN includes a specific fund for infill gauge schemes to progress towards the SFN vision of extensive W12 gauge clearance. The freight industry has expressed an aspiration for W12 gauge clearance for sections of the network which could be used to transport short sea traffic. As a result, the Freight RUS (FRUS) set a policy to clear sections of a route to W12 wherever a structure is being rebuilt.

The SFN also identifies preferred options to meet forecast growth in freight volume. A funding provision of £5 million is included for studies to develop identified schemes for delivery in Control Period 5 (CP5) – between 2014 and 2019. A shortlist of potential schemes, including possible further capacity enhancements between Southampton and the WCML, has been agreed by the SFN Steering Group, and the initial studies are currently underway.

Train lengthening opportunities are also being assessed through the SFN, with the Southampton to West Midlands route as a candidate scheme currently being developed, permitting growth without increasing capacity utilisation. In order to facilitate this, infrastructure changes may be necessary.

4.2.1.2 Network availability and seven day railway

The Office of Rail Regulation (ORR) has allocated £160 million nationally to assist in the development of the seven day railway initiative. The programme of change will increase current levels of network availability 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 will be spent on both infrastructure enhancements to facilitate the increase in rail operations, such as crossovers and bi-directional signalling, and on investment to change Network Rail's work methods. Currently there are no infrastructure schemes being progressed in the RUS area for seven day railway funding. However, there are many initiatives in place which will deliver network availability benefits and it is anticipated that all operators of services within the RUS area will benefit from the ongoing introduction of national pilot initiatives. An example of this is the line between Lichfield City and Wichnor Jn. By using seven day railway funding, the line has been kept open on two additional weekend shifts during CP4 in order to retain CrossCountry drivers' route knowledge which can be used when other lines are blocked for enhancement work or in times of disruption. The line can also be used as a diversionary route.

A Network Availability Implementation Plan is currently in development and aims to deliver the regulated outputs for network availability in CP4. Network Rail measures network availability using the new possession disruption indices (PDIs) and the metrics are highly sensitive to the location, number and duration of possessions. The Network Availability Plan aims to achieve a 37 per cent improvement in PDI which in effect will deliver substantial improvements in network availability to passenger operators, and potentially allow passenger and freight operators to run additional train services at times that suppress customer demand.

The core initiatives and activities which will improve network availability include improvements to maintenance and renewal activities, more efficient methods of working, new possession strategies to minimise disruption, and the establishment of improved access points.

4.2.1.3 Train lengthening

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

The train operators have been responsible for the development of operational plans and subsequent procurement of rolling stock in line with HLOS passenger capacity requirements, with a view to providing best value for the investment by strengthening services on busiest routes. The HLOS peak demand requirement for Birmingham is expected to result in additional diesel multiple unit and electric multiple unit stock being provided to London Midland. The operational plan produced by London Midland has considered where additional peak capacity is required within the RUS area and has allocated additional vehicles to achieve this. The planned additional vehicles have formed part of the base for the RUS, and any options analysis undertaken assumes the additional capacity will be delivered.

The DfT recently announced in June 2010 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 options analysis.

4.2.1.4 Birmingham Gateway project

The major redevelopment of Birmingham New Street station (Birmingham Gateway) will transform

the station into a modern, welcoming and accessible gateway to the city and transport hub for the UK rail network. The focus of the project is on improving the station environment and passenger services, through increased passenger capacity, improved access, better pedestrian links to and through the station and more reliable customer services. The 2007 HLOS confirmed to Network Rail that £128 million would be made available for the Gateway project. The total fund for the redevelopment is £600 million as it also includes major funding from Advantage West Midlands, Birmingham City Council and Centro. Network Rail, which owns and operates Birmingham New Street station, will deliver the project.

In addition to the benefits to rail passengers, there are major associated economic and tourism benefits for the region. The project scope includes work to make the platforms clearer and less crowded, a grand concourse enclosed by a large light-filled atrium and eight new entrances making the station open to all sides of the city centre. Preparatory work has begun on the new concourse, including transformation of a former car park, and the current plan aims for completion of the first phase of works in 2012. The second phase of work to build a second concourse to be combined with the first phase will be completed in 2015.

4.2.1.5 Bromsgrove station relocation

This scheme is a third-party-funded enhancement to increase capacity and to enable longer services to call at Bromsgrove. The existing station is constrained with limited capacity to meet forecast passenger demand and increased services. It does not have the facility to turn back trains without significant impact on service performance. The proposed option is to relocate Bromsgrove station 250 metres southwards along the Birmingham to Bristol main line. Relocating the station enables the development of a larger station with improved passenger facilities, such as car parking, bus interchange, longer platforms, increased cycle storage, and with Disability Discrimination Act (DDA) compliance. Commissioning of this scheme is planned in CP4.

4.2.1.6 Extension of electrification and Cross City services to Bromsgrove

The scheme will extend electrification of the Cross City line from Barnt Green to Bromsgrove, which will facilitate the extension of the current Longbridge Cross City services to Bromsgrove. It is proposed that the scheme will provide capacity for three trains per hour to Bromsgrove. This scheme closely interfaces with the third-party-funded scheme to relocate Bromsgrove station (see 4.2.1.5). This relocation is required as a prerequisite of the extension of Cross City services to Bromsgrove, to provide the opportunity to install turn back facilities. The scheme at Bromsgrove also has a timetabling interface with the scheme to increase Cross City

4. Planned changes to infrastructure and services

services to Redditch. It is proposed that the current service of six trains per hour, where four turn round at Longbridge and two carry on to Redditch, will be extended so that three trains per hour run to Bromsgrove and three trains per hour will run to Redditch.

The timing of the delivery of this scheme is currently being determined and the proposed future timetable will be dependent on further detailed capacity and timetable modelling work to ensure capacity is available to support current passenger and freight services and the new service requirement.

4.2.1.7 Redditch branch enhancement

This scheme will improve capacity on the Redditch branch, by enabling an additional train per hour between Barnt Green and Redditch (in each direction), thereby delivering a standard 20-minute interval service between Redditch and Birmingham New Street. Network Rail is currently developing the option of a double track section between Alvechurch and Redditch which will require a second platform and footbridge at Alvechurch. To allow for local planning application timescales, the planned commissioning date for the project is now December 2013.

The service is currently operated by Class 323 electric multiple units and the extension of the Cross City services will only require a minimal increase in rolling stock.

4.2.1.8 West Midlands platform lengthening

This scheme will help to deliver the operational plans currently proposed by the train operators to achieve HLOS capacity metrics. Achieving the increase in demand set out in the HLOS requires train operators to deploy additional rolling stock. The preferred method for deploying extra stock will be achieved through operating longer trains but this will require platform lengthening and/or the operation of selective door operation (SDO) at some stations. The agreed scope for platform lengthening, following discussions with operators and other stakeholders, is detailed in **Table 4.1**.

4.2.1.9 Westerleigh Jn to Barnt Green linespeed improvement

Along the Bristol to Birmingham and South Wales to Birmingham corridors (which merge north of Gloucester), the scheme proposes to raise the linespeed to 100mph in both directions. This will provide the ability to reduce journey times by up to two minutes during future timetable recasts, with associated benefits to the wider cross boundary services. This enhancement will also

deliver significant performance improvements, as well as providing an increase in both passenger and freight capacity. Implementation of the linespeed improvement work is currently programmed for December 2012, from which revised timings can then apply.

4.2.1.10 Network Rail Discretionary Fund

The Network Rail Discretionary Fund (NRDF) is a mechanism for funding minor schemes (nominally under £5 million) which will enhance the capacity or capability of the rail network. An NRDF funded scheme must deliver value for money and have available resources to deliver the project efficiently. They are therefore schemes which are either linked to renewals or are stand alone schemes. A stand alone scheme is an enhancement undertaken as a separate scheme independent of any planned renewal works, whilst an enhancement undertaken with a renewal is an enhancement implemented as part of a planned renewal.

Schemes that have been funded by the NRDF and completed to date include:

- part doubling of the Coventry to Leamington Spa line as part of Coventry signalling renewal
- second access to Platform 12 at Birmingham New Street
- removal of permanent speed restrictions at Camp Hill and Grand Jn
- linespeed increases on the Cross City line south of Barnt Green
- W10 gauge enhancement on the Sutton Park line
- replacement of the bridge deck outside Birmingham Moor Street station in connection with Chiltern Railways timetable change at Birmingham Moor Street and Birmingham Snow Hill
- reduced headways, a new crossover at Stratford-upon-Avon and a new turnback facility at Whitlocks End, as part of the Shirley to Stratford signalling renewal.

Other schemes currently being developed with committed funding from NRDF align to resignalling projects being delivered in CP4. These are described in 4.2.2.3 – West Midlands resignalling programme.

There are also a small number of stand alone NRDF schemes which are described in 4.3.

Table 4.1 – Platform enabling works required for West Midlands train lengthening

Corridor	Rolling stock	Stations	Platforms
Cannock	DMU Operation Class 170 type units in formations no greater than 4 vehicles.	Hednesford	1
		Rugeley Trent Valley	1
Coventry	EMU Operation Class 323, 350 and a likely new build type unit in formations of no greater than 8 vehicles.	Hampton-in-Arden	1, 2
Derby	DMU Operation Class 170 type units in formations of 2, 3, 4 and 5.	Wilnecote*	1, 2
Leamington Spa	DMU Operation Class 150 and Class 172 type units in formations no greater than 6 vehicles.	Widney Manor	1, 2
		Small Heath	3, 4
Stourbridge	DMU Class 150, 170 and Class 172 type units in formations no greater than 6 vehicles.	Droitwich Spa	1, 2
		Kidderminster	1, 2
		Lye*	1, 2
		Langley Green	1, 2
		Cradley Heath	1, 2
Stratford-upon-Avon	DMU Operation Class 150 and Class 172 type units in formations no greater than 6 vehicles.	Wythall	1, 2
		Spring Road*	1, 2
		Whitlocks End	1, 2
		Yardley Wood	1, 2

*or Selective Door Operation (SDO), subject to an agreed operational plan

4.2.1.11 National Stations Improvement Programme

The National Stations Improvement Programme (NSIP) 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 improvements to the environment at selected stations. The programme is being developed through local delivery groups which enable the NSIP money to be invested in the most effective way by leveraging in third party

funding. Local delivery groups include train operators and representatives from Network Rail. As part of the NSIP Tranche One programme, work at stations on the Cannock line has recently been completed. This has included the installation of new CCTV and Customer Information Systems (CIS) equipment, new platform waiting shelters, artwork and station signage.

Within the RUS area the stations that have currently been identified for NSIP funding are presented in **Table 4.2** with a brief description of the planned works. For the NSIP Tranche Two programme, station sites are currently under consideration and development funding is being sought.

4. Planned changes to infrastructure and services

Table 4.2 – Tranche one National Stations Improvement Programme schemes		
Station	Planned works	Status
Aylesbury Town	<ul style="list-style-type: none"> ● improvements to the booking hall and waiting area including new glass partition wall to enclose the entrance to the toilets ● extension of existing passenger waiting area ● new ceramic tiled floor and skirting ● redecoration of booking hall walls ● refurbishment of the existing male, female and disabled toilets is also planned including new slip-resistant ceramic flooring, new heating and ventilation, and new recessed ceiling lighting. ● increased cycle facilities which will include reconfiguration to allow for an additional 26 cycle hoops ● relocation of security railings ● new paved areas ● new CCTV camera to view the gateline. 	Completed.
Gerrards Cross	<ul style="list-style-type: none"> ● refurbishment and extension of canopy on southbound platform ● installation of lift canopy on northbound platform ● relocation of cycle racks to provide more spaces 	Completed.
Haddenham Thame Parkway	<ul style="list-style-type: none"> ● installation of four new passenger waiting shelters. 	GRIP 3 Study Completed.
Leamington Spa	<ul style="list-style-type: none"> ● refurbishment of the waiting rooms, including CIS, speakers and CCTV ● enhanced access for all users, including passengers with disabilities ● provision and/or restoration of fabric and fittings key to reflect the Grade II listed status ● refurbishment of the disabled/baby change facilities and ladies toilets ● conversion of current staff facilities on the southbound platform for passenger use, with the ultimate aim of creating a refreshment room. 	Completed.
Princes Risborough	<ul style="list-style-type: none"> ● extension of the waiting room ● new seating ● new CCTV cameras ● refurbishment of existing public toilets including disabled toilets ● new paving on station forecourt ● additional cycle parking. 	Completed.
Tamworth	<ul style="list-style-type: none"> ● refurbishment of station building on platform ● resurfacing of platforms ● refurbishment of the toilets and installation of a DDA accessible toilet ● refurbishment of waiting rooms on platforms 3 and 4 ● refurbishment of booking hall ● new cycle storage facilities ● new platform canopy. 	Completion of the works is anticipated by the end of 2011.
Telford	<ul style="list-style-type: none"> ● glazing and re-cladding to building façade ● canopy extension on platform 1 ● new waiting room and shelter on platform 2 ● external landscaping ● new cycle facilities ● new station totem ● improved heating, doors, and seating ● refurbishment of toilets including new DDA accessible toilet. 	Completion of the works is anticipated by the end of 2011.

Table 4.2 (continued) – Tranche one National Stations Improvement Programme schemes

Station	Planned works	Status
University	<ul style="list-style-type: none"> ● widening of platform 2 ● extension of canopy on the Birmingham bound platform ● new cycle storage facilities ● new station signage ● renovation of the waiting room and ticket office. 	Completion of the works is anticipated at the beginning of 2012.
Warwick	<ul style="list-style-type: none"> ● refurbishment of the public subway, including new flooring, lighting, wall cladding and improved drainage system. ● basic fabric improvements to a currently disused room for use by passengers, with the ultimate aim of developing a refreshment room. 	Completed.
Wendover	<ul style="list-style-type: none"> ● installation of DDA compliant footbridge including lifts. <p>Funding has also been derived from Network Rail renewals, Chiltern Railways and DfT Access for All small schemes.</p>	Completion of the works is anticipated at the beginning of 2012.

4.2.2 Other committed enhancement schemes in CP4

The following schemes are committed enhancements within the West Midlands and Chilterns RUS area. These schemes, in addition to the capacity schemes specified above, have formed part of the baseline and have been taken into consideration during the appraisal work.

4.2.2.1 Evergreen 3 project

The Evergreen 3 project is the third phase of the major infrastructure works which Chiltern Railways have promoted as part of their 20 year franchise to improve services on the Chiltern Main Line. The first and second phase of works delivered additional capacity, improved speeds at certain locations and two new platforms at London Marylebone station.

The third phase of Evergreen is a £274 million project which will deliver faster journeys between London Marylebone to Birmingham via Bicester, and a new route to Oxford, offering new passenger services between London Marylebone and Oxford station. The scheme will deliver linespeed improvements to permit 100mph running on the Chiltern Main Line and additional line capacity will be created by providing passing facilities at Northolt, Princes Risborough and Bicester. This will allow more flexible and logical stopping patterns for suburban and long distance services. Work on the Chiltern Main Line to improve linespeeds and provide additional capacity, is planned to be complete by Summer 2011.

The Evergreen 3 project will also connect the Oxford to Bicester line to the Chiltern Main Line. This will enable a new Oxford to London Marylebone service via Bicester Town (known as BiOx), via a new south-west chord line. The scheme will rebuild the existing Bicester to Oxford line for 100mph capability, with five-minute planning headways and involves the construction of a new park and ride station at

Water Eaton, to the north of Oxford. There will be additional platforms at Bicester Town, Islip and Oxford (the BiOx works outlined here are subject to the granting of ministerial powers following Chiltern Railways TWA application – a decision is expected in late 2011).

All signalling on the route will be controlled by a central location, and it is anticipated that new services will commence in 2013. The associated timetable changes that will be delivered following the enhancement programme, will provide the following benefits:

- additional passenger capacity to London Marylebone in the three-hour morning peak
- Class 172 DMUs used on some suburban services
- linespeed improvement to enable faster journey time between London Marylebone and Birmingham (average 1 hour 41 minutes in the peak)
- half-hourly Oxford to London Marylebone service with 66 minutes journey time, calling at Water Eaton Parkway, Islip (some services), Bicester Town, Haddenham and Thame Parkway and High Wycombe
- changes in calling patterns on the long distance services to enable a faster journey time
- improvements to freight capability.

The following schemes, which are funded through the CP4 Delivery Plan, directly interface with the Evergreen 3 project with the overall aim of improving capacity and journey times between London Marylebone and the West Midlands:

4. Planned changes to infrastructure and services

- Aynho Jn to London Marylebone linespeed improvements:

The scheme will raise the linespeed at Aynho Jn (between Bicester and Banbury) in both directions. In the up direction (towards London) the linespeed will be increased from 60mph to 90mph and in the down direction (towards the West Midlands) the junction speed will be increased from 40mph to 85mph. The scheme will deliver a journey time reduction of 1 minute, and contribute towards the overall achievement of the 100 minutes journey time objective between London Marylebone and the West Midlands. Completion is planned for August 2011.

- South Ruislip loop:

This scheme comprises track and signalling alternations at South Ruislip in connection with wider remodelling being developed by the Evergreen 3 project, to provide capacity and linespeed improvements. It will enable a timetable recast so that stations between London and Gerrards Cross can receive additional inner suburban trains. These services will be able to be looped to allow faster services to overtake during the morning and evening peak hours. This will create additional capacity for key markets such as Beaconsfield, High Wycombe, Haddenham

and Thame Parkway and Bicester. Detailed design work is in progress with an aim to complete the overall works at Northolt by August 2011.

4.2.2.2 Metropolitan line resignalling

The subsurface lines resignalling programme (including the District and Hammersmith & City lines) is due to be completed by 2018. It is anticipated that the Metropolitan line will be completed in advance of this in 2016/17. In addition to the signalling upgrade works, planned changes include relocation of the signalling control to a central location and the introduction of new London Underground eight-car 'S' type rolling stock. This new stock is planned to be in service on the Metropolitan line in time for the introduction of the December 2012 timetable.

4.2.2.3 West Midlands resignalling programme

Table 4.3 outlines the signalling renewals, including proposed enhancement works, planned in the RUS area up to 2014. The signalling renewals work will replace life-expired assets with modern equivalent equipment. The RUS will consider the renewed and enhanced network as the baseline infrastructure during its development.

Table 4.3 – Signalling renewals, including proposed enhancement works, planned in the RUS area during CP4

Project	Proposed work including enhancement schemes	Benefits	Planned completion date
Water Orton resignalling	<ul style="list-style-type: none"> ● relocate signalling control to the West Midlands Signalling Centre ● provide four aspect signalling between Nuneaton and Water Orton East Jn and three aspect signalling between Park Lane Jn and Aldridge ● reduced signalling headways on the Sutton Park line and between Water Orton and Nuneaton ● remodelled junctions at Water Orton and Landor Street. 	Delivers increased capacity, increased operational flexibility and improved performance.	2012
Kidderminster/Hartlebury resignalling	<ul style="list-style-type: none"> ● relocate signalling control to the West Midlands Signalling Centre ● reduced signalling headways between Stourbridge and Kidderminster ● higher entry and exit speeds in and out of Kidderminster goods loop ● new facing crossover at Stourbridge Jn. 	Delivers improved capacity and operational flexibility on the line.	2012
Walsall and Cannock resignalling	<ul style="list-style-type: none"> ● relocate signalling control to the West Midlands Signalling Centre ● provides signal spacing for 75mph running ● reinstatement of connection at north end of Walsall station from platform 3 to the up main ● reduced signalling headways on the Sutton Park line ● provision of run round facility at Walsall on the out of use goods lines to Round Oak. 	Delivers increased capacity, increased operational flexibility, improved routing and improved performance.	2013

4.2.2.4 Cotswold line redoubling

The Cotswold line redoubling scheme involves 20 miles of redoubling the single line track on the Cotswold Line from west of Evesham through to Moreton-in-Marsh and from Ascott-under-Wychwood to Carlbury, with significant signalling modifications, three new station platforms and

associated facilities. The scheme will enable an hourly service to be introduced and provide performance improvement on the route. It will allow through running for freight and diversionary operations and will provide better connectivity from Worcester to Oxford and the Thames Valley area. The scheme is due for completion in Autumn 2011.

Table 4.4 – Access for All programme of works

Station	Planned scope	Status
Sutton Coldfield	The scheme consists of the replacement of the footbridge span and the installation of two new 16 person lifts that will link into the renewed footbridge. Additional CCTV cameras and supporting equipment will be installed. Other works include refurbishment works to platform 1 and 2 and the booking office.	Completed
Northfield	The scheme consists of two new 16 person lifts that will link into the existing footbridge. Additional CCTV cameras and supporting equipment will be installed.	2012
Selly Oak	The scheme consists of two new 16 person lifts that will link into the existing footbridge. Additional CCTV cameras and supporting equipment will be installed.	2012
Henley in Arden	The scheme is in the initial development stages.	2013
Shirley	The scheme is in the initial development stages. This scheme may be developed in parallel with the station footbridge renewal.	2014
Worcester Shrub Hill	The scheme is in the initial development stages. The outputs of this scheme may be incorporated into a potential third party funded scheme that is currently being developed with the Network Rail property team. Early indications suggest that a new footbridge may be provided which would link the proposed third party development to the station. The exact scope and timing of this scheme is still to be defined in detail.	2013/14

4.2.2.5 Access for All

Access for All, a 10-year initiative launched by the DfT in 2006 to make more than 200 smaller stations across the country accessible for all, is part of the Railways for All Strategy, which aims to address the issues faced by mobility impaired passengers using railway stations in the UK. Central to the strategy is the commitment of £35 million nationally per year, until 2015, for the provision of an obstacle-free, 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 Midlands and Chilterns RUS area are outlined in **Table 4.4**.

4.2.2.6 Birmingham Moor Street Platforms 3 and 4 reconnection

The scheme to reinstate the connection to the terminal platforms at Birmingham Moor Street station (one of the busiest stations in the West Midlands), was completed early in 2011. It reinstated the out-of-use Platforms 3 and 4 at the station, in order to decongest the crowded through platforms and provide better passenger circulation throughout the

station. The scheme included the replacement of the bridge deck outside the station, which was funded by the Network Rail Discretionary Fund. The scheme has delivered 32 vehicles worth of capacity for stabling, which has been released from Tyseley and provides an opportunity for future growth in the West Midlands. Reinstatement of the platforms has been required in order for Chiltern Railways to introduce their planned timetable changes.

4.2.2.7 Birmingham city centre metro expansion

As part of the West Midlands Region's wider transport strategy known as 'Vision for Movement' the Midland Metro tram system is to be extended. The trams will run through the city of Birmingham towards New Street, connecting to a redeveloped Birmingham New Street station and will provide connectivity to the city centre for passengers arriving into Birmingham Snow Hill station by rail or tram. The former Platform 4 at Birmingham Snow Hill (currently used by the tram system) will be vacated as part of the tram expansion with a new Snow Hill tram stop created close to the new station entrance. This will create an opportunity to potentially restore the platform for heavy rail use to provide additional capacity and operational flexibility at the station.

4. Planned changes to infrastructure and services

4.2.2.8 Car parking expansion schemes

The RUS recognises that the current shortage in car parking provision is one of the factors suppressing demand across the West Midlands and Chilterns RUS area. Therefore, the industry is working hard to improve parking facilities and develop suitable car parking expansion programmes.

In addition to specific plans to increase car parking capacity at Dudley Port station, and introduce a 350 space car park at the new Bromsgrove station, Centro is also developing a network station access strategy based on an analysis of the demand and capacity available on each route. This strategy will include a plan for improving park and ride and other access measures on a route-by-route basis, and will highlight particular stations at which future park and ride expansion should be focused.

As part of the Chiltern Railways franchise commitments, 1,444 new car parking spaces are being provided, with a life expectancy of 25 years, at stations on the Chiltern route. Car park capacity for commuters to London Marylebone has been a key area for development by Chiltern Railways in the past, with additional capacity delivered to accommodate growing demand. In 1994, a total of 3,100 spaces were provided at Chiltern stations and this more than doubled to 7,200 by 2009. A further 500 spaces have been added in 2010/11 including a new multi-storey facility at High Wycombe. Looking

forward, in the short term Chiltern is progressing schemes to increase capacity further, including at Solihull, Warwick Parkway and Leamington Spa. Further capacity will be delivered by Phase 2 of the Evergreen 3 project at Bicester Town and Water Eaton Parkway. It is to be expected that Chiltern Railways will continue to develop and promote car park expansion schemes that underpin the ongoing growth of the franchise to 2021.

London Midland has provided an additional 1000 car park spaces at their stations on the West Coast Main Line, with further capacity now available at Tamworth, Northampton, and Nuneaton. Around 350 spaces has also been added to London Midland stations in the West Midlands including Kidderminster and Worcester Shrub Hill. The plans include the requirement to ensure that all of the parking space areas have appropriate levels of lighting and security.

Virgin Trains are approaching completion of their major car park expansion programme to support increased demands on the WCML. Car park extensions which have been completed within the RUS area include Coventry, Rugby, Stafford, Wolverhampton and the significant delivery of 835 spaces at Birmingham International.

Table 4.5 outlines some of the stations where expansion schemes have been undertaken recently or are under development during CP4.

Table 4.5 – Car parking schemes in the West Midlands and Chilterns area

Operator/PTE	Station	Number of spaces	Date of completion
Centro	Bromsgrove New Station	c.350	December 2013
	Dudley Port	47	Summer 2011
	Longbridge Temporary Park and Ride	45	Spring 2011
	Rowley Regis	485	Currently unfunded
	Solihull	163	By December 2011
	Tile Hill	240	Spring 2011
	Whitlocks End	174	Spring 2011
	Yardley Wood	c.100	Currently unfunded although likely to be the next Centro car park expansion
Chiltern Railways	Gerrards Cross	80	March 2011
	Haddenham & Thame Parkway	200	March 2011
	Bicester North	150	March 2011
	Warwick Parkway	100	March 2011
	Leamington Spa	80	March 2011
	Banbury	200	March 2011
	High Wycombe	200	March 2011

Table 4.5 (continued) – Car parking schemes in the West Midlands and Chilterns area

Operator/PTE	Station	Number of spaces	Opening date
London Midland	Tamworth	79	September 2010
	Nuneaton	48	2010
	Kidderminster	100	2009
	Worcester Shrub Hill	9	2009
Virgin Trains	Birmingham International	835	September 2009
	Coventry	118	July 2009
	Rugby	332	September 2009
	Stafford	272	November 2010
	Wolverhampton	77	September 2009

4.3 Uncommitted enhancement schemes

The following are uncommitted schemes which, if implemented, would have a significant impact within the RUS area. These schemes are proposed mostly in CP5 and beyond.

4.3.1 Signalling renewal schemes in development

A number of signalling renewals are in the early stages of development, with work focusing on determining the scope and benefits which will be delivered. These signalling renewal plans include the Banbury area, proposed for late CP4 delivery and Birmingham New Street station area, Wolverhampton area, which are proposed for delivery in CP5 (2014–19).

Banbury resigalling

The Banbury resigalling project will renew life-expired signalling equipment in the Banbury area and align switch and crossing renewals, in order to rationalise the track layout. With the remodelling and resigalling work there will also be opportunities to enhance the capability of the infrastructure, which may include improvements to:

- the headway between Banbury North and the fringes to Marylebone and Oxford signalbox areas,
- the operation and flexibility of the Banbury station area, and
- the access and egress from existing platforms.

The project is considering the stabling arrangements at Banbury for passenger rolling stock and engineers' plant, potential changes to crossover arrangements around the station, possible bi-directional working over the down line between Banbury and Aynho Jn and reconfiguration of the looping arrangements at the north end of Banbury. This project is planned for completion in late CP4.

Wolverhampton Power Signal Box (PSB) resigalling

The Wolverhampton PSB resigalling project will renew life-expired assets in the Wolverhampton area with modern equivalent equipment. Signalling control will be relocated to the West Midlands Signalling Centre. Wolverhampton PSB will remain post commissioning to be utilised by local operations and maintenance. The project will incorporate signalling requirements for remodelling work at Bushbury Jn which will simplify the track layout. Four aspect signalling and axle counter train protection will be implemented as part of the scheme. The project will provide additional signals between Wolverhampton and Coseley, which will deliver a capacity improvement. This project is planned for completion during early CP5.

Birmingham New Street signalling renewals

Birmingham New Street Power Signal Box (PSB) controls a multiple route, high density part of the railway. The scope of this project is to renew all life-expired signalling equipment in the Birmingham New Street PSB control area and to transfer control to the West Midlands Signalling Centre. The boundaries of the project are at Five Ways, Smethwick Galton Bridge, Hamstead, Aston, Berkswell, and Adderley Park. The project will consider the options for increasing capacity and linespeed across the area. The use of bi-directional signalling and additional turn back moves to increase flexibility, together with rationalisation of junction layouts to decrease occupation times, are being investigated. The project is planned for completion during CP5.

Worcester area signalling life extension

There are plans for renewing the signalling equipment in the Worcester Area (Worcester Tunnel Jn, Worcester Shrub Hill and Henwick signal boxes) and at Droitwich Spa signal box. These plans include life extension of the assets only.

4. Planned changes to infrastructure and services

4.3.2 Wolverhampton to Shrewsbury linespeed improvements

This is an enhancement scheme to deliver journey time reductions on the Wolverhampton to Shrewsbury route. The project aims to raise the linespeed from the existing 70mph to 90mph over a distance of around 20 miles, which will help to deliver journey time reductions, increased capacity, timetable flexibility and performance resilience at both Shrewsbury and Wolverhampton. Following the Government's Comprehensive Spending Review in late 2010, the West Midlands Regional Funding Allocation (RFA) was withdrawn, leaving this project with a funding shortfall. Regional Partners are working together to actively source alternative funding streams.

4.3.3 Cannock line linespeed improvements

This scheme aims to increase the linespeed on the route between Rycroft Jn (Walsall) and Rugeley from the current 45/50mph to 75mph. The increase will apply to approximately 11 miles of the route in both directions. The objective of the scheme is to enable a timetabled reduction in journey time for passenger services on the route, in order to encourage growth in passenger travel and modal shift, thereby realising socio-economic benefits. To enable efficient delivery of the scheme, the track, structures and platform works would be delivered by the project, and the signalling works would be delivered separately by the Walsall and Cannock resignalling scheme. It should be noted that it is anticipated that the linespeed increase would be implemented following the completion of the resignalling scheme in 2013.

Following the Government's Comprehensive Spending Review in late 2010, the West Midlands RFA was withdrawn, leaving this project with a funding shortfall. Regional Partners are working together to actively source alternative funding streams.

4.3.4 Stretton and Cannock freight terminals

A new Strategic Rail Freight Interchange is being developed for connection to the network at Stretton, located between Wolverhampton and Penkridge. The 200-acre regional logistic site is expected to be similar to Daventry International Rail Freight Terminal and has a target commercial development of 3.5 million square feet, within easy access of the motorway network. The proposal is to provide two loops for the receipt and despatch of trains up to 775 metres in length, linked to the network by both north and south connections and crossovers. The terminal itself will be to the south of the loops and comprise up to six sidings. There is a significant interface with the Wolverhampton resignalling

project and delivery of the main signalling and track works may coincide with the resignalling project, currently expected in 2015. Current analysis indicates that there is sufficient capacity on the network to accommodate rail services to and from the proposed terminal site and no performance risk on other trains will result.

Elsewhere in the RUS area there is an aspiration to establish rail services to an existing intermodal facility (on the site of the former Mid-Cannock Colliery). The 28-acre site has a capacity of about 5,000 20-foot-container-equivalent units and an existing rail connection, which would be utilised to provide access to a new siding development. Current analysis indicates that there is sufficient capacity on the network to accommodate rail services to and from the Cannock site without impacting on the performance of other trains.

It is acknowledged that further development of these terminals should consider the implications on the capacity and operation of the strategic road network, and include ongoing communication with the Highways Agency.

4.3.5 Coventry to Nuneaton rail upgrade

Network Rail is working with Coventry City Council, Warwickshire County Council and Centro on a project to enhance the transport links between Nuneaton, Bedworth and Coventry. Locations along the route were identified as a major growth area in the former West Midlands Regional Spatial Strategy and there are a number of potential locations along the route that could receive significant additional housing. It is forecast that these demands will increase car use and congestion unless there is a good quality public transport alternative.

The proposed scheme includes plans for a new six-car bay platform at Coventry station, new stations at Coventry (Ricoh) Arena and Bermuda Park, and the extension of platforms at Bedworth station to accommodate three-car trains. The aim is to double the existing hourly service frequency and replace the current single rail car with two-car trains. For events at Ricoh Arena this service would be supplemented by a six-car shuttle service between Coventry and Arena stations, where a new crossover is being provided to allow services to terminate. The new bay platform at Coventry will remove services from the main through platforms at the station, thus delivering capacity and performance benefits.

The route has recently been resignalled with five-minute headways which provides sufficient capacity to handle both the current and future freight traffic alongside the proposed passenger service. Timetabling work has shown that it is possible to operate a half-hourly service from Nuneaton Platform 1 with the scheduled freight traffic that uses this platform.

In February 2011, the DfT announced that this scheme has been accepted into the Development Pool of schemes for which they are considering funding (subject to business case). The DfT will make a final decision on funding at the end of 2011. The scheme is currently in development.

Other enhancements being developed in the area include the Friargate major commercial regeneration project and plans to alter traffic flows around Coventry station area, with a potential new access to the station.

4.3.6 Station developments

The following station proposals are in different stages of development, with funding streams currently being explored:

Kenilworth station: a third-party scheme is in development to provide a new station at Kenilworth in Warwickshire. A new station in the town would give residents local access to the national rail network and encourage increased use of rail for journeys that might otherwise be undertaken by car. This would help improve accessibility, reduce road congestion and aid economic regeneration in the area through increased access to jobs, education and leisure opportunities. A potential service pattern is currently being investigated.

Stratford Parkway: a third party scheme is in development to provide a new parkway station in Bishopton, near Stratford-upon-Avon, with an aspiration to increase train services between Stratford-upon-Avon and Birmingham. The plan includes the provision of park and ride facilities which would save people from driving into Stratford-upon-Avon town centre to get the train at the existing station. Local developments at the existing station location will limit the potential to further expand the current car park and therefore will constrain the ability of passengers to access the station. Stratford Parkway would mitigate against the increased pressure on the existing Stratford station car park and enable a potential increase in train service frequency to cater for demand generated by the significant new housing developments planned to the north-west of the town.

Worcestershire Parkway: the South Worcestershire Joint Core Strategy to 2026 indicates that the South Worcestershire authorities (Malvern Hill District Council, Worcester City Council and Wychavon District Council) are supportive of the principle of developing a parkway station at Norton in Worcestershire as part of an integrated transport strategy. It is not certain whether this proposal will be taken forward for further development, and timescales are therefore undefined and are likely to be linked to longer term growth opportunities.

Shrewsbury Parkway: an initial investigation into the feasibility of a parkway station at Shrewsbury has been undertaken by Shropshire County Council. The aspiration to introduce a new parkway station is based on the issues with road layout, congestion and limited car parking at the current Shrewsbury station which leads to rail heading to other stations within the West Midlands. The proposed location for the parkway station would provide an access solution and an additional bus based park and ride location for Shrewsbury. Current analysis of demand and rail industry requirements supports the continued development of this proposal.

Birmingham Snow Hill: the opportunity to reinstate Platform 4 at Birmingham Snow Hill for heavy rail use (following the proposed extension of metro services to the city centre) is currently being investigated. A feasibility study is underway to assess platform capacity and utilisation. This study will aim to determine how the current platforms operate, how current platform utilisation can be maximised, and whether reinstatement of the former Platform 4 will be required to accommodate growth in the future. This study is due to report back post RUS publication.

Birmingham International: the West Midlands Regional Rail Prioritisation Plan highlights Birmingham International station as an international gateway to the West Midlands and as such there is an aspiration to upgrade the passenger environment, once funding can be found.

4.3.7 East-West Rail

The primary objective of this major scheme is to improve east-west connectivity in the Oxford to Cambridge arc. The East-West Rail Consortium is proposing to reopen railway lines and reintroduce passenger services from Oxford and Aylesbury to Bletchley and Milton Keynes. The main purpose of the reopened railway is to act as a local transport link to support growth and development, as well as ease traffic congestion problems in Oxford, Bletchley and Milton Keynes. Further development of the route would deliver significant capacity on the Cherwell Valley and other existing routes and is seen as a long-term strategic aspiration, supporting inter-regional passenger services and creating an alternative freight route between the South of England and the Midlands, the North and Scotland.

4. Planned changes to infrastructure and services

4.3.8 The Station Travel Plan initiative

The Station Travel Plan initiative aims to deliver further improvements to stations across the network. It addresses integrated public transport on a national basis and considers ways to reduce the environmental impact of transportation through promotion of 'smarter transport choices'. Within the RUS area, Kings Norton and Leamington Spa have been selected as pilot stations and practical steps are being taken to support walking, cycling, public transport and car-sharing opportunities.

4.4 High Speed 2

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. The study found a case for a dedicated high speed line from London to Birmingham, Manchester and Scotland.

High Speed 2 Limited (HS2 Ltd) is the company formed by the Government in January 2009 to further consider the case for high speed rail services from London to the West Midlands, northern England and Scotland. HS2 Ltd is currently considering the feasibility and credibility of potential options, and the results of this work will inform the Government's overall strategy and programme for establishing a high speed rail network.

4.5 Planned service changes

The section below outlines the major planned service changes within the RUS area during CP4:

4.5.1 December 2010 timetable change

The timetable change last December, deployed the use of loco-hauled services on selected Chiltern mainline services. This included the introduction of loco-hauled stock on peak hour trains and two-car Class 172s for use by Chiltern Railways at the south end of the route. The loco-hauled stock has improved the journey time of Chiltern Railway's London Marylebone to Birmingham service by approximately 10 minutes. This is a timetable and rolling stock based initiative and required the committed investment to reinstate two terminal platforms at Birmingham Moor Street (mentioned in section 4.2.2.6) and the modification of speeds to enable the operation of the loco-hauled services between Tyseley and Aynho Jn (both of which are described earlier).

In December 2010, Arriva Trains Wales introduced five additional return services between Wolverhampton and Shrewsbury services on Sundays. This has helped to provide additional capacity to cater for increased passenger demand between Wales and the West Midlands.

4.5.2 2011 timetable changes

Changes to the stopping pattern of Chiltern Railways services in 2011 will provide two extra services from Amsterdam to London and one extra service from Harrow-on-the-Hill in the morning peak. Additional peak semi-fast London Underground services between Amersham and central London will operate from December 2011 providing five extra trains in the morning peak period and two in the evening peak.

Further timetable changes are planned in 2011 as part of the Evergreen 3 project (£100m to improve the linespeeds south of Banbury). This aims to achieve a journey time between London Marylebone and Birmingham of one hour 40 minutes. The infrastructure enhancements required to deliver this include linespeed improvements between Neasden and Ruislip, the remodelling of Northolt, West Ruislip, Princes Risborough and Aynho Jn, and linespeed improvements from West Ruislip to just south of High Wycombe. The scheme will enable a timetable recast to reduce the number of stops made by long distance trains, whilst sustaining frequencies at key locations. It will facilitate potential additional inner-suburban trains between Gerrards Cross and London Marylebone. These services will be timetabled in such a way as to allow faster services to overtake at West Ruislip in the morning peak towards London, and with a similar arrangement at South Ruislip in the evening peak. The benefits of the new timetable structure comprise enhanced capacity provision for key markets such as Beaconsfield, High Wycombe, Haddenham and Thame Parkway and Bicester, consequent from the concentration of inner stops proposed.

4.5.3 2012 timetable changes

In December 2012, following the completion of delivery of S-Stock trains for the Metropolitan Line, it is anticipated that the higher operating speed capability of the new rolling stock will enable the introduction of a new integrated timetable on this corridor.

4.5.4 2013 timetable changes

The second stage of the Evergreen 3 project aims to re-link Oxford and High Wycombe through the creation of a new double track curve line linking the Chiltern route just south of Bicester North with the Bicester Town to Oxford line. Services from London Marylebone to Oxford are planned to start during 2013.

4.6 Planned rolling stock changes

The section below outlines the major rolling stock changes within the RUS area during CP4 and CP5:

4.6.1 Class 390 Pendolino vehicles

The DfT sponsored enhancement scheme to lengthen Class 390 vehicles on the WCML is progressing. The overall aim of this scheme is to increase capacity on the WCML to accommodate growth forecast on this route. The Class 390 vehicle fleet will be lengthened by adding two standard vehicles to the 31 existing nine-car sets, creating a total of 35 11-car trains. 21 sets will remain as nine-car formations. The new vehicles will be available for full service by 2012, however, deployment of these vehicles is still under consideration at this time.

In order for the lengthened sets to operate, platform work is required at a number of stations. Where platform extension is not feasible or economically viable, selective door operation (SDO) will be used. Stations affected in the RUS area are Lichfield Trent Valley, Wolverhampton and Northampton. In order to maintain the new fleet, associated improvement works required at Oxley and Wembley depots are also being implemented as part of this scheme.

4.6.2 London Midland Class 172's

During 2011, London Midland will begin to replace its existing Class 150 fleet operated on the Snow Hill lines with Class 172s. This is a new build of diesel unit, which will offer vastly improved passenger comfort, together with better performance arising from enhanced traction capability.

4.6.3 Chiltern Railways Class 172s

Chiltern Railways has committed to lease four new 2-car Class 172 units. These units will be used to provide additional capacity on trains into London Marylebone from High Wycombe. They have better

acceleration than Chiltern Railways existing vehicles and will therefore be mostly used on inner suburban routes but will have route acceptance for all Chiltern Railways existing routes.

4.6.4 LULs S stock

In addition to the signalling upgrade works planned on the Metropolitan Line, London Underground are introducing new eight-car 'S' type rolling stock. This new stock is planned to be in service on the Metropolitan Line for introduction from December 2012 timetable.

4.6.5 InterCity Express Programme (IEP)

The current High Speed Train fleet on the Great Western Main Line is due to be replaced by 2017. As a result, a new generation of rolling stock, IEP, will take over the London Paddington to Worcester and Hereford services. Peak hour services between London Paddington and Hereford will continue to be provided and the recent upgrade works on the Cotswolds line between Oxford and Worcester will allow an improved regular hourly service to operate. The new fleet will provide an increase in capacity which will make a major contribution towards meeting increasing demand over the next 30 years.

4.7 Depots and stabling

As part of the Network RUS workstream, Network Rail intends to publish a Depots Planning Guidance document. This document will:

- provide a consistent approach to industry depot planning (for both new and enhanced facilities)
- provide evidence on industry best practice
- provide synergy with future Rolling Stock Strategic Planning and
- align with industry strategic planning.



5. Planning context and future demand

5.1 Introduction

This chapter considers the planning context for the West Midlands and Chilterns RUS. In order for a RUS to be successful, it needs to develop the railway in a way that accommodates the future requirements of the network based on an understanding of the wider planning and development context in which it is set.

During the development of this RUS, the UK has undergone a change of government and consequently a new approach to local planning has been introduced. These changes have taken place during a challenging time for the UK economy due to the impact of a global recession and the need to significantly reduce the national budget deficit. The immediate focus has been on reducing the deficit and increasing the drive for efficiency savings.

Since the publication of the Draft for Consultation, the strategy and framework for local government planning has been determined. The changes made have focused on simplifying the local grant streams process (from 26 grant streams to just 4) and providing local councils with more flexibility and responsibility, in order for them to concentrate on local priorities and manage their budgets more effectively. As local budgets have been reduced as part of the wider Government spending review, the guidance given is for local authorities to use the knowledge and understanding previously used to inform regional strategies and local plans to shape their future priorities.

The former Regional Assemblies and Regional Development Agencies (RDAs) were responsible for prioritising schemes to be funded through the Regional Funding Allocation (RFA). Following the Comprehensive Spending Review the RFA fund was consolidated into the Major Local Transport Schemes budget. An announcement was made in February 2011 regarding those schemes that were being considered for funding from the Major Local Transport schemes budget. Schemes have been divided into two groups:

The Supported Pool – schemes which the Government are prepared to fund subject to renegotiation of funding bids from Local Authorities, and The Development Pool – schemes that will be taken forward for further analysis. Decisions on which schemes to support will be made in December 2011.

The Coventry to Nuneaton rail upgrade project was accepted into the Development Pool in February 2011.

At the same time the Regional Growth Fund (RGF) was established. The RGF is designed to provide the means to bring together fragmented funding streams into one consolidated pot to encourage more effective co-ordination and prioritisation of funding to encourage economic growth and increase the number of jobs, especially in economically disadvantaged areas. The RGF is overseen by an Independent Panel which advises ministers on allocations of the Fund and set the strategic direction to maximise the benefit of the fund.

In late 2010, the Government announced its intention to create new Local Enterprise Partnerships (LEPs) which would assume the responsibilities previously undertaken by the Regional Development Agencies (RDAs). The LEPs are designed to bring together business and civic leaders to set strategies and take decisions regarding their local area in order for it to prosper. These LEPs are equipped to promote private sector growth and job creation locally and provide support for local projects that have potential for economic growth.

In order for the RUS to understand the priorities for rail in the medium and longer term, it has been vital to consult established planning documents and to work closely with local planning bodies. It is important to recognise that whilst some of the regional strategies have recently been revoked, the key issues and aims outlined in them are likely to continue to be significant in local government planning and therefore are still of relevance in helping to establish the wider planning context for this RUS.

It is important to recognise that the Government is committed to long-term sustainable transport planning, and rail will have an essential role to play in this. It is worth noting that, even during the recession, rail has continued to experience growth across many market sectors, and forecast changes in population, housing, economy and employment will have an influence on future rail demand.

The following documents have been influential in the RUS process for understanding the planning context in which it is set:

- Regional Planning Assessment for the West Midlands (Department for Transport (DfT), 2006)
- Regional Planning Assessment for the Thames Valley (DfT, 2007)
- Regional Spatial Strategy for the West Midlands (NB. this strategy has now been revoked)
- South East Plan (NB. this strategy has now been revoked)
- Regional Economic Strategy for the West Midlands (NB. this strategy has now been revoked)
- Regional Economic Strategy for the South East (NB. this strategy has now been revoked)
- Delivering a Sustainable Transport System (DfT, 2008)
- The Future of Air Transport (DfT, 2003)
- Airport Master Plan to 2030 – November 2007 (Birmingham Airport)
- NEC Group Annual Review (Master Plan) – 2008/2009 (NEC Group)
- The Strategic Rail Authority West Midlands Route Utilisation Strategy (SRA, 2005)
- Network RUS: Scenarios and Long Distance Forecasts (2009)
- Network RUS: Electrification Strategy (2009)
- Freight Route Utilisation Strategy (2007)
- West Midlands Rail Development Plan (Centro, 2009)
- North-South rail links in Buckinghamshire (Chiltern Railways, 2008)
- Draft Replacement London Plan (2009)
- Mayor's Transport Strategy (2010).

5.2 Regional Planning Assessments

In order to understand the wider social and economic context and its impact on rail demand, Regional Planning Assessments (RPAs) were published in 2006 and 2007. These planning documents are geographically aligned to regions and aim to ensure medium to longer term rail planning is aligned to national and regional priorities and objectives. The RPAs focus on the key drivers for change including population growth, economic development and regeneration, and land and housing policy.

In terms of the West Midlands and Chilterns RUS area, the relevant RPAs are Thames Valley and

West Midlands, published by the Department for Transport (DfT) in June 2007 and July 2006 respectively. The focus of these assessments is on responding to demand, improving rail performance for passenger and freight customers and developing rail's contribution to the improvement of national productivity.

More detailed analysis of the future spatial and economic framework for the regions has been considered during work to establish the former Regional Spatial Strategies (RSS) and Regional Economic Strategies (RES). Whilst these strategies have now been abolished following the change in UK Government, they have played an influential part in setting the wider planning context for this RUS and still have relevance in outlining the local issues and potential solutions to these. It is important to recognise that the new LEPs will draw upon the experience of the former local planning authorities which produced the RSSs and RESs, to inform their local prioritisation process.

5.2.1 The Future of Air Transport

Since the General Election in 2010, the new coalition Government's focus for air transport policy has changed, with an emphasis on the need to make better use of existing capacity, rather than the development of new capacity. In March 2011, the Government published a scoping document 'Developing a Sustainable Framework for UK Aviation'. This document invites comments to define the debate on the UK long term policy for aviation and help to shape the draft aviation policy framework which is due to be published in March 2012. The scoping document explains the Government's commitment to develop a long-term, high level framework for aviation and in particular their objectives to:

- set out the aims for aviation and the parameters within which they can be delivered
- take account of the positive and negative impacts of aviation, and the sustainable balance between them
- integrate aviation policy with wider Government objectives, including delivering sustainable economic growth, combating climate change and protecting the local environment.

The RUS area provides links to major airports in the UK, including direct services to Birmingham Airport and Stansted Airport, and connecting services to Manchester and Heathrow airports. Two services an hour are also provided from Birmingham New Street to Liverpool South Parkway, which has an express bus service running to Liverpool John Lennon Airport. The RUS takes cognisance of air transport policy and the surface access strategies being promoted by these airports in order to understand the needs of passengers accessing these airports by rail. The recent growth and transport policies of airports which are anticipated to have a major impact on the RUS area are outlined below.

5. Planning context and future demand

5.2.1.1 Birmingham Airport

The recently renamed Birmingham Airport was the sixth busiest airport in the UK in 2009[†]. It is expected to experience a significant increase in passenger demand over the next 30 years and an Airport Master Plan and Airport Surface Access Strategy have been developed to support this level of growth. Growth forecasts presented in the Airport Master Plan for Birmingham Airport, published in 2007, predict that passenger numbers at Birmingham Airport will increase from the nine million in 2009 to around 27 million per year in 2030.

The West Midlands Regional Planning Assessment (RPA) set an objective for supporting growth at Birmingham Airport and also the adjacent National Exhibition Centre. The RUS needs to consider the forecast growth at Birmingham Airport and the NEC and assess how rail can support this growth. It is important to take into account the plans for development at Birmingham Airport and the targets set by the airport for increasing its passenger and employee public transport mode share by 25 per cent by 2012.

5.2.1.2 Liverpool John Lennon Airport

Liverpool John Lennon Airport (LJA) anticipates passenger numbers to reach around eight million by 2015 and 12.3 million by 2030. The opening of Liverpool South Parkway station in 2006, supported by an integrated bus interchange serving the airport, has increased rail as a surface access choice for air passengers at LJA.

5.2.1.3 London Heathrow Airport

London Heathrow Airport is the largest airport in the UK and currently handles around 66 million passengers per year. The Heathrow Airport Interim Master Plan forecasts this passenger demand to increase to 87 million per year by 2015/16 and thereafter to around 90-95 million per year. Since the General Election, and with the new coalition Government not supporting a third runway at London Heathrow Airport, BAA Limited (who owns London Heathrow Airport) has announced that it does not intend to proceed with a planning application for a third runway and the focus will now be on making better use of the existing runways, extending the current passenger terminals and improving access to the airport.

There is currently no direct rail access from the Chiltern route to London Heathrow Airport. The 'North-South rail links in Buckinghamshire' report, produced for Buckinghamshire County Council by Chiltern Railways, assessed the demand for rail access to London Heathrow Airport and concluded that a rail-coach service from High Wycombe to London Heathrow Airport would generate substantial demand.

5.2.1.4 Manchester Airport

Manchester Airport is the UK's fourth largest airport, and the largest outside of London. The Manchester Airport Masterplan to 2030 predicts around 38 million passengers will use the airport each year by 2015, and as many as 50 million by 2030. The airport strategy to 2030 has a sustainable development commitment which includes a target for 40 per cent of all passenger and airport staff journeys to be made on public transport by 2015.

5.2.1.5 Stansted Airport

Stansted Airport is the UK's third busiest airport, serving around 19 million passengers each year. The airport has experienced significant growth in recent years, supported by the expansion of low cost airlines which generate the majority of traffic at the airport. Since the General Election, and with the new coalition Government not supporting a second runway at Stansted Airport, BAA Limited (who owns Stansted Airport) has withdrawn the planning application for a second runway, and the focus will now be on making better use of the existing capacity, and improving access to the airport.

5.3 Forecast passenger demand

5.3.1 Forecasting approach

The Passenger Demand Forecasting Handbook (PDFH) methodology has been used to predict future growth in passenger rail journeys in the RUS area. PDFH is the industry standard methodology for modelling growth, using demand drivers such as UK demographics, economic growth, employment growth and the characteristics of competing modes to predict the change in passenger demand. An extensive validation exercise has been undertaken to assess how well the PDFH methodology would have explained historic growth in the RUS area. A backcasting exercise for the Chiltern region showed that, once the impact of rail capacity improvement schemes such as Evergreen I and II projects were included, then PDFH methodology was able to predict the actual growth between 1998 and 2007. A similar exercise undertaken by Centro's consultants found that again PDFH methodology was able to reasonably predict historic growth between 2004 and 2007 in the West Midlands region once the impact of rail enhancement schemes was taken into account.

Therefore, the PDFH methodology has been used to predict passenger growth in the RUS area, with the impact of committed schemes included in the forecast.

The RUS passenger forecast represents the 'do-minimum' situation and includes the impact of committed schemes including the Birmingham Gateway Project, service enhancements on the Cross City corridor, committed performance improvement in Control Period 4 (CP4) and the Evergreen 3 project as outlined in **Chapter 4**. These forecasts

[†] Source: Airport Master Plan published by Birmingham Airport

are unconstrained by on-train crowding. Options recommended in **Chapter 6** are not included in the 'do-minimum' forecasts.

The RUS uses passenger counts conducted in autumn 2009 in the base which are then uplifted by the RUS passenger growth rate to estimate the level of demand in 2020. The Cannock and Walsall, Shrewsbury and Derby and Nuneaton corridors have more recent and accurate passenger count data (autumn 2010) available and these are being used in the analysis. These forecasts are used to identify gaps between supply and demand by 2020 and to develop options in **Chapter 6**.

In 2010, after the forecasts published in the Draft for Consultation were developed, 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 impact of this on rail demand is different between local commuting and the longer distance market. In markets that are dominated by commuter travel, rail demand is less elastic to changes in rail fare as there are fewer alternatives available for passengers. Therefore its impact on rail demand is likely to be small. For the long distance market, the impact is more difficult to estimate, not least because only a small percentage of fares are regulated. Using standard industry forecasting approach, this increase in rail fare gives an expected reduction in rail demand by a total of three to four per cent over three years. This is equivalent to one to two years of demand growth presented in the Draft for Consultation. In other words, it is predicted that it will take another one to two years for the growth forecasts to materialise. Therefore the forecasting period presented in the following sections have been updated to reflect this review.

The following sections present passenger growth in the West Midlands region, to and from Birmingham, and demand to London Marylebone by route and market sector. The impact of this growth on peak-hour train loadings in 2020 for services into Birmingham and into London Marylebone is also estimated.

5.3.2 Passenger forecasts – West Midlands region

The number of passenger rail journeys made to, from and within the West Midlands region of the RUS area is predicted to increase by 30 per cent between 2008/09 and 2020/21, equivalent to a 2.2 per cent increase per annum.

Centro also commissioned consultants to develop their own set of passenger rail forecasts at a more disaggregated level (eg. by station, corridor and time of day) under various scenarios (eg. with and without uncommitted schemes) for their multimodal transport appraisal purposes. Their aggregated unconstrained forecast that includes the impact

of committed schemes predicts all day demand to grow by approximately 28 per cent between 2008 and 2019, which is similar to those developed specifically for the RUS.

5.3.3 Passenger forecasts – Birmingham

The number of passenger rail journeys to or from Birmingham is predicted to increase between 2008 and 2020 by 32 per cent in the peak and a similar growth rate is predicted for all day. This is equivalent to 2.3 per cent per annum. Factors that have been working in favour of rail, such as growing population, structural changes in employment markets, road congestion in Birmingham city centre and increased competitiveness of rail will continue to drive growth in rail demand to Birmingham.

The East Midlands RUS published in February 2010 has predicted rail demand from Derby to Birmingham to increase by 40 per cent between 2009 and 2019, that is equivalent to 3.4 per cent per annum. Same level of growth forecast is also predicted for demand between Leicester and Birmingham. These forecasts are used in this RUS to identify gap and to develop options on the Derby and Nuneaton corridor as presented in **Chapter 6**.

5. Planning context and future demand

5.3.4 Passenger loadings versus capacity – Birmingham in 2020

The RUS compares the level of demand in 2020 against committed capacity and this identifies gaps in each corridor. Train capacity includes both standard class seats and standing capacity. Typical commuter rolling stock has a standing capacity of 40 per cent of seats although it can vary significantly by rolling stock type. For typical interurban and long distance rolling stock, the standing capacity is around 20 per cent of seats.

The impact of the RUS growth forecast on crowding by 2020 is shown in **Tables 5.1** and **5.2** for the high-peak hour (08:00 to 08:59) and three-hour peak (07:00 to 09:59) respectively. These represent the total number of passengers carried as a proportion of seats and as a proportion of the nominal train capacity, for each corridor, along with the number of services estimated to have passenger standing. Services are considered to be in excess of capacity when passenger loads are more than the nominal train capacity or when passengers are standing for more than 20 minutes. This is consistent with DfT policy. The proposed vehicles provided through the CP4 Delivery Plan are included to derive the capacity level in 2020.

The CP4 Operational Plan proposed by London Midlands in March 2010 has been used in the base. This plan is still in development and is subject to funding availability. The capacity and demand analysis presented in **Chapter 5** and **6** assumes this additional capacity in the baseline.

It should be noted that the seating and train capacity utilisation on the busiest services are higher than the average figures presented in **Tables 5.1** and **5.4**. In general, when the average load factor exceeds 70 per cent, there are likely to be individual services with passengers standing. When the load factor exceeds 90 per cent, the number of passengers on the busiest services is likely to exceed the nominal train capacity that includes standing capacity.

The build-up of the high-peak hour demand against the committed train capacity in 2020 on the local commuter service is presented in **Figure 5.1** to **Figure 5.3**. These graphs plot the total passenger loading against capacity across all trains in the high-peak hour. Therefore, on the busiest trains, standing tends to start earlier and capacity utilisation is generally higher than those illustrated in the graphs.

Most corridors are predicted to experience higher levels of crowding in 2020 than current despite the additional vehicles provided by the CP4 Operational Plan. Every corridor is predicted to have some passengers standing over relatively short distances and some services would have more passengers than the nominal train capacity. More capacity is likely to be required on some corridors to meet future demand, subject to business case and funding being available. The options developed to address these gaps are presented in **Chapter 6**. The following sections discuss each corridor in turn.

Table 5.1 – High-peak hour (08:00 to 08:59) estimated load factors on arrival at Birmingham central stations, average weekday in 2020/21

Corridor	Passenger market	Load factor: number of passengers compared to seats	Load factor: number of passengers compared to train capacity	Number of services	Estimated number of services with passengers standing	Estimated number of services in excess of capacity
Coventry	Local commuting	110%	80%	4	3	1
	Interurban and long distance	56%	48%	5	1	0
Cross City North	Local commuting	110%	90%	6	4	2
Cross City South	Local commuting	115%	93%	6	4	0
	Interurban and long distance	86%	51%	4	1	1
Cannock and Walsall	Local commuting	109%	72%	4	2	2
Derby	Interurban and long distance	101%	84%	4	2	2
Nuneaton	Interurban and long distance	121%	101%	3	3	3
Worcester and Hereford	Interurban	86%	51%	2	1	1
Leamington Spa & Chiltern	Local commuting	118%	73%	4	3	0
	Interurban and long distance	130%	92%	3	3	1
Shrewsbury	Interurban and long distance	112%	70%	3	2	2
Stafford & Wolverhampton	Local commuting	100%	81%	3	1	0
	Interurban and long distance	95%	70%	6	3	1
Stourbridge	Local commuting	132%	82%	7	7	1
Stratford-upon-Avon	Local commuting	119%	73%	4	3	0

Source: 2009/10 passenger counts conducted by Arriva Train Wales, Chiltern Railways, CrossCountry, London Midland and Virgin Trains are uplifted by the RUS forecast to 2020/21. Note: Seat and train capacity includes the additional capacities proposed in the CP4 Delivery Plan. Train capacity includes both standard class seats and standing allowance. Services are in excess of capacity when passenger loads exceed the nominal train capacity or when there are passengers standing for more than 20 minutes. This is consistent with DfT policy.

5. Planning context and future demand

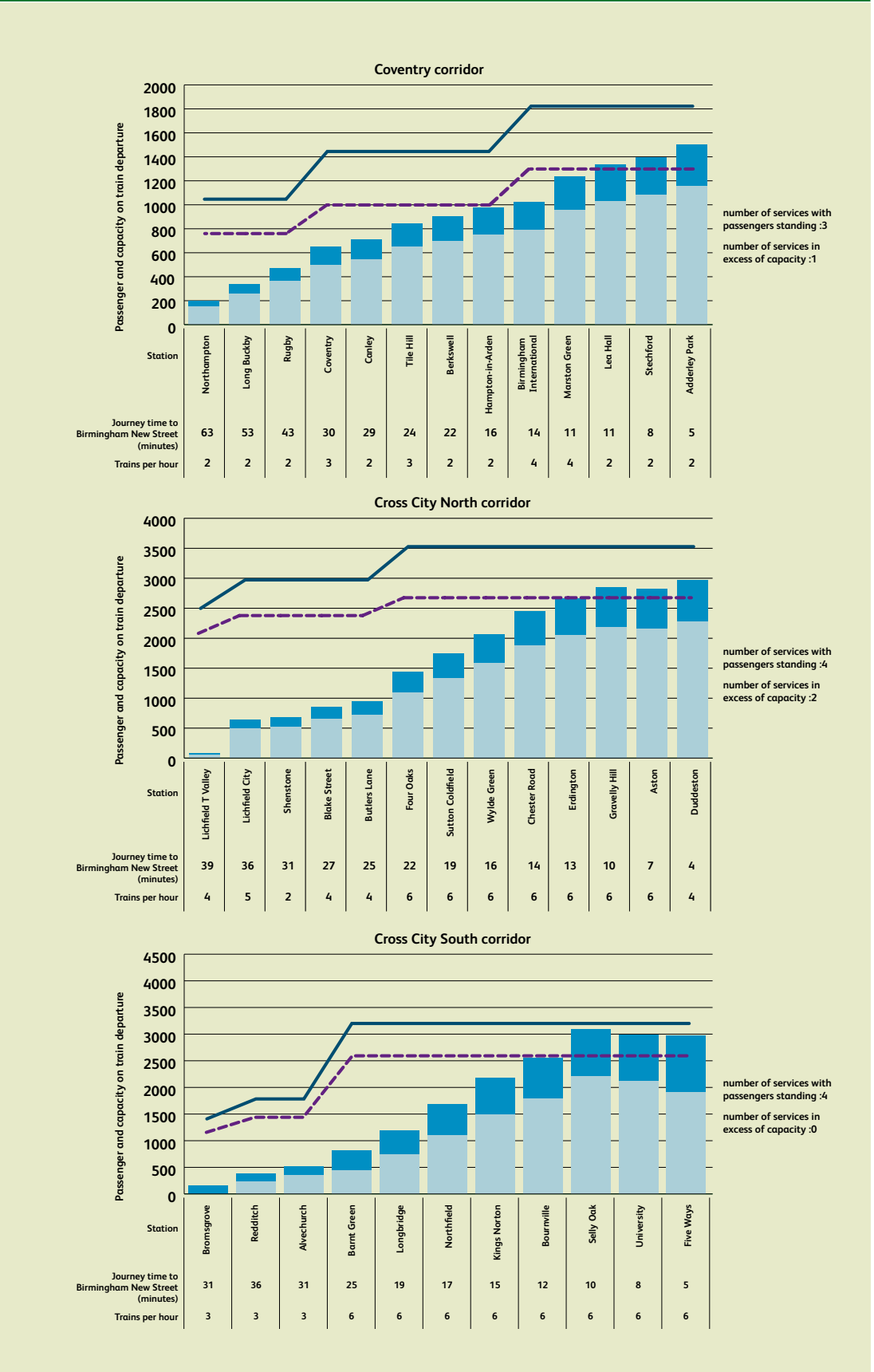
Table 5.2 – Morning three-hour peak (07:00 to 09:59) estimated load factors on arrival at Birmingham central stations, average weekday in 2020/21

Corridor	Passenger market	Load factor: number of passengers compared to seats	Load factor: number of passengers compared to train capacity	Number of services	Estimated number of services with passengers standing	Estimated number of services in excess of capacity
Coventry	Local commuting	85 %	60%	13	4	2
	Interurban and long distance	50 %	43%	14	3	2
Cross City North	Local commuting	86 %	70%	18	6	3
Cross City South	Local commuting	80 %	65%	18	4	0
	Interurban and long distance	78 %	56%	7	2	2
Cannock and Walsall	Local commuting	71 %	49%	11	4	3
Derby	Interurban and long distance	97 %	80%	10	4	4
Nuneaton	Interurban and long distance	107 %	91%	7	4	4
Hereford to Worcester	Interurban	90 %	53%	6	2	1
Leamington Spa & Chiltern	Local commuting	98 %	60%	10	5	0
	Interurban and long distance	95 %	63%	6	3	1
Shrewsbury	Interurban and long distance	81 %	55%	8	3	3
Stafford & Wolverhampton	Local commuting	82 %	66%	6	2	0
	Interurban and long distance	79 %	57%	14	4	1
Stourbridge	Local commuting	98 %	60%	17	11	1
Stratford-upon-Avon	Local commuting	80 %	49%	10	4	0

Source: 2009/10 passenger counts conducted by Arriva Train Wales, Chiltern Railways, CrossCountry, London Midland and Virgin Trains are uplifted by the RUS forecast to 2020/21. Note: Seat and train capacity includes the additional capacities proposed in the CP4 Delivery Plan. Train capacity includes both standard class seats and standing allowance. Services are in excess of capacity when passenger loads exceed the nominal train capacity or when there are passengers standing for more than 20 minutes. This is consistent with DfT policy.

Figure 5.1 – Estimated passenger loadings and capacity for commuting services into Birmingham by corridor in the morning high-peak hour in 2020

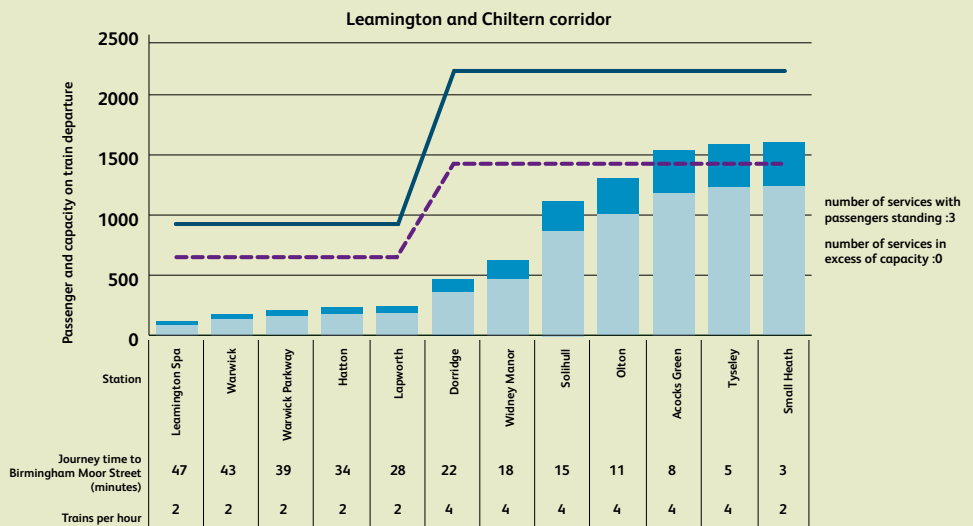
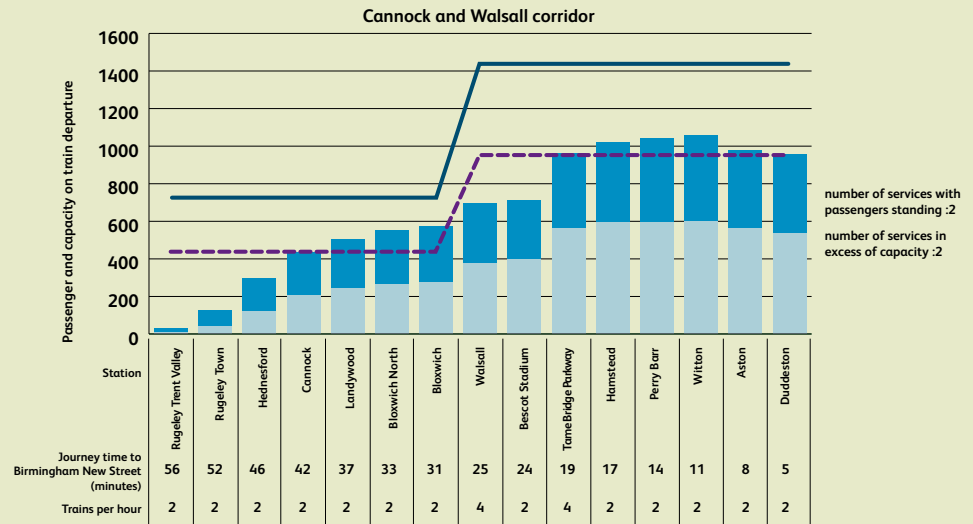
- Train capacity (seating and standing capacity)
- Seats
- Passenger loadings 2009
- Passenger growth to 2020



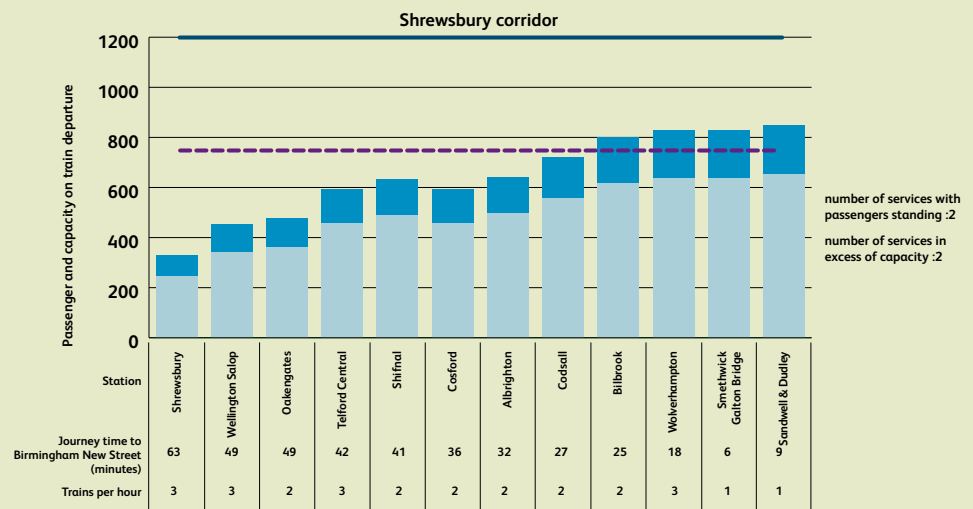
5. Planning context and future demand

Figure 5.2 – Estimated passenger loadings and capacity for commuting services into Birmingham by corridor in the morning high-peak hour in 2020

- Train capacity (seating and standing capacity)
- Seats
- Passenger loadings 2009
- Passenger growth to 2020



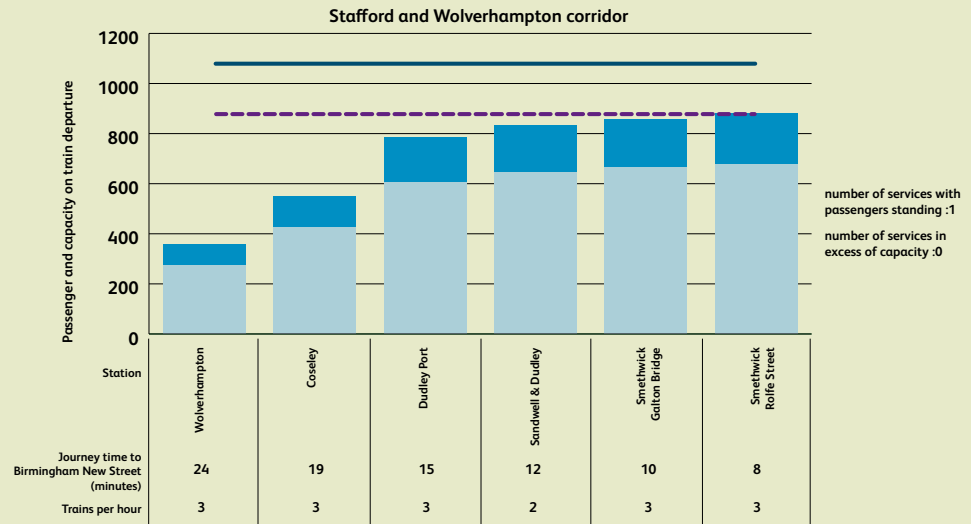
Note: London Midland's services only.



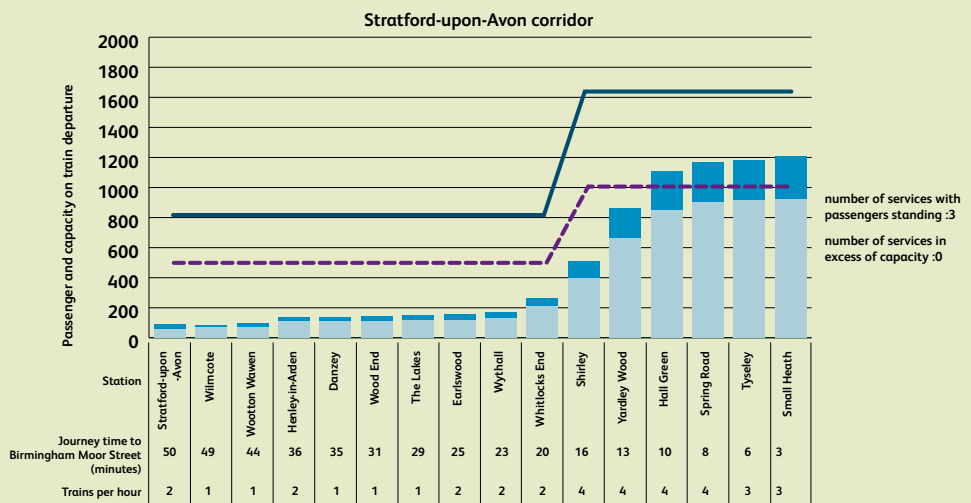
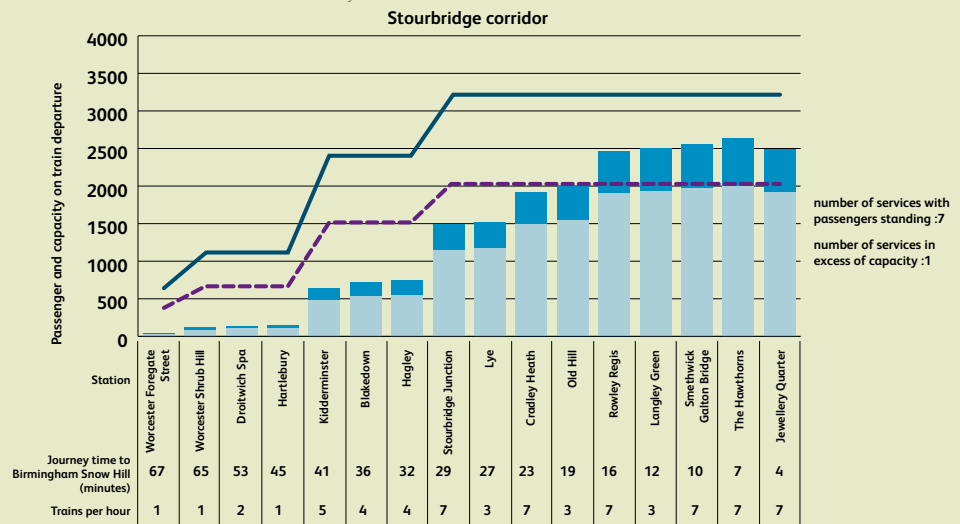
Note: London Midland's and Arriva Train Wales services.

Figure 5.3 – Estimated passenger loadings and capacity for commuting services into Birmingham by corridor in the morning high-peak hour in 2020

- Train capacity (seating and standing capacity)
- Seats
- Passenger loadings 2009
- Passenger growth to 2020



Note: London Midland's services only.



5. Planning context and future demand

Figure 5.4 – Estimated passenger loadings and capacity for commuting services into Birmingham by corridor in the morning high-peak hour in 2020

- Train capacity (seating and standing capacity)
- Seats
- Passenger loadings 2009
- Passenger growth to 2020



5.3.5 Coventry corridor

The capacity analysis assumes that the current busiest local suburban service on the Coventry corridor will be lengthened by four cars in CP4 in accordance with the Operational Plan proposed in March 2011. However, this is still subject to further development and funding availability. However, analysis indicates that even with this train lengthening there are still some passengers expected to stand in 2020 and most high-peak hour services would have passengers standing from Marston Green inwards. The busiest train is predicted to have passengers standing from as far as Berkswell, which is more than 20 minutes from central Birmingham and therefore the service would be operating over train capacity.

The RUS assumes that all services formed of Class 390 rolling stock from London Euston to Birmingham/Wolverhampton in the morning peak will be lengthened from nine-car to 11-car by 2020 and this would help to reduce crowding. However, on the non-London long distance services there will be standing on more services particularly in the peak-hour and this is addressed and discussed in detail in **Chapter 6**.

5.3.6 Cross City North corridor

The number of services with passengers standing in 2020 is predicted to increase on the Cross City North corridor despite the additional capacity provided by the latest CP4 Operational Plan. Most standing would tend to start from Erdington, which is about 13 minutes from Birmingham, and the busiest train would have passengers standing as far out as Sutton Coldfield. Two out of six services in the morning high-peak hour are forecast to have more passengers than the nominal train capacity on the approach to Birmingham. The option developed to address this gap is discussed further in **Chapter 6**.

5.3.7 Cross City South corridor

On the Cross City South corridor, there is planned service improvement with the Cross City line operating three trains per hour to each of Bromsgrove and Redditch (in each direction) by extending the existing Longbridge services. Additional vehicles are planned in order to operate this service enhancement and to meet demand on the rest of the corridor. Analysis shows that in 2020, standing will become more common in the morning peak over relatively short distances as shown in **Figure 5.1** the long distance Cardiff to Nottingham services are predicted to have passengers standing in the peak morning.

5.3.8 Cannock and Walsall corridor

The latest passenger loadings count data shows a significant increase in passenger demand on the Cannock line between 2009 and 2010. This demand growth has been factored into the forecast to derive the level of demand in 2020.

With this growth forecast and the proposed CP4 Operational Plan on the Cannock and Walsall, demand is expected to outstrip supply in 2020. The high-peak hour load factors are predicted to be significantly higher than in 2009 with some passengers having to stand for more than 20 minutes in 2020. Services starting from Rugeley Trent Valley are expected to be more crowded in 2020 and three services in the morning peak are predicted to operate above the capacity level of the trains. All services starting at Walsall will become three-car electric multiple units, a change from the current two to three-car diesel multiple unit.

5.3.9 Derby and Nuneaton corridor

Crowding is forecast to become more acute by 2020 on the interurban and long distance services which connect key urban centres in the North East, Yorkshire, East Midlands and West Midlands. Some services call at local stations such as Tamworth and Water Orton, providing demand for local commuting as well as for longer distance passengers. On the Derby to Birmingham Services, two out of four high peak services are predicted to operate beyond train capacity. While on the Nuneaton Corridor, three high peak services to Birmingham would have more passengers standing for more than 20 minutes. This is consistent with the findings concluded by the East Midlands RUS which analysed train loadings on the Leicester/Stansted Airport to Birmingham services. The RUS addresses this crowding gap through the options developed in **Chapter 6**.

5.3.10 Worcester and Hereford corridor

On the busiest Hereford to Birmingham peak service via Bromsgrove, some passengers would be standing from Worcester which is more than 30 minutes from Birmingham city centre. Crowding on these has been identified as a gap and this is analysed and discussed further in **Chapter 6**.

5.3.11 Leamington Spa and Chiltern corridor

There is generally sufficient capacity to accommodate demand in 2020 on the services to Birmingham. On the local suburban services from Dorridge, standing over short distances will become more common in the high-peak hour and all standing will be within the nominal train capacity. New Class 172 rolling stock is planned to be introduced in CP4 which would offer higher standing capacity and this would allow more passengers to be accommodated than the current Class 150 rolling stock. The latest Operational Plan shows some Class 150 rolling stock would be retained.

5. Planning context and future demand

On the interurban and long distance services from London Marylebone and Reading, all the high-peak hour services would have passengers standing on arrival at Birmingham and most standing would be for less than 20 minutes. The busiest service would have standing starting from as far out as Leamington Spa. The RUS analyses this issue in **Chapter 6**.

The RUS recognises that Chiltern Railways Franchise Agreement requires Chiltern to deliver incremental additional capacity to ensure that future overcrowding does not exceed set limits throughout the period of the 20-year franchise.

5.3.12 Shrewsbury corridor

Crowding is forecast to become more prevalent between Shrewsbury and Birmingham on the long distance services as illustrated in **Figure 5.2**. All the high-peak hour services from Shrewsbury to Birmingham are expected to have passengers standing for more than 20 minutes. On the busiest train standing would start from Codsall, which is more than 30 minutes from central Birmingham. However, not all passengers would be standing for this amount of time as some will alight at Wolverhampton and more passengers will get on, Wolverhampton being another key major urban centre that attracts high volumes of commuting journeys. No additional vehicles are planned for the Shrewsbury long distance route in CP4 and the RUS proposes options to address this gap in **Chapter 6**.

5.3.13 Stafford and Wolverhampton corridor

The local commuting services that start from Wolverhampton and call at intermediate stations would experience higher load factors by 2020 as there are no additional vehicles being planned for introduction in CP4. However, the majority of the standing would be for less than 10 minutes and the number of passengers on each train is unlikely to exceed the nominal train capacity in 2020.

On the services from Liverpool Lime Street and Manchester Piccadilly, standing is likely to occur between Wolverhampton and Birmingham with the busiest trains having standing starting even further back as they are used by both commuters and long distance travellers. In calculating the capacity in 2020 on the long distance services, it is assumed that all the current services operated by nine-car Class 390 trains will become 11-car in the peak and this would address crowding on these services. The remaining long distance services on this corridor do not have planned additional capacity in CP4 and crowding will become more acute. The RUS addresses this issue in **Chapter 6**.

5.3.14 Stourbridge corridor

The majority of the Stourbridge services would have passengers standing in the high-peak hour and shoulder-peak for less than 20 minutes and the number of passengers is unlikely to exceed the nominal train capacity. New Class 172 rolling stock is planned for introduction in CP4 and it would offer higher standing capacity enabling more passengers to be accommodated than the current Class 150 rolling stock. The latest CP4 operational plan proposes some class 150 vehicles to be retained. It also shows that the increase in peak hour capacity on this corridor is not as much as the plan that was assumed in the Draft for Consultation. On the busiest train in the morning peak, standing would start from Stourbridge, which is more than half an hour from Birmingham. The RUS addresses this issue in **Chapter 6**.

5.3.15 Stratford-upon-Avon corridor

The load factor relative to seating on the Stratford upon-Avon line will increase by 2020 but its load factor to capacity will remain similar to current as illustrated in **Figure 5.3**. This is because the new Class 172 rolling stock, planned for introduction in CP4, offers higher standing capacity which will help to accommodate demand growth. The latest CP4 Capacity Plan has been assumed in the analysis and it shows less capacity than the Plan assumed in Draft for Consultation. It is predicted that standing over relatively short distances will become more common in the high-peak hour with standing tending to start from Spring Road which is less than 10 minutes from Birmingham.

5.3.16 Passenger forecasts – London Marylebone

The predicted number of passenger arrivals in 2020 London Marylebone is split into three categories: Aylesbury via Amersham, suburban, and long distance services to London Marylebone. In general, services starting from High Wycombe and south thereof are grouped as suburban services to London with the remaining services on the Leamington Spa and Chiltern corridor grouped as long distance services.

The passenger forecasts at London Marylebone include demand stimulated by the committed Evergreen 3 project, as discussed in **Chapter 4**, and are based on the latest specification (eg. the timetable and rolling stock deployment plan) provided by Chiltern Railways. Implementation of the Evergreen 3 project, which will see significant journey time improvements between Birmingham and London Marylebone and which will create new connectivity between Oxford and London Marylebone, will drive growth and provide competent journey times. The RUS estimates the impact of this timetable intervention on demand, however it is not able to predict how other competitors (rail and coach operators) would respond to the timetable changes.

Passenger demand to London Marylebone on the Aylesbury corridor, measured in passenger journeys, is predicted to increase by 22 per cent between 2009 and 2020 in the peak, equivalent to 1.8 per cent per annum. The majority of this growth is driven by changes in the underlying external factors, predominately employment growth in central London. The Evergreen 3 project will not affect the journey time and service frequency on the Aylesbury corridor. As a result the demand growth forecast to 2020 for the Aylesbury corridor is relatively low compared to the Leamington Spa and Chiltern corridor, which will benefit from significant timetable and journey time improvement.

The number of passengers arriving at London Marylebone on suburban services from the Leamington Spa and Chiltern route is predicted to increase by 28 per cent in the peak between 2009 and 2020, which is 2.3 per cent per annum. Just over half of this growth is driven by external factors, while the remaining growth is generated by the Evergreen 3 project which would give journey time improvements and new rolling stock. Demand in the off-peak hours, predominantly comprising leisure traffic, is likely to increase at a higher level than this but this has not

been modelled in the RUS. This is because on-train crowding is not an issue in the off-peak hours.

Demand to London Marylebone on long distance services is predicted to increase by 35 per cent between 2009 and 2020 in the peak. This is equivalent to 2.8 per cent per annum. The journey time improvement between Birmingham and London Marylebone, as a result of the Evergreen 3 project, would stimulate demand on this corridor and its effect is likely to be more significant in the shoulder-peak and off-peak hours. The committed new half-hourly Oxford to London Marylebone service via a new station at Water Eaton Parkway (as discussed in **Chapter 4**) creates new rail connectivity between major urban centres the Chiltern region. This would attract new passengers to the Leamington Spa and Chiltern corridor and increase passenger arrivals at London Marylebone in the peak and off-peak. It is anticipated that demand growth in the off-peak hours, predominantly comprising leisure trips, would grow at a higher rate than that in the peak-hour. The level of growth particularly in the off-peak hour is also likely to be affected by fares set by Chiltern Railways and how its competitors respond.

Table 5.3 – Morning high-peak hour (08:00 to 08:59) load factors on arrival at London Marylebone, average weekday estimates in 2020/21

Corridor and service group	Load factor: number of passengers compared to seats	Load factor: number of passengers compared to train capacity
Aylesbury (via Amersham)	140 %	128 %
Leamington Spa and Chiltern: suburban	113 %	84 %
Leamington Spa and Chiltern: long distance	120 %	120 %
Total	113 %	106 %

Table 5.4 – Morning three-hour peak (07:00 to 09:59) load factors on arrival at London Marylebone, average weekday estimates in 2020/21

Corridor and service group	Load factor: number of passengers compared to seats	Load factor: number of passengers compared to train capacity
Aylesbury (via Amersham)	108 %	91 %
Leamington Spa and Chiltern: suburban	93 %	68 %
Leamington Spa and Chiltern: long distance	113 %	100 %
Total	104 %	84 %

Note: These forecasts do not include passengers on the Metropolitan lines. Train capacity includes both standard class seats and standing allowance. Services are in excess of capacity when passenger loads exceed the nominal train capacity or when there are passengers standing for more than 20 minutes. This is consistent with DfT policy.

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5.3.17 Passenger loadings versus capacity at London Marylebone in 2019

The impact of the 2020 passenger forecast on crowding at London Marylebone is shown in **Tables 5.3** and **5.4** for the high-peak (08:00 to 08:59) and three-hour peak (07:00 to 09:59) respectively. These represent the total number of passengers carried as a proportion of seats and as a proportion of the nominal train capacity. The commitment to additional capacity in the Chiltern Franchise Agreement, and enabled by the Evergreen 3 Project, has been taken into account to calculate the capacity level in 2020

5.3.18 Aylesbury corridor

On the Aylesbury corridor, train capacity is planned to increase by around 20 per cent over the three-hour morning peak by 2020 through committed train lengthening in CP4, however, the increase in capacity will occur in the shoulder peak as all the high-peak hour trains are already operating at their maximum lengths. As shown in **Table 5.3**, the high-peak hour passengers to train capacity ratio is predicted to increase from 102 per cent currently to 128 per cent by 2020 assuming CP4 capacity. At this level, it generally implies that there will be high levels of crowding, and most high-peak hour services would have more passengers than train capacity. The three-hour peak load factor is likely to remain the same as current due to the extra capacity added in the shoulder-peak. The predicted high-peak hour crowding is discussed further in **Chapter 6**. The RUS recognises that Chiltern Railways Franchise Agreement required Chiltern to deliver additional capacity to ensure that future crowding does not exceed set limits throughout the period of the 20-year franchise.

5.3.19 Suburban services to London on the Leamington Spa and Chiltern corridor

Peak-hour load factor (passengers to train capacity ratio) at London Marylebone on the suburban services is predicted to remain similar to current. The increase in demand to 2020 would be met by the additional train capacity provided in the morning three-hour peak through the Evergreen 3 project. The new Class 172 rolling stock is planned to be introduced on some of the suburban services and this will allow more passengers to be accommodated. Standing would occur on most high-peak hour trains but this is likely to be over relatively short distances and within train capacity.

5.3.20 Long distance services to London on the Leamington Spa and Chiltern corridor

Peak-hour load factor (passengers to train capacity ratio) at London Marylebone on the long distance services is predicted to be around 120 per cent in the high-peak hour and 100 per cent in the three-hour morning peak by 2020. At this level of crowding it generally indicates that the busiest services will be operating close to or even above train capacity. The Evergreen 3 project, planned to be completed by 2012, increases morning peak train capacity on the long distance services by around 18 per cent, but demand growth to 2020 is likely to be higher than this. The new half-hourly services from Oxford and faster journey times between urban centres and London Marylebone will generate new demand and increase passenger arrivals at London Marylebone.

5.4 Forecast freight demand

5.4.1 Forecast origins and methodology

Freight demand forecasts were developed nationally in the Freight RUS published in March 2007. This strategy focused on accommodating forecast freight traffic across the network over the 10-year period from 2004/05 to 2014/15, and estimated approximately 25 per cent growth in the number of freight trains per day.

Since the publication of the Freight RUS, these forecasts have been reviewed and updated to include the aspirations of the DfT and other stakeholders to increase the proportion of freight carried by rail throughout the United Kingdom. The DfT's White Paper 'Delivering a sustainable railway', published in July 2007, predicted a doubling of rail freight demand over the next 30 years and proposed the development of a Strategic Freight Network in England and Wales to facilitate this growth without having a detrimental impact on network capacity and reliability. The focus is to devise a network of core trunk routes with sufficient capacity and appropriate gauge to accommodate the expected major flows of freight.

Freight demand forecast has been developed nationally to 2019 and 2030 for the Strategic Freight Network. The forecasts were developed, as reported in the Network RUS: Scenarios and Long Distance Forecasts, 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.

Table 5.5 – Forecast change in freight demand by commodity to 2030

	Million tonnes			Billion tonne km		
	2006	2030	Average annual growth	2006	2030	Average annual growth
Solid fuels	51	41	-1 %	8	5	-2 %
Construction	21	32	2 %	4	5	1 %
Metals and 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 %

In common with the method adopted in the Freight RUS, this perspective was complemented by a 'bottom up' view of the markets provided by a review of the forecasts by the industry. The forecast change in demand by commodity type is shown in **Table 5.5** and the forecast daily.

The national Strategic Freight Network forecasts have been assessed by the freight operators who form part of the RUS Stakeholder Management Group, in order to ascertain that they are at an appropriate level to accommodate the expected growth in freight traffic on specific corridors within the RUS area. These forecasts have taken into account the impact of the recent recession.

The outputs of this assessment were agreed by the Stakeholder Management Group as part of the base to be used in option analysis work. **Figures 5.5** and **5.6** show the forecast level of freight paths per hour by line of route required in each direction for both 2019 and 2030. It should be noted that the numbers of paths shown are predicated on 6 day per week running, and with a 25 per cent increase in train lengths. The anticipated outputs of committed and uncommitted enhancement schemes have also been taken into account and affect the forecast. If the underlying assumptions of freight growth change in any way, then further analysis will be required to assess the implications on the number of freight train paths required. It is recognised that further infrastructure interventions may be required to accommodate longer freight trains.

5.4.2 Current market scenarios

The potential for freight growth exists in all market sectors, but different rates and extents of growth are envisaged.

5.4.3 Intermodal

Current analysis indicates that the majority of growth in freight demand is forecast to occur in the non-bulk sector, concentrated on deep sea intermodal traffic. Domestic non-bulk traffic is also forecast to grow rapidly, but this is from a low base.

The completed CP4 W10 gauge clearance schemes will assist the competitive nature of rail in the intermodal market. The Productivity Transport Innovation Fund scheme to enhance the gauge between Southampton and the West Coast Main Line has facilitated the conveyance of 9'6" containers on standard wagons which will drive commercial demand for extra trains from the port of Southampton. Growth in demand is also anticipated from the East Coast ports following the completion of the Felixstowe to Nuneaton Productivity Transport Innovation Fund scheme to provide an alternative route to transport 9'6" high containers between the East Coast ports and the West Coast Main Line, and onto the Midlands, the North West and Scotland.

Further freight traffic growth from the South West is likely to be generated by the planned Deep Sea Container Terminal at Bristol, which will have a total throughput of about 1.5 million equivalent units or approximately one million containers per annum. It is estimated that 40 per cent of this traffic would be transported to and from the port by rail, possibly triggering the need for further capability enhancements on routes via the Lickey Incline and Stourbridge. DfT consent was given for construction of the Deep Sea Container Terminal on 25 March 2010 and construction is expected to take three to four years.

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The growth facilitated by these schemes will mean a significant increase in traffic to freight handling facilities within the RUS area. Some of the existing terminals in the RUS area have expansion plans to enable them to cater for continued demand as a number of them are operating at, or close to, their capacity. It is anticipated that the intermodal terminal at Donnington, near Telford, will stimulate further freight growth on the routes between Crewe, Shrewsbury and Wellington. There are also some new intermodal site aspirations for this route including Mid-Cannock and Stretton.

5.4.4 Bulk sector

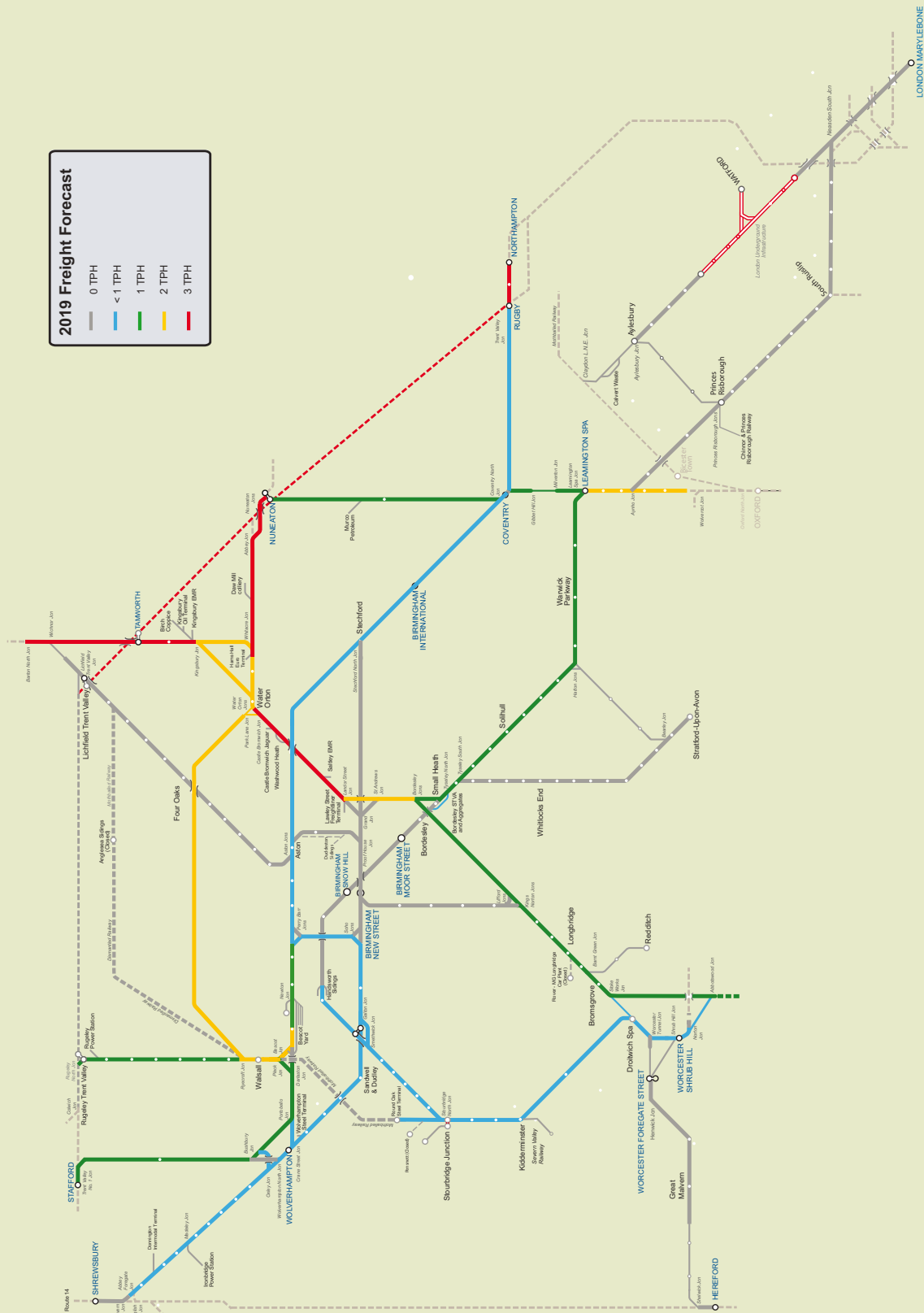
The bulk sector is forecast to grow, albeit at a slower rate than the non-bulk sector. There are predicted increases in CP4 in imported coal and aggregates. The forecasts for coal are based on assumptions about the use of alternative fuels such as biomass in the medium to long term. Taking into account the continuing uncertainty in gas and oil prices and the time it takes to build nuclear power stations, coal is expected to remain in demand for the foreseeable future. It is likely that the source points for imported coal to the West Midlands power stations at Rugeley and Ironbridge will change, with greater demand from ports in the South Wales and Bristol area. Ironbridge is scheduled to close before the end of 2015.

Other markets are also expected to experience growth. Growth in the movement of scrap metals is forecast from a number of key sites in the West Midlands area, and petroleum traffic to Kingsbury Oil Terminal from the east coast ports is expected to require either an increase in the number or load of trains which may drive significant terminal modifications. Any increase over 3,000 tonnes needs to have reception facilities off the main line to eliminate reversing and propelling. In addition, the market for aggregate traffic into the South East is expected to drive the development of other freight sites near Neasden on the Chiltern main line. During the development of the West Midlands and Chilterns RUS, an analysis has been carried out to determine the routes within the RUS area where freight growth is expected to require heavier and longer trains:

- intermodal (75 mph container trains, 1,600 tonnes, 640 metres long) between Southampton/Felixstowe and West Midlands/North West/North East
- bulk freight (60mph coal, metals, petroleum, aggregates, etc., 2,400 tonnes, 448 metres long) to West Midlands power stations and oil terminals, also through trains between South/South West and North West/North East)
- trains to Kingsbury Oil Terminal are expected to be at least 3,000 tonnes, 557 metres long.

There is a concentration of freight terminals within the RUS area on the route between Nuneaton and Landor Street Junction. Strategic Freight Network growth has forecast a need for three freight paths per hour on this route.

Figure 5.5 – West Midlands & Chilterns freight forecasts 2019



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Figure 5.6 – West Midlands & Chilterns freight forecasts 2030

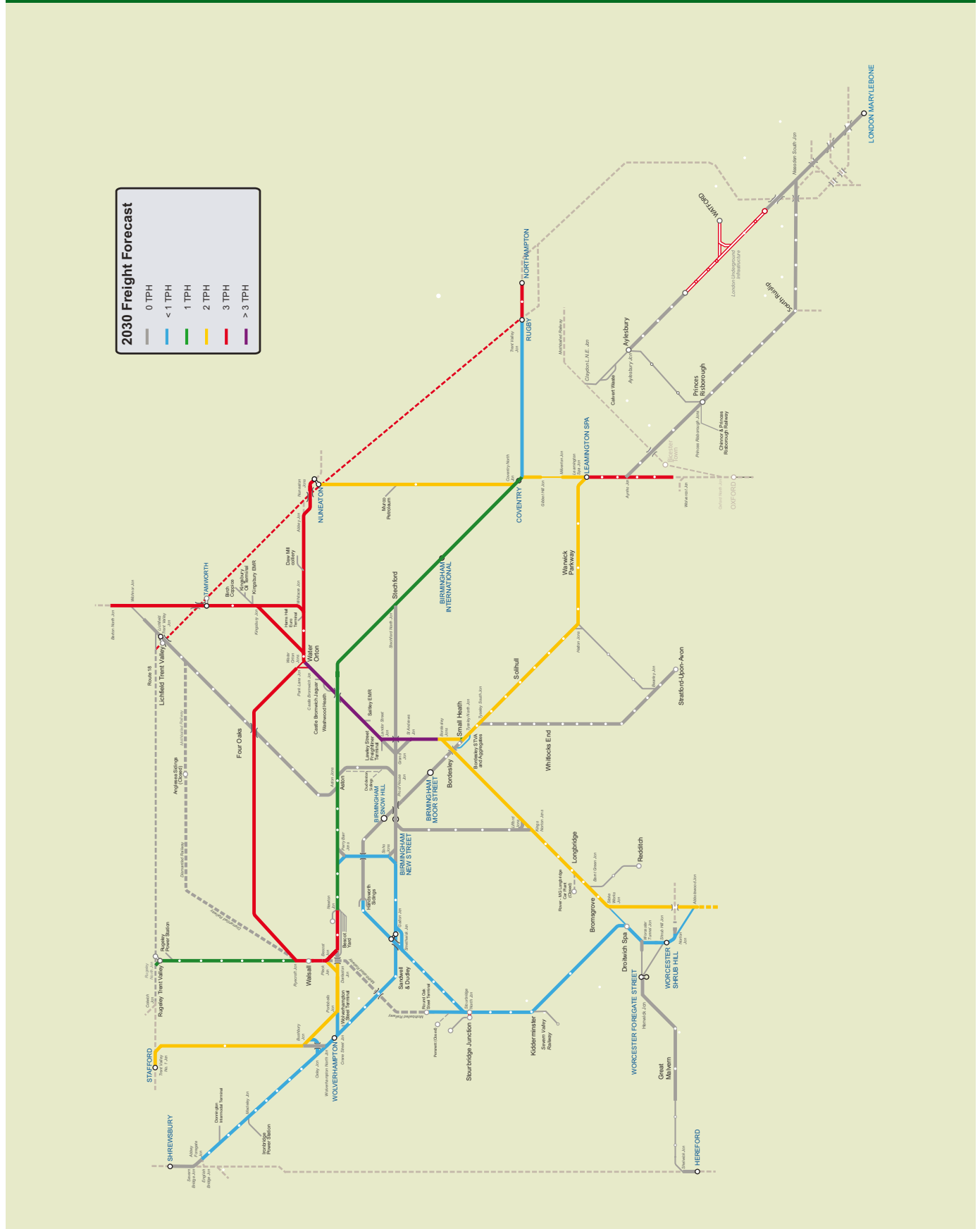
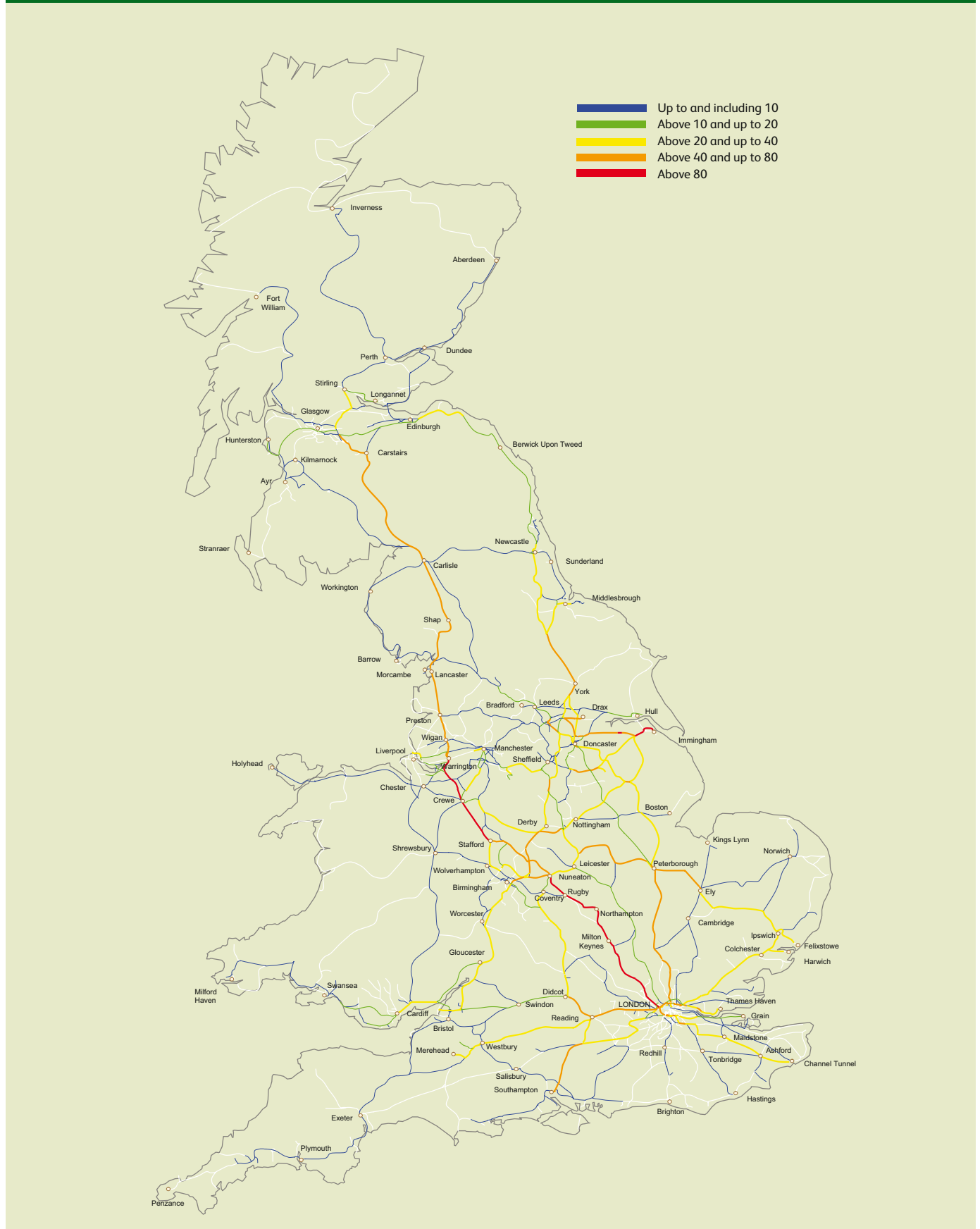


Figure 5.7 – West Midlands & Chilterns forecast daily paths 2019



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Figure 5.8 – West Midlands & Chilterns forecast daily paths 2030



6. Gaps and options

6.1 Introduction

Previous chapters have presented the current capability and requirements of the network, committed schemes and forecasts of future demand. The gaps identified in the West Midlands and Chilterns Route Utilisation Strategy (RUS) area are presented in this chapter along with the options developed and appraised to close these gaps.

6.2 Gaps

6.2.1

Instances where the current rail infrastructure and train services (including committed schemes) are

not able to meet existing and/or future passenger and freight demands are termed RUS 'gaps'. Where a gap is identified in the RUS area it also needs to be considered as consistent with funding that is, or is reasonably likely to become available during the period of the RUS.

6.2.2

The gaps relevant to the West Midlands and Chilterns RUS area fit into six categories, as outlined in **Table 6.1**. The gap reference number reflects the gap category and helps to indicate the nature of the gap issue.

Table 6.1 – Gap categories

Gap reference	Gap category	Gap description
FC	Freight capacity/capability	Insufficient availability of routes to run the required volume of freight services or meet the characteristics of freight trains (eg. 775m long trains).
JT	Journey time	Journey times between key locations do not meet current or future needs. Long distance services are a high priority
OC	On-train capacity	Current or forecast passenger demand exceeds train capacity to the extent that it is not possible to meet the DfT standard of train capacity.
RC	Rail connectivity	Inadequate opportunity to travel by rail between two locations within an acceptable journey time or frequency compared to other modes of transport.
RI	Rail interchange	Inadequate links between one rail service and another or between rail and other transport modes.
SC	Station capacity/facilities	Existing or future passenger demand cannot be accommodated or adequately supported.

6.3 Process

6.3.1

In line with other established RUSs, the process adopted during the West Midlands and Chilterns RUS has been to identify and list where issues exist on the current railway and where they are expected to arise in the future. This has been undertaken through an analysis (with stakeholder input) which has considered whether the RUS baseline services and infrastructure (including committed schemes) are able to meet predicted changes in demand. This analysis enabled the identification of potential "gaps" between what the railway system delivers now and what it is required to deliver over the timeframe of the RUS.

6.3.2

A list of over 170 issues was assembled from this process, which were then subjected to a comprehensive review by the West Midlands and Chilterns RUS Stakeholder Management Group (SMG). From this review each issue was categorised as a gap, option, constraint or stakeholder aspiration. The full list of issues and their classification is outlined in **Appendix C**. Those issues which were identified as gaps were considered to need further, more detailed analysis as part of this strategy.

6. Gaps and options

6.4 Gap identification

6.4.1

The list of identified issues outlined in **Appendix C** has been consolidated for each corridor as a number of issues relate to the same overall gap. Generic gaps, relevant to all parts of the RUS area, were also identified by the Stakeholder Management Group (SMG) as part of the gaps process.

The identified list of consolidated gaps is outlined in **Table 6.2**. To aid navigation and cross referencing with other chapters in the RUS the gaps are grouped into corridor routes and the routes are tabulated alphabetically. The table shows the gap reference, RUS corridor, gap description and gap category. Gaps concerning freight services are addressed separately in **section 6.11**.

It should be noted that the description for each gap has been reviewed since the publication of the Draft for Consultation following feedback received during the consultation period. Gap descriptions have been modified where appropriate to offer more detail and each gap has been classified into one of the following categories to provide more clarity about the nature of the gap.

A number of gaps were closed prior to detailed option analysis because they are being addressed by other committed schemes, work undertaken in other RUSs or work undertaken by other studies outside of the West Midlands and Chilterns RUS. This has been indicated in the final two columns of **Table 6.2** which reference whether option work has been carried out by this RUS or whether the gap is closed due to recognition of the work outside the RUS, details of which are outlined in **section 6.5**.

Table 6.2 – West Midlands and Chilterns RUS gaps

Gap reference	Corridor	Consolidated gap	Gap type	Addressed outside of West Midlands and Chilterns RUS (section 6.5)	Addressed by West Midlands and Chilterns RUS options work
OC-1	Routes into Birmingham	Inadequate capacity to accommodate High Level Output Specification (HLOS) peak demand into Birmingham by the end of Control Period 4 (CP4).	On train capacity	See section 6.5.1.1	
OC-2	Routes into London Marylebone	Inadequate capacity to accommodate HLOS peak demand into London Marylebone by the end of CP4.	On train capacity	See section 6.5.1.1	
JT-1	Aylesbury	Inadequate journey time on the Aylesbury corridor.	Journey time	See section 6.5.3.1	
OC-3	Aylesbury	Inadequate capacity and poor service mix on the Aylesbury corridor.	On train capacity	See section 6.5.3.1	
RC-1	Aylesbury	Poor rail connectivity between the north and south of Buckinghamshire, particularly from Aylesbury.	Rail connectivity	See section 6.5.3	
OC-4	Birmingham New Street	Limited operational capacity on approach to and within Birmingham New Street station.	On train capacity		✓
RI-1	Birmingham New Street	Potential passenger flow and interchange issues following the completion of the Birmingham New Street Gateway project.	Rail interchange	See section 6.5.1.2	
OC-5	Cannock and Walsall	Inadequate peak capacity on the Cannock and Walsall line.	On train capacity		✓
RC-2	Cannock and Walsall	Limited access to the rail network from the Aldridge/Brownhills area to cater for housing growth and regeneration.	Rail connectivity		✓
RC-3	Cannock and Walsall	Lack of direct rail connectivity between Walsall and the north	Rail connectivity		✓

Table 6.2 (continued) – West Midlands and Chilterns RUS gaps

Gap reference	Corridor	Consolidated gap	Gap type	Addressed outside of West Midlands and Chilterns RUS (section 6.5)	Addressed by West Midlands and Chilterns RUS options work
RC-4	Cannock and Walsall	Limited connectivity: Walsall - Wolverhampton.	Rail connectivity		✓
SF-1	Cannock and Walsall	Inadequate station facilities at Cannock Line stations (all six stations Bloxwich-Rugeley Town) limiting rail accessibility.	Station facilities	See section 6.5.1.3	
OC-6	Coventry	Inadequate peak capacity on the Coventry corridor.	On train capacity	See section 6.5.2.1	✓
RC-5	Coventry	Lack of direct services Birmingham International/Coventry–Derbyshire, Yorkshire and the North East.	Rail connectivity		✓
JT-2	Cross City and Lickey	Inappropriate journey time Birmingham to the South West (Birmingham New Street – Bristol Temple Meads).	Journey time	See section 6.5.1.4	
OC-7	Cross City and Lickey	Inadequate capacity between Bromsgrove and Birmingham New Street to accommodate demand.	On train capacity	See section 6.5.1.5	
OC-8	Cross City and Lickey	Inadequate capacity between Redditch and Birmingham New Street to accommodate demand.	On train capacity	See section 6.5.1.5	
OC-9	Cross City and Lickey	Cross City and Lickey corridor peak and all day capacity.	On train capacity		✓
OC-10	Cross City and Lickey	Inadequate capacity to meet demand on long distance high speed services between Bristol Temple Meads and Birmingham New Street and beyond.	On train capacity	See section 6.5.2.2	
SC-1	Cross City and Lickey	Limited station capacity at University station to accommodate future growth.	Station capacity	See section 6.5.1.6	
JT-3	Derby and Nuneaton	Inappropriate journey time between Birmingham New Street and Leicester/Stansted Airport	Journey time	See section 6.5.2.3	
JT-4	Derby and Nuneaton	Inappropriate journey time between Birmingham New Street and Nottingham	Journey time		✓
OC-11	Derby and Nuneaton	Inadequate capacity on the Derby and Nuneaton corridor.	On train capacity	See section 6.5.2.4	✓
OC-12	Derby and Nuneaton	Inadequate capacity between West Midlands and West Yorkshire.	On train capacity	See section 6.5.2.5	
OC-13	Derby and Nuneaton	Inadequate capacity to accommodate demand between Birmingham New Street, Leicester, Peterborough, Cambridge and Stansted Airport.	On train capacity	See section 6.5.2.6	

6. Gaps and options

Table 6.2 (continued) – West Midlands and Chilterns RUS gaps

Gap reference	Corridor	Consolidated gap	Gap type	Addressed outside of West Midlands and Chilterns RUS (section 6.5)	Addressed by West Midlands and Chilterns RUS options work
OC-13a	Derby and Nuneaton	Inadequate capacity to accommodate local demand between Hinckley/Nuneaton and Birmingham New Street.	On train capacity		✓
RI-2	Derby and Nuneaton	Limited interchange opportunities with the West Coast Main Line on the Derby and Nuneaton corridor.	Rail interchange	See section 6.5.2.7	
JT-5	Leamington Spa and Chiltern	Unattractive journey time: London Marylebone – Birmingham Moor Street on Chiltern route.	Journey time	See section 6.5.1.7	
JT-6	Leamington Spa and Chiltern	Inappropriate journey time Oxford – Birmingham New Street.	Journey time		✓
OC-14	Leamington Spa and Chiltern	Inadequate capacity on the Leamington Spa and Chiltern corridor.	On train capacity		✓
RC-6	Leamington Spa and Chiltern	Poor service provision at some smaller stations within the Chilterns area.	Rail connectivity		✓
RC-7	Leamington Spa and Chiltern	Limited rail access to London Heathrow Airport to meet London air passenger demand growth forecasts.	Rail connectivity	See section 6.5.3.3	
RI-3	Leamington Spa and Chiltern	Limited interchange opportunities between Birmingham central stations.	Rail interchange	See section 6.5.3.4	
SC-2	Leamington Spa and Chiltern	Inadequate station capacity at Birmingham Moor Street and Birmingham Snow Hill stations	Station capacity	See section 6.5.3.5	
SC-3	Leamington Spa and Chiltern	Future station congestion at London Marylebone resulting from increased demand on Chiltern services.	Station capacity	See section 6.5.2.8	
OC-15	Leamington Spa and Nuneaton	Overcrowding on Leamington Spa – Coventry services in the morning and evening peak, and throughout the day	On train capacity		✓
RC-8	Leamington Spa and Nuneaton	Limited access to the rail network from Kenilworth.	Rail connectivity	See section 6.5.3.6	
RC-9	Leamington Spa and Nuneaton	Limited rail provision between Nuneaton and Coventry to meet demand for rail services to Ricoh Arena and Bermuda Park.	Capacity	See section 6.5.3.7	
JT-7	Shrewsbury	Inadequate journey time between Wolverhampton and Shrewsbury.	Journey time	See section 6.5.3.8	
OC-16	Shrewsbury	Inadequate peak and all day capacity for passenger services between Shrewsbury and central Birmingham.	On train capacity		✓

Table 6.2 (continued) – West Midlands and Chilterns RUS gaps

Gap reference	Corridor	Consolidated gap	Gap type	Addressed outside of West Midlands and Chilterns RUS (section 6.5)	Addressed by West Midlands and Chilterns RUS options work
RC-10	Shrewsbury	Irregular timetable interval between rail services from Telford and Birmingham New Street	Rail connectivity		✓
JT-8	Stafford and Wolverhampton	Inadequate journey time between Birmingham New Street and Manchester Piccadilly.	Journey time	See section 6.5.2.9	
OC-17	Stafford and Wolverhampton	Inadequate peak and all day capacity on the Stafford and Wolverhampton corridor.	On train capacity		✓
OC-18	Stafford and Wolverhampton	Inadequate capacity between Manchester Piccadilly and Birmingham New Street.	On train capacity	See section 6.5.2.9	
OC-19	Stafford and Wolverhampton	Inadequate capacity between Stafford and Birmingham New Street.	On train capacity		✓
JT-9	Stourbridge	Inappropriate journey time between Birmingham, Stourbridge, Kidderminster and Worcester.	Journey time		✓
OC-20	Stourbridge	Inadequate peak capacity for passenger services between Stourbridge and central Birmingham.	On train capacity		✓
OC-21	Stratford-Upon-Avon	Inadequate peak and all day capacity between Stratford-upon-Avon and Birmingham Moor Street.	On train capacity		✓
JT-10	Worcester and Hereford	Inappropriate journey time between Worcester and Hereford.	Journey time		✓
OC-22	Worcester and Hereford	Inadequate capacity to meet growth in demand for rail services between Birmingham New Street and Worcester/Hereford.	On train capacity		✓
RC-11	Worcester and Hereford	Limited rail service provision between Worcester and areas south of Worcester	Rail Connectivity		✓
GEN-1	Generic	Inadequate provision of early morning and late evening services within the RUS area.	On train capacity	See section 6.6.1	
GEN-2	Generic	Inadequate seven day timetable to meet demand levels for services within the scope of the West Midlands and Chilterns RUS area.	On train capacity	See section 6.6.2	
GEN-3	Generic	Limited rail connectivity to Birmingham Airport.	Rail connectivity	See section 6.6.3	
GEN-4	Generic	Limited car parking capacity within the West Midlands and Chilterns RUS area.	Station facilities	See section 6.6.4	

6. Gaps and options

6.5 Gaps being addressed outside the West Midlands and Chilterns RUS

Some of the gaps identified in the West Midlands and Chilterns RUS did not require further detailed analysis within the strategy as they are being addressed or considered outside of the RUS. This includes the outputs of committed schemes, work undertaken in other RUSs and work being considered as part of other studies or uncommitted schemes. The following section outlines which gaps have been closed due to the acknowledgement of these existing or potential solutions:

6.5.1 Gaps addressed by committed schemes

It is recognised that a number of gaps identified in the RUS are being addressed as part of committed schemes. There is therefore no need for further analysis to be undertaken. This section presents the gaps which are currently being addressed as part of committed schemes.

6.5.1.1

Gap OC-1: Inadequate capacity to accommodate HLOS peak demand into Birmingham by the end of Control Period 4

Gap OC-2: Inadequate capacity to accommodate HLOS peak demand into London Marylebone by the end of Control Period 4

As outlined in **Chapter 4**, Network Rail has responded to the requirements set out by the Department for Transport (DfT) in the July 2007 HLOS and has established a national programme of expenditure to meet the targets set. This is the CP4 Delivery Plan for which Network Rail has received committed Government funding to develop and implement between 2009 and 2014. For the purpose of the West Midlands and Chilterns RUS, the key outputs specified in the CP4 Delivery Plan are considered to be part of the base. This includes the associated operational plans which Network Rail and the Train Operators have formulated to determine the additional vehicles required to meet the HLOS capacity targets set for individual routes.

A number of issues raised during the early stages of the RUS, specifically the need to accommodate HLOS peak demand capacity targets during CP4, have subsequently been resolved by the commitments made in the CP4 Delivery Plan and associated operational plans. Consequently these issues have not been taken forward into detailed option analysis. Where capacity gaps have been taken forward for detailed analysis, any additional HLOS vehicles which have been confirmed have been considered as part of the base and RUS analysis work has concentrated on determining whether this fully addresses the gap until 2019.

It is important to note that as the CP4 Delivery Plan is considered part of the base in this RUS, any refinement to that plan, in the form of changes to specified outputs or funding, would directly affect the assumptions made during the gaps and options analysis. If for any reason there are further changes to the CP4 Delivery Plan which leads to any committed scheme not materialising, the RUS would then treat the lack of output as a gap for which the original CP4 enhancement would form a potential option.

6.5.1.2

Gap RT-1: Potential passenger flow and interchange issues following the completion of the Birmingham Gateway project

This issue has been addressed in the early stages of the Birmingham Gateway project and no further work needs to be undertaken separately by the RUS. The Birmingham Gateway project will substantially increase passenger capacity at Birmingham New Street station and improve passenger flow and interchange. Part of the key outputs defined during detailed project development included greatly increasing the concourse area available to passengers. Significantly improved interchange routes will be provided, with increased provision for vertical circulation between platforms and concourse level. As part of the renewal and enhancement works at platform level, redundant rooms and facilities are being removed to aid passenger flows and maximise space available. Passenger flow modelling has been used to demonstrate that these changes enable Birmingham New Street station to manage the current passenger growth expectations up to 2035.

6.5.1.3

Gap SF-1: Inadequate station facilities at Cannock line stations (Bloxwich – Rugeley inclusive) limiting rail accessibility

The adequacy of facilities available at the stations on the Cannock line was raised as an issue during the early stages of the RUS. Stakeholders considered that the quality of the customer information, signage and general station environment to be inadequate, causing a detrimental effect on a passenger's overall journey experience. This issue was the focus of the first phase of the National Station Improvements Programme (NSIP), which specifically aimed at delivering enhancements at key stations across the network through joint industry working. London Midland and Network Rail, supported by Centro, work as part of a local delivery group and have successfully delivered significant improvements at Cannock line stations during 2010/2011.

The stations which have received NSIP funded improvements are Bloxwich, Bloxwich North, Landywood, Cannock, Hednesford and Rugeley Town. The committed programme included help points, enhanced lighting, better signage and new ticket machines. A further scheme has also been developed by the Local Delivery Group and Staffordshire County Council, in partnership with the DfT's Access for All programme, to provide real-time train running information. These schemes have raised awareness of the station facility requirements on this line and the research undertaken as part of the programme will help to inform the station facility owner of further improvements to consider in the future.

6.5.1.4

Gap JT-2: Inappropriate journey time Birmingham to the South West due to low linespeed

This issue was raised during the early stages of the RUS, and has been addressed by a committed enhancement scheme funded through the CP4 Delivery Plan to improve the linespeed between Westerleigh Jn and Barnt Green. The project will enhance the linespeed on approximately 18 miles of the route between Bristol Parkway and Gloucester and between Cheltenham Spa and Birmingham. The project will explore the possibility of raising the linespeed capability to 100mph over approximately 30 miles in each direction. This will be realised once relevant level crossing renewals are completed during CP4 / early Control Period 5 (CP5), along with other additional works that may be required. The enhanced linespeed will deliver performance improvement, as well as increasing capacity. Implementation of the works is planned for 2012, from which revised timings can then apply.

6.5.1.5

Gap OC-7: Inadequate capacity between Bromsgrove and Birmingham New Street to accommodate demand

Gap OC-8: Inadequate capacity between Redditch and Birmingham New Street to accommodate demand

The need for further investment in rail services to respond to growing demand in Bromsgrove and Redditch was highlighted during the gap identification stage of the RUS. The issue of congestion and lack of sufficient service capacity to both these locations has been addressed through the committed enhancement schemes which received funding through the CP4 Delivery Plan.

The extension of electrification to Bromsgrove, funded through the CP4 Delivery Plan, will facilitate the extension of Cross City services to Bromsgrove. This scheme has an interface with a third-party funded scheme to relocate Bromsgrove

station, as this will deliver the required turn back facilities for Cross City services. The extension of Cross City services, which is an output of the two schemes, will offer a significantly enhanced service frequency at Bromsgrove, by providing an additional three trains per hour in each direction. These schemes are considered to address the need to accommodate strong growth in peak and off-peak travel at Bromsgrove.

As part of the Bromsgrove electrification scheme development, detailed timetable analysis and modelling work will be undertaken to confirm that adequate capacity exists to accommodate current freight and passenger requirements. During CP4, Network Rail is also undertaking a feasibility study to GRIP stage 2, to consider medium to longer term issues concerning additional capacity required to deliver forecast growth in freight traffic and other RUS recommendations

The Redditch branch enhancement, funded through the CP4 Delivery Plan, will facilitate a service extension which will address the gap relating to growth at Redditch. The project encompasses work on the Redditch branch to enable an increase from the current two to three Cross City services per hour. Option development is in progress to determine the track, signalling and overhead line infrastructure works required to enable the output requirements to be achieved at the most efficient cost. This project has a timetabling interface with the Bromsgrove electrification scheme due to the nature of the Cross City service frequency and pattern.

6.5.1.6

Gap SC-1: Limited station capacity at University station to accommodate future growth

Station capacity at University station on the Cross City line has been identified as a gap in light of future passenger growth, stimulated by developments at the University of Birmingham and Queen Elizabeth hospital in the vicinity of the station. The University of Birmingham is the largest university in the West Midlands and is unique in having its own railway station. Growth at the university in recent years has been accelerated by the developments in research, learning resources and sports facilities at the Edgbaston Campus which is adjacent to University station. The rail station also serves the Queen Elizabeth hospital site, which has recently been redeveloped with a new hospital to replace the old Queen Elizabeth and Selly Oak hospitals and large research centre run by the University of Birmingham Medical School. Developments at the University and Queen Elizabeth hospital sites are reflected in the increasing station usage, with around 2 million passengers using the station annually.¹

1 West Midlands Region Rail Development Plan – Appendix B, Centro, June 2009

6. Gaps and options

The RUS recognises that the station environment at University station is being addressed as part of the National Stations Improvement Programme (NSIP). London Midland's Local Delivery Group has identified University as a suitable candidate station to benefit from Tranche 1 NSIP funding, based on its footfall. The defined programme of work proposed at University includes relocating the existing retail unit, improvements to the stair access, extension of the canopy on platform 1, replacing internal glazing on the concourse and improvements to the entrance of the station building. Improvements will also be made to station lighting, cycle storage and the waiting room facilities on Platform 2. The RUS recognises that this work provides the opportunity to make significant improvements at the station to enable it to accommodate future forecast passenger numbers and meet their needs.

6.5.1.7

Gap JT-5: Unattractive journey time London Marylebone to Birmingham Moor Street via the Chiltern route

This issue was raised during the early stages of the RUS and relates to the need to improve journey times for passengers travelling between Birmingham Moor Street and London Marylebone on the Chilterns route. This gap has been addressed as part of Phase 1 of the Evergreen 3 project, in progress at the time of RUS publication, involving the upgrade of the main line track between London Marylebone and Birmingham Moor Street. This work will permit 100 mph running on over 50 miles of route and deliver journey time improvements, which will see the fastest peak-hour journey time from Marylebone to Birmingham reduced by 25 minutes to 92 minutes. The work involved to achieve this journey time improvement includes remodelling of the junctions at Neasden, Northolt and Aynho and removal of the former speed restrictions through Bicester North. The infrastructure upgrade will be supported by the recently re-instated platforms at Birmingham Moor Street. It is anticipated that the accelerated services will commence in September 2011.

6.5.2 Gaps being considered or have been considered by other RUSs

A number of gaps which were identified during the development of the West Midlands and Chilterns RUS have been analysed as part of work undertaken in other RUSs. This is due to the fact that a corresponding gap was identified in other RUSs or the nature of the options to address the gap fit better into the geography or scope of another Route Utilisation Strategy. Gaps which have been or are currently being addressed by other RUSs are outlined below.

6.5.2.1

Gap OC-6: Inadequate peak capacity on the Coventry corridor

Gap OC-17: Inadequate peak and all day capacity on the Stafford and Wolverhampton corridor

The capacity issues on these two corridors have been partly addressed by the option recommended in the Great Western RUS to lengthen long distance services between Manchester Piccadilly and Bournemouth via Coventry and Birmingham International (Option D in the Great Western RUS). This option recommended lengthening the busiest service between Manchester Piccadilly and Bournemouth which is routed via the Coventry and Stafford and Wolverhampton corridors, as presented in this RUS.

The number of additional vehicles required is dependant on the resourcing plan (train diagrams). The theoretical minimum number of trips made by the lengthened train (one return trip per day) and the theoretical maximum number of trips (based on a two day diagram of May 2009) have been used to establish the range of vehicles required. The Great Western RUS used passenger counts undertaken by CrossCountry in May 2009 as a basis for a load factor analysis of the current situation. The projections to 2019 were then made and a business case developed for additional vehicles. The business case included the benefits of crowding relief to passengers and also estimated the revenue impact of releasing suppressed demand. The results of the analysis showed that the option would eliminate most of the standing between Manchester Piccadilly and Bournemouth via Coventry and Birmingham International, and that the main costs relate to rolling stock requirements. It was acknowledged that some standing may still be observed in key urban centres on the route during the morning and evening peak periods when the services are used by both commuters and long distance travellers.

A case for providing between two and nine additional vehicles (in traffic) was presented, as the amount would depend on the resourcing plan (diagram). A case exists for nine additional vehicles

if the operating costs are based on 'one return trip'. This reduces to two vehicles if the operating costs are based on a 'two day diagram'. The following table outlines the appraisal results:

Table 6.3 – Train lengthening of long distance services between Manchester and Bournemouth via Coventry and Birmingham International

30-year appraisal	£ million (2002 PV)	
	One return trip	Two day diagram
Costs (Present Value)		
Investment Cost	0	0
Operating Cost	57	14
Revenue	-15	-4
Other Government Impacts	3	2
Total costs	45	12
Benefits (Present Value)		
Rail users benefits	68	16
Non users benefits	6	2
Total Quantified Benefits	74	18
NPV	30	6
Quantified Benefit Cost Ratio (BCR)	1.7	1.5

The West Midlands and Chilterns RUS recognises the analysis undertaken by the Great Western RUS and supports the recommendation to provide additional vehicles on the long distance services between Manchester Piccadilly and Bournemouth by 2019 to alleviate crowding on these services.

6.5.2.2

Gap OC-10: Inadequate capacity to meet demand on long distance high speed services between Bristol Temple Meads and Birmingham New Street and beyond

The West Midlands and Chilterns RUS notes that gap OC-10 has been assessed by the Great Western RUS through work to address a corresponding gap to improve connectivity and capacity between the West Midlands and the South West corridor.

The analysis undertaken in the Great Western RUS incorporated options to lengthen the Manchester to Bournemouth services with options to lengthen the Edinburgh Waverley to Plymouth (included in the East Midlands RUS) and Manchester to Bristol Temple Meads/Paignton services. The options were assessed using 2009 passenger counts data received from CrossCountry and projections to 2019 produced using the Network Rail RUS growth forecasts. Load factor analysis enabled a business

case to be developed for additional vehicles. Various mileage scenarios were modelled based on the May 2009 train diagramming requirements, with the assumption that these can be further optimised in the future. **Table 6.4** presents the number of additional vehicles in traffic that the business case can support for each of the corridors under the following scenarios:

- One return trip per day (theoretical minimum number of trips made by the lengthened train). For example, the service will run Manchester Piccadilly to Bristol Temple Meads and back again in one day. In practice the train is likely to operate on the network throughout the day as shown in today's diagrams.
- One return trip per day (using the current CrossCountry weekday May 2009 diagrams). For example, the Bournemouth to Manchester Piccadilly service runs to Manchester Piccadilly but then runs a return trip to Exeter and then forms a Manchester to Birmingham New Street service.
- Two-day diagram (provides similar routeings as the one-day diagram but over a two-day period, for example, the Edinburgh Waverley to Plymouth service will run Edinburgh Waverley to Plymouth on day one and then runs Plymouth to Edinburgh Waverley on day two).

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Table 6.4 – Additional vehicles by corridor

Corridor	Mileage scenarios		
	One return trip per day	One-day diagram	Two-day diagram
Edinburgh Waverley to Plymouth	9	9	6
Manchester Piccadilly to Bournemouth	9	7	2
Manchester Piccadilly to Bristol Temple Meads	1	1	0
Total	19	17	8

With these assumptions, the additional number of vehicles in traffic that the business case can support ranges from eight to 19 depending on the scenario. The final number of vehicles required will therefore

be dependent on the ability to optimise future train diagrams. **Table 6.5** shows the transport economic efficiency table for the option as presented in the Great Western RUS.

Table 6.5 – Transport economic efficiency table for train lengthening

30 year appraisal	£ million (2002 PV)		
	One return trip per day	One-day diagram	Two-day diagram
Costs (Present Value)			
Investment Cost	0	0	0
Operating Cost	134	123	58
Revenue	-47	-45	-25
Other Government Impacts	9	9	6
Total Costs	96	87	39
Benefits (Present Value)			
Rail users' benefits	213	201	120
Non-users' benefits	22	21	13
Total Quantified benefits	235	223	133
NPV	139	135	94
Quantified BCR	2.5	2.5	3.4

The West Midlands and Chilterns RUS supports the train lengthening recommendations made on these service groups, and no further capacity analysis on the Bristol to Birmingham route will be undertaken in this RUS.

6.5.2.3

Gap JT-3: Inadequate journey time between Birmingham New Street and Leicester/Stansted Airport

The route between Birmingham New Street and Stansted Airport was identified in the East Midlands RUS as part of a list of routes where it was believed that an improvement in journey time would promote even greater rail travel and enable rail to become more competitive with road. Option 4.2 of the East Midlands RUS considered the journey time improvement that would be provided through the provision of enhanced infrastructure between Helpston Jn and Nuneaton, as part of the Ipswich to Nuneaton capacity improvement scheme. The preferred option for the Ipswich to Nuneaton

capacity scheme examined the provision of additional infrastructure between Helpston Jn and Nuneaton. The preferred option included:

- Four tracks between Syston Jn and Leicester station
- Three tracks between Leicester station and Wigston Junction
- Improvements at Syston Jn and relocate Syston station.

Table 6.6 outlines the appraisal results which were produced on the basis of identifying the level of additional infrastructure spend that can be justified for a one-minute journey time improvement to generate a BCR of 2.0 on the following sections of the Birmingham New Street to Stansted Airport corridor:

- Birmingham New Street to Nuneaton
- Nuneaton to Leicester
- Leicester to Melton Mowbray.

Table 6.6 – Transport economic efficiency table for Birmingham New Street - Stansted Airport journey time improvements

60 year appraisal	£ million (2002 PV)		
	Birmingham - Nuneaton	Nuneaton - Leicester	Leicester - Meton Mowbray
Costs (Present Value)			
Investment Cost	8	9	5
Operating Cost	0	0	0
Revenue	-5	-6	-3
Other Government Impacts	1	1	1
Total Costs	4	4	3
Benefits (Present Value)			
Rail users' benefits	7	8	4
Non-users' benefits	2	2	1
Total Quantified benefits	9	10	5
NPV	4	5	3
Quantified BCR	2.0	2.0	2.0

The East Midlands RUS recommended that linespeed improvements are incorporated into an integrated scheme for the Leicester area, to include Leicester resignalling, for early implementation in CP5. Since the publication of the RUS, the work to define the requirements for a journey time improvement has commenced. Two schemes are under consideration as candidate schemes for CP5 delivery. These are as follows:

- **Scheme 1** –Journey time improvements between Helpston Jn and Birmingham New Street
- **Scheme 2** –Journey time improvements between Wigston Jn and Leicester and Syston, included as part of resignalling and the Felixstowe to Nuneaton upgrade phase 2

6.5.2.4

Gap OC-11: Inadequate capacity on the Derby and Nuneaton corridor

As outlined above, the train lengthening recommendations made in other RUSs help to address capacity gaps identified in this RUS. On the Derby and Nuneaton corridor, overcrowding has been addressed to an extent by the option outlined in the Great Western (Option D) and East Midlands (Option 2.5) RUSs to lengthen long distance interurban services between Plymouth and Edinburgh Waverley via Derby.

The West Midlands and Chilterns RUS supports the recommendation made for additional vehicles to be provided on the busiest services between Edinburgh Waverley and Plymouth long distance services by 2019 to alleviate crowding on the route. In line with the East Midlands and Great Western RUS analysis, it is noted that the number of additional vehicles is dependent on the resourcing plan. The theoretical minimum number of trips made by the lengthened train (one return trip per day) and the theoretical maximum number of trips (based on a two-day diagram of May 2009) have been used to establish the range of vehicles required. The main costs relate to rolling stock. The following table outlines the appraisal results:

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Table 6.7 – Transport economic efficiency table for train lengthening between Plymouth and Edinburgh Waverley via Derby

30-year appraisal	£ million (2002 PV)	
	One return trip	Two-day diagram
Costs (present value)		
Investment cost	0	0
Operating cost	71	44
Revenue	-29	-21
Other Government impacts	6	4
Total costs	47	27
Benefits (Present Value)		
Rail users benefits	140	104
Non-users benefits	15	12
Total quantified benefits	155	116
NPV	108	88
Quantified BCR	3.3	4.2

The option offers a high value for money business case, with a case existing for nine additional vehicles if the operating costs are based on ‘one return trip’, which reduces to six vehicles if the operating costs are based on a ‘two-day diagram’ instead. The West Midlands and Chilterns RUS recognises that this will eliminate most standing between Edinburgh Waverley and Plymouth. However some standing may still be observed on some sections of the route particularly during the morning and evening peak at key urban centres when the services are used by both commuters and long distance travellers. This RUS considers the localised crowding on these services between Tamworth and Birmingham New Street, and proposes options to address this. Analysis shows that Option 11b would help to alleviate peak crowding from Tamworth to Birmingham New Street, but Option 12b is preferred as this helps to address peak crowding on this route and on the line to Nuneaton as well.

6.5.2.5

Gap OC-12: Inadequate capacity between West Midlands and West Yorkshire leads to crowding

The issue of crowding between the West Midlands and West Yorkshire areas has been considered by the Yorkshire and Humber and East Midlands RUSs.

In the short term it has been recognised that the recent rolling stock seating configuration introduced on CrossCountry’s services between Birmingham New Street, Derby and Sheffield will help to alleviate some crowding.

In the longer term, the Yorkshire and Humber RUS predicted that demand for travel between the Yorkshire and Humber RUS area, the West Midlands and south thereof will have increased to such an extent over the next 10 to 15 years that significant train lengthening or a third service every hour will be necessary. As this option would require a large scale package of infrastructure investment at a number of key locations across the network for which there is no current economic case, the RUS concluded that Network Rail needed to continue to develop a holistic view during CP5 of the key cross boundary rail passenger markets through the overall geographical RUS programme and other industry processes.

The West Midlands and Chilterns RUS notes the recommendations of the Yorkshire and Humber RUS as outlined above. The option of assessing a third long distance service between Yorkshire and Birmingham New Street is considered to be a medium to longer-term strategy in this RUS which would provide an alternative option for increasing capacity on this corridor and also provides additional connectivity benefits in linking Bristol, Birmingham, Manchester, Yorkshire and Newcastle. It is recognised that this option will be assessed in further detail during the next review of the CrossCountry franchise. The West Midlands and Chilterns RUS option work on the Derby and Nuneaton corridor will take into account the potential future requirement for a third long distance service on the route between Birmingham New Street and Wichnor Jn and consider it as a sensitivity in any modelling work that is undertaken.

6.5.2.6

Gap OC-13: Inadequate capacity to accommodate demand between Birmingham New Street, Leicester, Peterborough, Cambridge and Stansted Airport

The East Midlands RUS identified a capacity gap on the route between Birmingham New Street and Stansted Airport, indicated by evidence of crowding on services throughout the day. The RUS considered a number of options to address this gap. The option for lengthening the busiest services between Birmingham New Street and Leicester, and Birmingham New Street and Stansted Airport to 3 or 4-car rolling stock was not recommended due to the significant amount of additional rolling stock required and the

fact that it did not improve regional connectivity. The recommendation was to combine service extensions of the Birmingham New Street to Leicester service to Cambridge in every second hour with train lengthening from 2014 throughout the week and at weekends to target the crowding in the peaks (Option 2.4 in the East Midlands RUS). This option requires six additional vehicles, additional train crew and platform extensions at Stansted Airport. Partial fitment of Selective Door Opening equipment would also be required at some stations which have limited platform lengths. The East Midlands RUS recommended that the option be implemented as soon as rolling stock becomes available. The following table outlines the appraisal results for this option.

Table 6.8 – Transport economic efficiency table for service extensions and train lengthening between Birmingham New Street, Leicester and Cambridge

60 year appraisal	£ million (2002 PV)
Costs (Present Value)	
Investment Cost	1
Operating Cost	51
Revenue	-32
Other Government Impacts	6
Total Costs	27
Benefits (Present Value)	
Rail users' benefits	76
Non-users' benefits	11
Total Quantified benefits	87
NPV	61
Quantified BCR	3.3

The West Midlands and Chilterns RUS recognises that this recommendation will help to address the capacity gap OC-13 (inadequate capacity to accommodate demand between Birmingham New Street, Leicester, Peterborough, Cambridge and Stansted Airport) identified during the baseline stage of this RUS. Further analysis has been undertaken during the development of this RUS to assess whether this option also addresses gap OC-13a – inadequate capacity to accommodate local demand between Hinckley/Nuneaton and Birmingham New Street. This analysis is presented in section 6.8.5.

6.5.2.7

Gap R-I2: Limited interchange opportunities with the West Coast Main Line on the Derby and Nuneaton corridor

Stakeholders identified a gap in interchange opportunities on the Derby and Nuneaton corridor,

focussed on the need for improved interchange with the West Coast Main Line services at Tamworth and Nuneaton stations. The West Coast Main Line RUS is considering the potential for an additional off-peak service from London Euston that could create increased interchange opportunities within the West Midlands area, offering passengers with further opportunities for connecting with services to London, the North and Scotland. The current economic analysis, which will be reported in the West Coast Main Line RUS, due to be published in July 2011, suggests that stopping at Nuneaton has greater value than stopping at Tamworth. The West Coast Main Line RUS will also consider the socio-economic benefits of stopping at the other main Trent Valley stations, which includes Lichfield Trent Valley.

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6.5.2.8

Gap SC-3: Future potential station congestion at London Marylebone and heavy crowding on the Bakerloo line resulting from increased demand on Chiltern services

The RUS recognises that increased growth in passenger numbers at London Marylebone, forecast in the HLOS and facilitated by key projects like the Evergreen 3 project, may lead to congestion at the station. Tackling station congestion is important for safety and security reasons and because it can act as a disincentive to travel through its impact on overall journey time and passenger experience. Specific issues at Marylebone station relate to the anticipated increase in station footfall following the Evergreen 3 project, and in particular the new service between Oxford and London Marylebone. The main areas of the station which may potentially become congested following the increase in passenger numbers are the gatelines, the escalators and stairways to the Underground services, and the walking route between Marylebone and Baker Street Underground station.

The Network RUS: Stations Draft for Consultation (published in May 2011) has focused on the issue of congestion at stations. From the analysis undertaken London Marylebone was identified as one of 24 on the network which may require interventions by Control Period 8 (2029-2034). The strategy recognises that each station can have its own unique issues and it has therefore recommended, where appropriate, that bespoke solutions are developed at a local level using some or all of the interventions suggested.

Stations on the network are leased to franchised train operating companies who are responsible for the day to day management of all facilities and services at the station. Chiltern Railways are the current Station Facility Owner for London Marylebone and have undertaken some local level analysis to consider the potential constraints at the station following the Evergreen 3 project and beyond. This analysis has focused on the ability of the gatelines, escalators and staircases to the Underground, and the walking route to Baker Street Tube station to accommodate the increased numbers of passengers safely and efficiently, particularly during peak hours.

In the short term Chiltern Railways are investigating options to improve passenger flows to and from Platforms 1 and 2, and are undertaking pedestrian modelling to understand how far this addresses the capacity issues. In the longer term, opportunities for more extensive interventions in line with those suggested by the Stations RUS toolkit will need to be considered, including the potential relocation of the ticket office.

6.5.2.9

Gap JT-8: Inadequate journey time between Birmingham New Street and Manchester Piccadilly

Gap OC-18: Inadequate capacity between Birmingham New Street and Manchester Piccadilly

Gap JT-8 is based on the objective to reduce rail travel time between the key locations of Birmingham and Manchester. The baseline analysis presented in **Chapter 3** shows that the fastest journey time achievable between these two locations throughout the day (based on a sample of journey times on Wednesdays between 1000 and 1600 hours) is 1 hour 24 minutes, with an average speed by rail of 59 mph. This is a slower journey time than other journeys between similar sized locations of comparable distance. It has therefore been considered as a gap in this RUS, for which further analysis is required.

The West Coast Main Line RUS has led the analysis on this gap (gap JT-4 in the West Coast Main Line Draft for Consultation). The strategy considered how altering stopping patterns and examining time allowances in the timetable can help reduce journey time. Option JT4.1 presented in the Draft for Consultation considered rerouting the existing long distance high speed service between Birmingham New Street and Manchester Piccadilly to operate via Crewe. This involves diverting the slower of the two existing Long Distance High Speed (LDHS) services connecting Birmingham and Manchester (the service from Bournemouth) from the Stoke-on-Trent route to operate via Wilmslow. This is a cost neutral option as the only impact is a marginal change in mileage-related costs. Due to the fact that this option reduces connectivity for passengers between Birmingham and Stoke-on-Trent it needed to be appraised as a combination package with option JT3.1 (Service alteration to the existing interurban service between Euston and Crewe). The appraisal results for these options are still being determined and will be reported in the West Coast Main Line RUS due to be published in July 2011.

6.5.3 Gaps being considered by other workstreams or uncommitted schemes

The RUS recognises that further work is not required in relation to some gaps identified as it is already underway as part of established workstreams or uncommitted schemes. The gaps which this is applicable to are outlined below with details provided regarding the work which is currently in progress.

6.5.3.1

Gap OC-3 – Inadequate capacity and poor service mix on the Aylesbury corridor

Gap JT1 – Poor journey time on the Aylesbury corridor

Inadequate capacity and poor service mix have been identified as a consolidated gap on the Aylesbury line based on identified overcrowding which is seen as a result of a number of factors. On-train crowding on the Aylesbury line, particularly south of Harrow, is recognised to be an issue which will be further exacerbated by planned housing growth and redevelopments in the Aylesbury area. The infrastructure between Harrow and Amersham is owned by London Underground Limited (LUL), and the line is shared between LUL services and national rail services operated by Chiltern Railways. This mix of services, together with the current slow journey times and frequent stopping patterns impact on capacity and performance on the line.

In order to determine the capacity requirements on the route between London Marylebone and Aylesbury, passenger demand forecasts to 2019 were assessed. Committed changes which will increase future capacity on this line were included as part of this assessment, including CP4 train lengthening commitments. The analysis shows that there will be high levels of crowding in 2019 with most services operating close to or even above train capacity in the high-peak hour.

Due to the fact that the mix of linespeed on this line limits the option of increasing peak hour frequency, initial RUS analysis considered an option of providing additional peak hour capacity by train lengthening was considered to help alleviate on-train crowding into London Marylebone. As this option would require platform lengthening at various stations along the route to accommodate services that are longer than six-car, it is anticipated that the cost of platform lengthening would be too high to support train lengthening of a few services in the high-peak. As a result no business case has been developed.

The RUS has considered an alternative option of using timetable interventions to address crowding on this corridor. The Draft for Consultation presented the results of an initial examination of the potential opportunities to improve capacity, service mix and journey time between Aylesbury Vale Parkway and London Marylebone. This examination assessed the route between Amersham and Harrow-on-the-Hill

where both national rail services and LUL services operate over the LUL infrastructure (Metropolitan Line). This initial examination considered what opportunities might exist for improving the overall service mix on this part of the network, and also what opportunities might exist for improving overall journey times over the route, once LUL's new 'S' stock is introduced on LUL's Metropolitan Line services during 2011/12, and once the LUL Metropolitan Line is resignalled, the works for which are currently planned to commence during 2016. The LUL 'S' stock has a higher operating speed capability than the current LUL 'A' stock and this presents the opportunity for a recast of the timetable for both the LUL and national rail services that operate jointly over the section of the route between Rickmansworth and Amersham. The planned resignalling of the Metropolitan Line will offer further opportunity for both timetable and journey time improvements that will be derived from the introduction of modern technology signalling.

The current national rail franchise passenger operator (Chiltern Railways) and LUL, have commenced consideration of what opportunities exist to exploit incremental service mix and journey time improvements following the introduction of the December 2012 timetable, and the planned introduction of the new fleet of LUL 'S' stock. Further planning will be undertaken to exploit the opportunities presented once details of the LUL Metropolitan line resignalling proposals become more certain.

6.5.3.2

Gap RC1- Poor rail connectivity between the north and south of Buckinghamshire, particularly from Aylesbury

Limited rail links between key towns in Buckinghamshire and the surrounding areas was raised as a gap in the baseline stage of the RUS. Buckinghamshire County Council have commissioned a study, undertaken by Chiltern Railways, to consider potential options to improve transport links. The report, published in 2008, considered the planned population growth in Aylesbury and the options to provide improved public transport links on the Milton Keynes – Aylesbury – High Wycombe – Thames Valley corridor. The rail and infrastructure options proposed included combining East West Rail and Chiltern services.

As the options that have been developed did not require extra train paths between Aylesbury Vale Parkway and London Marylebone, a detailed timetable study analysing the impact of the north-south links on the Aylesbury line (as defined in the RUS) is not required in this RUS.

The work undertaken in the study has been further developed as part of the East West Rail Western (Bedford to Oxford/Swindon) Section GRIP 4 (single option development) study, which was completed in 2010.

6. Gaps and options

Chiltern Railways are developing proposals for the Oxford to Bicester part of the Western Section of East West Rail. As part of the Evergreen 3 project, Chiltern Railways is proposing to construct a new railway (including the reconstruction of an existing railway) between Bicester and Oxford, together with the construction or reconstruction of stations at Bicester Town, Islip, Water Eaton and Oxford. They are working with the East West Rail Consortium as both projects complement one another. These improvements will not only provide the upgraded infrastructure and stations for the Oxford-Bicester section of East West Rail but they will also introduce a new direct rail service between Oxford and High Wycombe which will strengthen the latter's connectivity with the Oxford City Region. The potential extension of East West Rail Aylesbury services to High Wycombe would also help to address the network capacity issues on the Aylesbury to Prince Risborough single, low speed, branch line.

The West Midlands and Chilterns RUS acknowledges the strategic objectives of Buckinghamshire County Council and recognises the work being developed by the East West Rail Consortium and Chiltern Railways. The delivery of the service and infrastructure enhancements proposed by East West Rail will be dependent on a value for money business case, stakeholder endorsement and an appropriate funding stream becoming available.

6.5.3.3

Gap RC5 - Limited rail access to London Heathrow Airport from the Chiltern lines to meet London air passenger demand growth forecasts

The need for improved rail links to Heathrow Airport from the Buckinghamshire area has been identified as a gap in this RUS. This gap has been considered as part of the North South Links in Buckinghamshire study which recognises that the airport is one of the largest travel generators in the South East. This study has considered a number of options, including the feasibility of direct coach links from High Wycombe. It concluded that a direct coach service would result in significant additional traffic, but would be dependent on easy interchange with rail at High Wycombe and a simple through ticketing procedure. The West Midlands and Chilterns RUS acknowledges the strategic objective of Buckinghamshire County Council to establish a regional coach network within the Thames Valley, as outlined in the study. The RUS supports this cost-effective, integrated transport solution as currently the best solution to bridge this gap.

6.5.3.4

Gap RI3 - Limited interchange opportunities between Birmingham central stations

In the West Midlands the network of lines radiating from Birmingham Snow Hill and Moor Street stations, and those operating from Birmingham New Street, are poorly connected with each other for passengers interchanging between services. This has been identified as a gap in the RUS as it reduces the overall connectivity and effectiveness of the network, extends journey times and may discourage rail use. It is recognised that these issues are currently being reviewed and addressed by Centro, in partnership with Birmingham City Council and other stakeholders, with an aim to improve the connectivity between the stations.

To improve the links between Birmingham Snow Hill and Birmingham New Street, Centro is developing plans to extend the current Midland Metro Line 1 tram route. Midland Metro services from Wolverhampton currently terminate at Birmingham Snow Hill, but in future will go onto the streets to Birmingham New Street. Work is planned to start in 2012, with an expected opening of 2015 in line with the completion of the Birmingham Gateway project.

Between Birmingham Moor Street and Birmingham New Street stations, Centro is developing proposals to upgrade the pedestrian tunnel under the Bullring which provides a 400m direct link between the stations, but which is currently of poor quality. The future construction of a High Speed Line station adjacent to Birmingham Moor Street station, and the Birmingham Gateway project to redevelop Birmingham New Street, will further increase the need to have a high quality pedestrian link on this axis. There is a need to ensure that with the stations' close proximity, the stations are considered as a single city centre interchange and passengers should feel as comfortable as possible when interchanging between them.

Centro is aiming to implement some improvements to the pedestrian tunnel in 2011. As part of the wider city centre development plans, Centro is also seeking to improve the bus/rail interchange as well as connections to other modes in order to fully integrate rail into the city's public transport network.

6.5.3.5

Gap SC2 – Inadequate station capacity at Birmingham Moor Street and Birmingham Snow Hill stations

Station crowding at Birmingham Moor Street and Birmingham Snow Hill has also been raised as an issue that the RUS needs to review. The Network RUS: Stations Draft for Consultation recognises that tackling congestion is important for many reasons including safety and security concerns, and the fact that station crowding can act as a

potential disincentive to travel because it increases the overall journey time and can lead to an unpleasant travelling experience, thus making rail less competitive.

The following section outlines the key issues at the two central Birmingham stations and the work which is in progress to address these in the future:

Birmingham Moor Street – The Draft for Consultation outlined the issue of the narrow southbound platform at Birmingham Moor Street and concerns surrounding crowding on this platform during peak times and times of perturbation. Chiltern Railways have recently completed work to install two new bay platforms at the station which will help to ease this station capacity issue. It is likely, however, that crowding on the southbound platform will continue to be an issue in the evening peak. In the longer term, platform widening is a solution which needs to be considered as an integral element of the future High Speed station plans. In the medium term, Chiltern Railways, as the Station Facility Owner, will need to proactively manage congestion issues on the platform.

Chiltern Railways have initiated a review of the station capacity in light of the expected increased passenger numbers following the Evergreen 3 project main line works. A similar study is also being progressed for Solihull station. The study will consider the capability of the barriers, platforms, concourse and other areas of the station to handle the projected passenger flow both in terms of waiting passengers and for passengers accessing trains. The study aims to identify any risks to passenger safety, impact on passenger comfort and whether any minor changes to the layout would help to address these. The results of the review will help to determine any work required in order to address both current and future passenger handling issues at the station. The RUS recommends this review is revisited at a suitable point following the implementation of the Evergreen 3 project to ensure that the projections are in line with the actual passenger growth.

Based on the analysis undertaken in the Network RUS: Stations Draft for Consultation (published in May 2011), Birmingham Moor Street has been identified as one of 24 stations where it is anticipated that interventions will need to be considered by 2031 to address station congestion. It recommends that consideration be given to the use of 'softer' measures from the toolkit to address station congestion.

Birmingham Snow Hill – The narrowness of the concourse at Birmingham Snow Hill station is an issue particularly during peak times, and passenger congestion at the ticket barriers at Birmingham Snow Hill is currently evident when two trains arrive at the station simultaneously. This issue is likely to be further exacerbated with anticipated passenger growth, and London Midland as the Station Facility Owner, is currently considering options that may help to address this issue in the future.

The recent opening of the new second entrance at the station will relieve crowding to some extent, but passenger forecasts indicate that the main gatelines will continue to be congested during peak times and this will need to continue to be monitored closely. This approach corresponds with the recommendations made in the Network RUS: Stations strategy which identified Birmingham Snow Hill as one of 10 stations where there is some uncertainty about whether current improvement plans will fully address congestion issues in the future. It's therefore recommended that the situation is to be kept under review and measures described in the Network RUS: Stations toolkit be considered during the development of Station improvement plans.

The RUS recognises that there is a GRIP 2 study in progress to determine whether there is a future requirement to reinstate the former Platform 4 at Birmingham Snow Hill. If this study is developed to GRIP 3 – option development – this will consider passenger flows within the station area.

6.5.3.6

Gap RC8 - Limited access to the rail network from Kenilworth

The demand for a rail service at Kenilworth was identified as a gap by stakeholders during the baseline stage of the RUS. It is recognised that this is being considered through the work being undertaken by a third party to develop a new station at Kenilworth. The RUS notes the further development of this scheme will help to determine options and potential timescales for its development.

In light of the gaps and options outlined in this RUS, it is essential that future freight growth and the recommendation that the second hourly CrossCountry service be diverted by this route, is taken into account in any timetable analysis which is undertaken during further development of the Kenilworth station scheme. As noted elsewhere, freight traffic over this route is predicted to grow, and this RUS recommends that the Reading to Newcastle CrossCountry services be diverted via Coventry. At the time of publication, early indications from the analysis of the capacity needed to support these changes suggest that part of the single line between Milverton Jn and Kenilworth will need to be redoubled, Thirty party funders and their developers will need to incorporate at least passive provision for this redoubling when designing the new station.

6. Gaps and options

6.5.3.7

Gap RC7 - Limited rail provision between Coventry and Nuneaton to meet demand for rail services to Ricoh Arena and Bermuda Park

The need to improve the rail provision on the Leamington Spa to Nuneaton line in order to serve both current demand and future demand relating to business, housing and leisure developments was identified as a gap during the baseline analysis stage of the RUS. It is recognised that the work being undertaken as part of the proposed scheme to upgrade this line, with potential new stations at Ricoh Arena and Bermuda Park addresses this gap. This scheme, which is currently in development, is described in more detail in **Chapter 4**. A business case has been submitted to the DfT for a funding decision.

6.5.3.8

Gap JT7 – Inadequate journey time between Wolverhampton and Shrewsbury

The journey time between mid-Wales and Birmingham was identified as a gap in the baseline stage of the RUS. The route between Wolverhampton and Shrewsbury is a mixed-use railway, with local services, inter-regional services and freight traffic sharing capacity on the route. Passenger services are currently operated by Arriva Trains Wales and London Midland. DB Schenker operates freight services to and from Ironbridge Power Station. Stakeholders requested that consideration be given to improving the linespeed on the route from the current prevailing speed of 70mph as this would help to reduce journey times, increase capacity and provide additional timetable flexibility and performance resilience at Wolverhampton and Shrewsbury.

An enhancement scheme to deliver journey time reductions by raising the linespeed on the route between Wolverhampton and Shrewsbury is currently in development. This scheme is jointly funded by the Network Rail Development Fund (NRDF) and a third party. This scheme offers opportunities for both passenger and freight operators who run services on the Wolverhampton to Shrewsbury line. Performance analysis carried out as part of the scheme has indicated that if linespeeds are increased to 90mph for a significant proportion of the route, reductions in sectional running times are achievable for currently-operated rolling stock. The shorter journey times achieved on delivery of the project would be reflected in the timetable.

An opportunity for potential additional benefit arises from Arriva Trains Wales trains arriving earlier at Wolverhampton, resulting in these services reaching their final destination of Birmingham International earlier.

The RUS recognises that the options to consider journey time savings between Shrewsbury and Birmingham New Street have been considered in detail as part of the work undertaken for the Wolverhampton to Shrewsbury linespeed improvement project. The RUS recognises that at the time of publication this scheme is on hold due to the withdrawal of regional funding to support it. The RUS recommends that this scheme be delivered in order to address the journey time gap on this route. It supports the investigations under way to identify whether an alternative source of third party funding is available to support the delivery of the scheme.

6.6 Generic gaps

A number of generic gaps, which are considered to have relevance to all parts of the RUS area, were identified by the Stakeholder Management Group as part of the gap identification process:

Table 6.9 – Generic gaps

Generic gap No	Generic gap description
GEN -1	Inadequate provision of evening services within the RUS area.
GEN -2	Inadequate seven-day timetable to meet demand levels for services within the scope of the West Midlands and Chilterns RUS area.
GEN -3	Limited rail connectivity to Birmingham Airport.
GEN -4	Limited car parking capacity within the West Midlands and Chilterns RUS area.

Due to the fact that these gaps have a strategic relevance to many routes within the RUS area and beyond its boundaries, the majority of these issues are being managed through a number of established schemes and workstreams.

The section below outlines the various workstreams or initiatives which have already been established to address these gaps, and will also propose any further work which may help.

6.6.1

GEN-1: Inadequate provision of early morning and late evening services within the RUS area

The SMG has identified that on some of the routes radiating from central Birmingham the current rail service provision in the early morning and evening is not adequate to meet passenger requirements. This issue was raised by a number of stakeholders during the baseline process, and further emphasised during the consultation process.

The RUS recognises that later evening services in the West Midlands should be considered on some corridors to meet current and future demand, especially with Birmingham as a key regional city attracting a large number of leisure travellers. The on-train crowding that is sometimes observed on the last evening trains departing central Birmingham is seen to confirm the demand for later evening services.

It is difficult to undertake detailed business case analysis for earlier or later services as there is currently insufficient robust data to demonstrate the current and potential level of rail demand for late evening services. The socio-economic benefits of running later evening services is likely to be marginal and therefore the business case, based on socio-economic benefits, is likely to be weak. The RUS recognises, however, that there are disparities between service provision in the earlier and later periods across the RUS area, which may be suppressing demand on certain routes.

During the consultation period, the RUS has considered the specific routes for which earlier and later services are a gap and has considered any operating constraints which would impede future service enhancements. The locations which have been identified as having poor early and later services are Sudbury Hill Harrow, Sudbury & Harrow Road on the Chiltern corridor, Stratford-upon-Avon and Hereford.

It is recognised that rail service provision is determined by a number of factors including track capacity, engineering access requirements, and passenger demand. The operation of later services to Hereford, for example, is constrained by the closing hours of the signal boxes between Henwick and Ledbury. In order to enable later services to run the signal box opening hours would need to be reviewed or consideration would be need to be given to the requirement to stable trains at Hereford station. It is also recognised that a revised mid-week engineering access policy would also be required to enable later service provision to Hereford.

On the Stratford-upon-Avon route, initial indications are that there are no major operational constraints to prevent carrier or later trains from operating to Stratford. If demand and operator resources supported the case to run later services there

may therefore be future potential to extend the late evening Whitlocks End services to and from Stratford-upon-Avon.

Consultation responses highlighted the limited morning and evening service provisions at smaller stations in the Greater London area, in particular at Sudbury Hill Harrow and Sudbury and Harrow Road. The RUS notes that potential service improvements may be achievable in the future, subject to a review of demand at these stations. Future timetable changes should therefore include consideration of the service provision at smaller stations in the Greater London area.

The RUS proposes that for any stations where there is evident demand for earlier or later services, train operators and other stakeholders work together to determine whether any operational constraints exist which may prevent service enhancements and what solutions may be available to address these. A localised study is likely to be required to understand the level of potential demand, the operational feasibility of service enhancements and the effect these enhancements may have on resources.

6.6.2

GEN-2: Inadequate seven-day timetable to meet demand levels for services within the scope of the West Midlands and Chilterns RUS area

The need to improve the seven-day timetable on key routes within the RUS area has been identified as a gap by stakeholders. The SMG has considered how weekend service limitations may be suppressing demand in many market sectors from passengers who wish to travel seven days a week or employees who are required to work at weekends. An associated issue is when passengers are forced to travel on rail replacement buses which usually take longer than trains and add to road congestion.

It is recognised that demand for weekend rail trips to key urban centres is increasing due to the growing availability of social and leisure activities, particularly on Sundays. The increasing demand for Sunday services is demonstrated by the fact that it is now the second busiest day of the week for some interurban and long distance services. During the baseline and consultation stages of the RUS, stakeholders expressed the opinion that some suburban and interurban services in the West Midlands are inadequate on Sundays and do not start early enough to meet demand. These included long distance services between Birmingham New Street and Oxford, Birmingham New Street and Sheffield, Banbury and Oxford, and Birmingham New Street and Manchester Piccadilly. Sunday service issues are also considered to be more acute on certain corridors in the RUS area, for example there are only two direct trains on Sundays from Hereford to Birmingham, and the first train starts in the afternoon.

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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 Office of Rail Regulation (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.

A national fund has been allocated as part of the CP4 Delivery Plan to assist in the development of a seven day railway, and a network availability plan is currently being developed to reduce disruption to customers (passenger and freight) and better meet their needs, whilst delivering efficient and effective maintenance, renewals and enhancements. The concept is being developed by Network Rail with industry stakeholders by examining appropriate route sections. The programme aims to keep passengers on trains rather than rail replacement buses during engineering works, and where an industry business case can be obtained, to allow passenger and freight operators to run additional train services at times that address suppressed customer demand.

The RUS recognises that if six days a week network access cannot be provided to freight operators this translates into a requirement for more freight paths on weekdays.

The core initiatives and infrastructure enhancements which the funding will be spent on are outlined in **Chapter 4**. There are currently no specific schemes being progressed within the RUS area, although there are already initiatives in place to deliver network availability benefits and it is anticipated that there will be benefits available from the ongoing national pilot initiatives which focus on new methods of working and new technology.

The RUS also notes the route categorisation initiative which has been established as part of the Network Availability Plan and focuses on the long distance inter-regional routes being considered as part of this gap. A small number of key routes, which in aggregate carry 60 per cent of all weekend passengers, have been identified for special attention as part of a passenger route categorisation process. The routes covered by the route categorisation principles include the long distance inter-regional routes between Birmingham New Street and Manchester Piccadilly via Stoke-on-Trent and between Birmingham New Street and Southampton Central via Coventry, Oxford and Reading. The passenger route categorisation principles to be applied to these routes to provide the best service to the passenger or freight end customer are:

- passengers will not be transferred onto buses
- diversions away from a train's normal route will not increase passengers' planned journeys times by more than 30 per cent.

Any commitments associated with these principles will take effect from the start of the December 2011 timetable, except when the demands of rail improvement work make achieving this aim impracticable.

In addition to considering the strategic workstreams in place to address seven day railway opportunities, the RUS has considered whether any specific operating constraints might exist on individual routes in the RUS area where greater network availability is sought. In relation to the Sunday timetable from Hereford to Birmingham there is no major operational reason which would preclude operators or service specifiers from considering starting the service earlier. Ledbury signal box currently opens at 12:30 which would potentially enable a service from Hereford to Birmingham as early as 12:50 rather than the current 15:30.

6.6.3

GEN-3: Limited connectivity to Birmingham Airport

During the gap identification process, stakeholders raised connectivity to Birmingham Airport as a generic gap across the RUS area. This gap recognises that there is a need to improve surface access to the airport by rail for those employed at the airport and for air passengers. Birmingham Airport is a main driver of employment and economic activity within the West Midlands and forecasts indicate that it will have an increasingly important role in supporting prosperity and providing international links.

Birmingham Airport is forecast to handle 27 million passengers per year in 2030 (Source: Airport Master Plan published by Birmingham Airport in 2007). Surface access is crucial for supporting this growth and improving public transport links is a high priority in the context of a sustainable approach. The need to support the sustainable growth of the aviation industry was highlighted in the recent Government scoping document 'Developing a Sustainable framework for UK Aviation'. This document set out the key principles and challenges of a new greener aviation policy and invited comments, which will help to shape the draft aviation policy framework which is due to be published in March 2012.

The importance of rail connectivity to Birmingham Airport has been highlighted in the Airport Master Plan and Airport Surface Access Strategy, published in 2007, and is supported in the Regional Planning Assessment for the West Midlands. The Airport Surface Access Strategy sets out a Passenger Public Transport Modal Share target for the airport of 25 per cent by 2012, with 12 per cent by rail. Similarly,

it sets out an Employee Public Transport Modal Share target of 25 per cent by 2012, with six per cent by rail.

Birmingham Airport is operational 24 hours a day, with air services operating throughout the night and early in the morning, when rail services are either limited or not available. Analysis of airport passenger and employee surveys indicates a strong demand for rail services.

Airport passenger surveys in 2008 show that routes with direct rail services to Birmingham International station have more than 20 per cent of their passengers travelling to the airport by rail, highlighting that good connectivity helps to increase rail demand. Airport employee surveys in 2008 show that a large proportion of staff work in shifts and many start their work shifts very early in the morning, when either rail services are not available or limited. This limits the number of workers being able to commute to work by rail. On Saturdays and Sundays the network and frequency of rail services is reduced, compared with weekdays, and compounded by weekend rail maintenance.

It is also recognised that events scheduled at the National Exhibition Centre (NEC), next to Birmingham International station, also create significant demand for rail. Currently, rail service provision is not considered to be sufficient due to the disparity in timing between the last train services to locations across the RUS area and the ending of events at the NEC and limitations in the range of services available on Saturdays and Sundays.

Consequently options have been developed to address this gap on some of the radial routes into Birmingham. The proposed Option 7 of diverting the existing Reading – Newcastle service via Coventry and Birmingham International stations provides direct rail services between the North East, Yorkshire and West Midlands and helps to address this connectivity gap. As part of the analysis undertaken for Option 2 (extension of Birmingham to Walsall EMU services to a new station at Aldridge), consideration has been given to the potential to link the new service with the local service from Birmingham New Street to Wolverhampton which would enable the proposed half-hourly Birmingham New Street to Aldridge service to be linked to the Coventry corridor. This analysis recognises there is a need to improve access within the RUS area to Birmingham Airport and the RUS supports more analysis of this connectivity option during any further development of the Aldridge new station scheme. This will help to determine the viability and benefits of extending the service to the Coventry corridor to provide through service connectivity.

It is recognised that passenger benefits will also be delivered by the Birmingham Gateway project, which plans to improve connectivity to Birmingham International station through provision

of an enhanced Customer Information System at Birmingham New Street. The associated system will have the capability to display the next fastest available train to designated locations, including Birmingham Airport and the National Exhibition Centre. This will assist passengers in connecting to Birmingham International station services more efficiently.

6.6.4

GEN-4: Limited car parking capacity within the West Midlands and Chilterns RUS area

The lack of car parking capacity has been identified as an issue at a number of stations within the RUS area, and has been classified as a generic gap which needs to be addressed in order to prevent limited station car parking facilities being a factor suppressing future passenger demand.

Chapter 4 has outlined where a number of schemes are in development or have recently been completed to provide additional car parking capacity, sponsored by the train operating companies, third parties, and Network Rail. These include at Solihull, Warwick Parkway, Birmingham International, Tamworth, Wolverhampton and Leamington Spa. These enhancements have been achieved through various means such as remodelling of the car park layout, creation of a multi-storey or decked car park, or through additional capacity acquired by purchase of land or available space for adjoining or overflow car parks. Network Rail, will continue to work with station operators to review and assess opportunities for increasing car park capacity at all stations across the RUS area.

There are also a number of stakeholder aspirations, some of which are currently unfunded, for increased car parking capacity at stations across the RUS area. These include local authority plans at Worcester Shrub Hill, Lichfield Trent Valley, and Hatton.

In addition to specific plans to increase car parking capacity at Dudley Port station and a 350 space car park at the new Bromsgrove station, Centro is developing a network station access strategy based on an analysis of the demand and capacity available on each route. This strategy will include a plan for improving park and ride and other access measures on a route-by-route basis, and will highlight particular stations at which future park and ride expansion should be focused.

It is recommended that Network Rail continues to work with station operators, local authorities and Centro to review and assess opportunities for further increases to car park capacity across the RUS area. Joint initiatives with local authorities are encouraged as a way to secure incremental car park expansions and deliver better access to stations.

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6.7 West Midlands and Chilterns options analysis

6.7.1 Option definition

For each of the consolidated gaps which required detailed analysis consideration has been given to a standard toolkit of option solutions. The option toolkit includes a range of interventions, from the operation of longer trains within current infrastructure, re-timetabling to improve capacity, to platform extensions and the construction of additional infrastructure. Using the toolkit, interventions are defined and developed into proposed options to identify the next steps in the analysis. These interventions were reviewed and agreed by the SMG prior to commencement of the detailed assessment.

6.7.2 Assessment of options

Each of the options has been assessed for operational and/or economic impact where applicable. Where a specific gap has been identified, timetable and performance analysis has been used to determine whether or not an option is practicable, ie. the proposed service can actually be timetabled reliably on the network. Where an option is considered to be practicable an economic appraisal has been carried out which compares the revenue implications and the socio-economic benefits of changes due to the infrastructure and/or revised service specifications (frequency, journey time, stopping pattern) against operating cost changes and any capital costs necessary to enhance infrastructure to permit such service alterations.

The option of train lengthening is one of the interventions considered where a gap is based on a mismatch between supply and demand. As part of the options work carried out in this RUS, passenger loadings on each corridor have been assessed in the high-peak hour (between 08:00 and 08:59) and in the three-hour peak (between 07:00 and 09:59) to understand the demand which is anticipated up to 2020. This demand has been measured against the

supply in terms of train service provision, including any additional capacity which is committed as part of the CP4 Delivery Plan or other committed service enhancement. Where there is shown to be a mismatch between supply and demand an economic appraisal to assess the value for money of train lengthening has been considered.

Train lengthening and other options developed to address gaps to 2020 have been subject to an appraisal which is compliant with the DfT Transport Analysis Guidance. Where appropriate, benefit cost ratios are reported, which indicate the value for money of any particular scheme. The DfT funding criteria permits recommendation of funding through the RUS process if the benefit cost ratio is at least 1.5, which is indicative of medium value for money. However, schemes involving infrastructure investment are required to offer high value for money indicated by a benefit cost ratio of at least two. The business case results presented are based on high level feasibility work unless otherwise stated, and represent the most likely value for money based on a range of key sensitivities.

All option analysis work undertaken starts from a base which includes the HLOS-funded enhancements and any other committed enhancement schemes as outlined in **Chapter 4**. The base for each option also includes the requirements for freight services to 2019 and 2030 as agreed by freight operators through the Strategic Freight Network growth forecasts.

6.8 Option appraisal

The option appraisals that have been carried out for each corridor are presented below, detailing the scope, the process undertaken and the recommendations of the analysis. For consistency of approach the options analysis is presented on a corridor-by-corridor basis, in alphabetical order, with the specific options relating to Birmingham New Street station area being presented in **section 6.10**.

6.8.1 Aylesbury corridor

Table 6.10 – Aylesbury corridor

Gap reference	Consolidated gap	Gap type	Option reference	Option
JT-1	Inadequate journey time on the Aylesbury corridor.	Journey time	-	Addressed by other worksteam (see section 6.5.3.1)
OC-3	Inadequate capacity and poor service mix on the Aylesbury corridor.	On train capacity	-	Addressed by other worksteam (see section 6.5.3.1)
RC-1	Poor rail connectivity between the north and south of Buckinghamshire, particularly from Aylesbury.	Connectivity	-	Addressed by other worksteam (see section 6.5.3.2)

6.8.2 Cannock and Walsall

Table 6.11 – Cannock and Walsall

Gap reference	Consolidated gap	Gap type	Option reference	Option
OC-5	Inadequate peak capacity on the Cannock and Walsall line.	On train capacity	Option 1	Train lengthening on all peak service groups.
RC-2	Limited access to the rail network from the Aldridge/Brownhills area to cater for housing growth and regeneration.	Rail connectivity	Option 2	Extension of Birmingham to Walsall electric services to a new station at Aldridge.
RC-3	Lack of direct rail connectivity between Walsall and the north.	Rail connectivity	Option 3	Extend the existing Birmingham New Street to Rugeley Trent Valley local service to Stafford.
RC-4	Limited connectivity: Walsall - Wolverhampton.	Rail connectivity	Option 4	Timetable study to consider direct services between Wolverhampton and Walsall.
SF-1	Inadequate station facilities at Cannock Line stations (all six stations Bloxwich-Rugeley Town) limiting rail accessibility.	Station facilities	-	Addressed by committed scheme (see section 6.5.1.3).

Option 1- Train lengthening on all peak services on the Cannock and Walsall line

The RUS has assessed passenger demand on the Cannock and Walsall line based on passenger counts conducted in autumn 2009, and a further review of the latest count data available (Autumn 2010). When analysing demand and capacity requirements up to 2020, London Midland's proposed operational plan for CP4 has been included in the base. This plan has been revised since the publication of the Draft for Consultation and the latest version of the plan has been used.

The Draft for Consultation assessed the option for lengthening train services on the Cannock and Walsall line using autumn 2009 count data in the base and the RUS demand forecasts to 2020. Analysis has identified that some passengers may still be standing during the busiest peak hour on approach to Birmingham in 2020, although this is within the DfT's standing time allowance guidance. The business case included in its base the capacity enhancements which were proposed in the operational plan available at the time of publication (this proposed that the number of seats between Cannock/Walsall and Birmingham New Street be increased by around 500 seats in the three-hour morning peak). The Draft for Consultation analysis suggested that the proposed CP4 additional vehicles will provide sufficient supply to meet both current and forecast demand to 2020 on this corridor and it gives poor value for money to lengthen peak local services beyond the delivery plan.

Since the publication of the Draft for Consultation the operational plan has been reviewed and the proposed CP4 capacity in the latest plan is similar

to that assumed in the Draft for Consultation. The proposed operational plan continues to include train lengthening on Rugeley Trent Valley to Birmingham New Street diesel services in the morning and evening peaks and an increase in capacity on services from Walsall to Birmingham New Street. All services starting from Walsall are to become electric services and this increases seating capacity compared to diesel services. This proposal is still in development and subject to affordability.

During the consultation period, several responses suggested that demand on the corridor was increasing at a faster rate than the forecasts presented in the Draft for Consultation. A request was made that the demand analysis and train lengthening business case be reviewed in the light of the available autumn 2010 passenger counts and the latest version of the operational plan. The analysis of the latest passenger counts supported the view of increased demand, showing that there had been an all day increase in demand of around 20 per cent on the line from Rugeley Trent Valley to Walsall and Birmingham New Street. The revised analysis showed that passengers are predicted to be standing for more than 20 minutes on three morning peak services and two evening peak services in 2020.

The SMG has taken into account the implications of the recent growth on the Cannock and Walsall corridor. Consideration was given to the potential drivers of this growth which could include increases in road congestion and petrol prices, road works in the local area, and timetable changes on the route. The new and improved station facilities delivered on the Cannock line as part of the National Station Improvement Project (NSIP) may also encourage

6. Gaps and options

more passengers to use stations. It was agreed that future demand growth on this corridor is uncertain and it will be difficult to firmly predict the growth rate for the next 10 years. The RUS has therefore continued to use the growth forecast of 2.3 per cent per annum but using autumn 2010 passenger demand in the base. This therefore gives a higher level of demand in 2020 compared to the Draft for Consultation. The SMG has agreed

that the recent high growth is likely to continue in the short term however it is not clear how far this high growth will continue in the future. Therefore the RUS recommends that demand assessment be undertaken in the medium term to confirm whether intervention over and above the RUS recommendation is required. The results of the revised train lengthening business case is presented in option 1.

Assessment of Option 1	Train lengthening on peak service groups (central growth scenario)																											
Gaps addressed	Consolidated gap OC-5: Inadequate peak capacity on the Cannock and Walsall line.																											
Concept	Lengthen three morning and three evening peak trains by 2020 on the Walsall to Birmingham New Street service by one additional vehicle.																											
Operational analysis	No additional services required. It is assumed that each strengthened vehicle would make only two round trips per day as it could be taken out of operation in the off-peak. The extra vehicles would serve busy morning and evening peak services.																											
Infrastructure required	No additional infrastructure is required to support this option. The existing platforms north of Walsall can accommodate trains up to 4-car length with selective door operation (SDO). The RUS option for 4-car operation in the morning peak for Rugeley services is based on the assumption of SDO.																											
Passenger impact	This option assesses the business case for additional vehicles beyond the CP4 operational plan. Additional vehicles and capacity would help to reduce the number of passengers standing for more than 20 minutes.																											
Freight impact	Current and future freight demand can be accommodated.																											
Financial and economic analysis	<p>The main costs relate to rolling stock.</p> <p>The following table outlines the appraisal results:</p> <table border="1"> <thead> <tr> <th rowspan="2">30-year appraisal</th> <th>£million (2002 PV)</th> </tr> <tr> <th>Option</th> </tr> </thead> <tbody> <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>4.8</td> </tr> <tr> <td>Revenue</td> <td>-2.9</td> </tr> <tr> <td>Other Government impacts</td> <td>0.6</td> </tr> <tr> <td>Total costs</td> <td>2.5</td> </tr> <tr> <td colspan="2">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td>5.9</td> </tr> <tr> <td>Non-users benefits</td> <td>1.6</td> </tr> <tr> <td>Total quantified benefits</td> <td>7.5</td> </tr> <tr> <td>NPV</td> <td>5.0</td> </tr> <tr> <td>Quantified benefit cost ratio</td> <td>3.0</td> </tr> </tbody> </table>	30-year appraisal	£million (2002 PV)	Option	Costs (present value)		Investment cost	0.0	Operating cost	4.8	Revenue	-2.9	Other Government impacts	0.6	Total costs	2.5	Benefits (present value)		Rail users benefits	5.9	Non-users benefits	1.6	Total quantified benefits	7.5	NPV	5.0	Quantified benefit cost ratio	3.0
30-year appraisal	£million (2002 PV)																											
	Option																											
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Non-users benefits	1.6																											
Total quantified benefits	7.5																											
NPV	5.0																											
Quantified benefit cost ratio	3.0																											
Link to other options	None																											
Conclusion	The analysis shows that the business case is very sensitive to the level of demand in the baseline and growth forecast. The case for lengthening based on the revised growth scenario offers high value for money. The RUS recommends that demand on this route is kept under review as the actual demand that materialises will determine the exact number of additional vehicles required. In the longer term, as demand materialises it is likely that the case to support platform lengthening as part of the business case will also be strengthened.																											

Option 2- Timetable study to assess extension of rail services to a new station at Aldridge

The RUS has considered the need to provide improved rail access to the areas of Aldridge and Brownhills, located to the north of Walsall, based on housing growth projections, local demands and the need to reduce road congestion. Centro is currently developing the business case for building a new station at Aldridge, on the Sutton Park line. Provision of direct rail services from this area to Birmingham city centre is predicted to help to cater for this housing growth and support the regeneration of the area. The plans include a new station building and car park spaces.

A timetable study was undertaken for the RUS to assess the extension of rail services to the potential new station and understand what service provision and infrastructure would be required to support the proposed services. Consideration was given to the option of using diesel multiple units (DMU) and the option to use electric multiple units (EMU), which would require extension of overhead electrification from Walsall to Aldridge. The RUS analysis has indicated that the DMU option is not feasible due to the need to recast all services to DMU operation. The RUS therefore concludes that Aldridge new station would be best served by an extension of the Birmingham New Street to Walsall electric services to provide a half-hourly service.

Due to the fact that the current EMU service between Birmingham New Street and Walsall has 17 minutes turnaround time at Walsall, a timetable recast would be required to maintain a clockface timetable and offer a half-hourly service pattern at Aldridge:

Timetable option A – run the current EMU service between Birmingham New Street and Walsall and return 10 minutes later than current to allow for the extension to Aldridge. This would, however, require a retiming of services from Rugeley Trent Valley to Birmingham New Street which conflicts at Soho South Jn and with existing scheduled Rugeley services. This option was therefore dismissed.

Timetable option B – run the current EMU service between Birmingham New Street and Walsall 10 minutes earlier and return in the current time slot. This would also require Rugeley Trent Valley services to be retimed from Birmingham New Street. This option is viable if two minute headways are

provided between Soho South Jn and Birmingham New Street to prevent service conflict. Services would be required to layover at Birmingham New Street for 20 minutes. The service would not allow provision of direct services through to Wolverhampton.

The above options require additional vehicles and train crew. The options would incur additional mileage-related operating costs.

If the turnaround time at Walsall is sufficient to allow the services to operate to Aldridge, then no additional vehicles or train crew would be required. This scenario is presented in assessment of Option 2.

In order to improve operational resilience it would be advisable to reinstate Platform 4 at Walsall, and enhance the signalling headways and linespeed on the Cannock line.

During the consultation period Centro have further developed a high level business case, with support from Network Rail. The above infrastructure requirement, its capital expenditure and operating cost and timetable study have been fed into the business case. Centro has undertaken high level demand forecast analysis and predicted Aldridge station to have an annual footfall of 100,000 in the first year of its opening increasing to 124,000 per annum by 2026. This forecast is in line with the other studies such as the trip rate modelling analysis which predicts demand of 150,000 per year. The appraisal results are outlined in option 2.

As part of the timetable study to consider how a new station at Aldridge might be served, the opportunity was taken to consider how services on this corridor might be linked with other corridors to provide cross-Birmingham opportunities. The high level analysis suggested that if the Cannock line was electrified, electric services from Rugeley into Birmingham New Street could be linked with the local service from Birmingham New Street to Wolverhampton which would enable the proposed half-hourly Birmingham New Street to Aldridge service to be linked to the Coventry corridor. This analysis recognises there is a need to improve access within the RUS area to Birmingham Airport. The RUS supports more analysis of this connectivity option during any further development of the Aldridge new station scheme. This will help to determine the viability and benefits of extending the service to the Coventry corridor to provide through service connectivity.

6. Gaps and options

Assessment of Option 2	Extension of Birmingham to Walsall EMU services to a new station at Aldridge																										
Gaps addressed	Consolidated gap RC-2: Limited access to the rail network from the Aldridge/Brownhills area to cater for housing growth and regeneration.																										
Concept	A high level business case has been produced to assess demand for rail at Aldridge and the option to serve this demand by extending electrification from Walsall to Aldridge to enable the current electric Birmingham New Street to Walsall service to extend to Aldridge.																										
Operational analysis	The current electric service from Birmingham New Street to Walsall would be extended to Aldridge station, which is approximately seven minutes in journey time from Walsall. A half-hourly service frequency is assumed. No additional rolling stock or train crew resources would be required as this could be utilised from current resources on the Walsall to Birmingham route.																										
Infrastructure required	This business case includes Walsall and Cannock resignalling in its baseline and assumes the signalling enhancements have been delivered. Signalling alterations would be required between Soho South Jn and Birmingham New Street to allow two minute headways to Birmingham New Street and prevent service conflicts. Electrification to Aldridge. A new station to be provided at Aldridge including one platform which enables services to terminate clear of the running line.																										
Passenger impact	Demand for rail in the Aldridge and Brownhills area would be served by the extension of services to a new station and passengers would be provided with connectivity to Birmingham city centre. The business case is based on an estimated 100,000 passenger journeys per year in 2016 increasing to approximately 124,000 by 2026. Demand growth is assumed to be zero after 2026, consistent with DfT guidance. This is consistent with other studies such as the trip rate modelling work, although this is considered to be conservative based on local demand assumptions.																										
Freight impact	Current and future freight demand can be accommodated.																										
Financial and economic analysis	<p>The following table outlines the appraisal results:</p> <table border="1"> <thead> <tr> <th>60-year appraisal (2002 market prices and values)</th> <th>£million (2002 PV)</th> </tr> </thead> <tbody> <tr> <td colspan="2">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td>11.4</td> </tr> <tr> <td>Operating cost</td> <td>9.4</td> </tr> <tr> <td>Revenue</td> <td>-0.9</td> </tr> <tr> <td>Other Government impacts</td> <td>0.6</td> </tr> <tr> <td>Total costs</td> <td>20.4</td> </tr> <tr> <td colspan="2">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td>35.7</td> </tr> <tr> <td>Non-users benefits</td> <td>5.7</td> </tr> <tr> <td>Total quantified benefits</td> <td>41.4</td> </tr> <tr> <td>NPV</td> <td>21.0</td> </tr> <tr> <td>Quantified benefit cost ratio</td> <td>2.0</td> </tr> </tbody> </table>	60-year appraisal (2002 market prices and values)	£million (2002 PV)	Costs (present value)		Investment cost	11.4	Operating cost	9.4	Revenue	-0.9	Other Government impacts	0.6	Total costs	20.4	Benefits (present value)		Rail users benefits	35.7	Non-users benefits	5.7	Total quantified benefits	41.4	NPV	21.0	Quantified benefit cost ratio	2.0
60-year appraisal (2002 market prices and values)	£million (2002 PV)																										
Costs (present value)																											
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Other Government impacts	0.6																										
Total costs	20.4																										
Benefits (present value)																											
Rail users benefits	35.7																										
Non-users benefits	5.7																										
Total quantified benefits	41.4																										
NPV	21.0																										
Quantified benefit cost ratio	2.0																										
Link to other options	None																										
Conclusion	The RUS option work concludes that a new station at Aldridge would be best served by an extension of the Birmingham New Street to Walsall electric services. The RUS recognises the business case work undertaken by Centro which produces a high value for money business case and requires electrification on the route between Walsall and Aldridge. The RUS supports further work by Centro to further develop the business case for Aldridge station.																										

Option 3 - Extend the existing Rugeley local service to Stafford

A new gap was raised during consultation to consider connectivity from Walsall to the north. This is based on the fact that Walsall is a major population centre which has poor service connectivity to locations north of the town.

Chapter 3 provides examples of journey times and interchanges required to travel to key destinations north of the town. Due to the lengthy journey time and requirement to interchange south of the town

to travel northwards, the rail service provision is considered to be insufficient to meet passenger needs and therefore likely to deter passengers from using rail transport. In the longer term this may also be constraining the economic regeneration of the town. The RUS has therefore undertaken a high level timetable assessment and economic appraisal to consider the case for extending the existing Walsall to Rugeley Trent Valley service to Stafford, using both 75mph and 100mph rolling stock. The results of this work are presented in section below.

Assessment of option 3	Extension of Rugeley Trent Valley services to Stafford																																									
Gaps addressed	Consolidated gap RC-3: Lack of direct rail connectivity between Walsall and the north																																									
Concept	Extending the existing Walsall to Rugeley Trent Valley service to Stafford.																																									
Operational analysis	Consideration has been given to operating the service using <ul style="list-style-type: none"> a) 75mph rolling stock b) 100 mph rolling stock The analysis assumes one extra unit is required and two additional drivers and train managers.																																									
Infrastructure required	No additional infrastructure is required to support this option.																																									
Passenger impact	Provides Walsall passengers with improved connectivity to the north.																																									
Freight impact	Current and future freight demand can be accommodated.																																									
Financial and economic analysis	<p>The option is based on operating costs and no capital expenditure is assumed. The operating costs include mileage related costs, vehicle leasing costs and crew resource expenses. The following table outlines the appraisal results:</p> <table border="1"> <thead> <tr> <th rowspan="2">30-year appraisal</th> <th colspan="2">£million (2002 PV)</th> </tr> <tr> <th>Based on 75 mph unit</th> <th>Based on 100 mph unit</th> </tr> </thead> <tbody> <tr> <td colspan="3">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>Operating cost</td> <td>12.8</td> <td>12.8</td> </tr> <tr> <td>Revenue</td> <td>-1.7</td> <td>-1.8</td> </tr> <tr> <td>Other Government impacts</td> <td>0.4</td> <td>0.4</td> </tr> <tr> <td>Total costs</td> <td>11.5</td> <td>11.4</td> </tr> <tr> <td colspan="3">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td>5.7</td> <td>6.0</td> </tr> <tr> <td>Non-users benefits</td> <td>1.1</td> <td>1.2</td> </tr> <tr> <td>Total quantified benefits</td> <td>6.8</td> <td>7.2</td> </tr> <tr> <td>NPV</td> <td>-4.7</td> <td>-4.1</td> </tr> <tr> <td>Quantified benefit cost ratio</td> <td>0.6</td> <td>0.6</td> </tr> </tbody> </table>	30-year appraisal	£million (2002 PV)		Based on 75 mph unit	Based on 100 mph unit	Costs (present value)			Investment cost	0.0	0.0	Operating cost	12.8	12.8	Revenue	-1.7	-1.8	Other Government impacts	0.4	0.4	Total costs	11.5	11.4	Benefits (present value)			Rail users benefits	5.7	6.0	Non-users benefits	1.1	1.2	Total quantified benefits	6.8	7.2	NPV	-4.7	-4.1	Quantified benefit cost ratio	0.6	0.6
30-year appraisal	£million (2002 PV)																																									
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Rail users benefits	5.7	6.0																																								
Non-users benefits	1.1	1.2																																								
Total quantified benefits	6.8	7.2																																								
NPV	-4.7	-4.1																																								
Quantified benefit cost ratio	0.6	0.6																																								
Link to other options	None																																									
Conclusion	The RUS high level analysis work shows that the option offers poor value for money. This option is not recommended.																																									

6. Gaps and options

A sensitivity test was performed on option 3 based on mileage related costs but no additional train crew and rolling stock costs. Based on this, the option offers medium value for money, however, the business case has not taken into account of the performance risks that are likely to be incurred. The high level timetable assessment highlighted issues relating to connection times at Rugeley Trent Valley and turn around times at Stafford. The lack of adequate turn around time at Stafford would be a high performance risk as it constrains operational flexibility. There are further issues relating to the requirement to cross the layout of the West Coast Main Line, with potential conflicts identified with the current Virgin Trains West Coast Main Line services. The RUS therefore concludes that any connectivity benefit is likely to be offset by the performance risks and is unlikely to offer value for money once these disbenefits are included. It is recognised, however, that there may be opportunities available for a timetable recast on the West Coast Main Line which would enable the option of extending services to be reconsidered at a future time. The next planned recast of the timetable is in 2013 after the next West Coast Main Line franchise is let.

It is recognised that the electrification of the route between Walsall and Rugeley would offer opportunities to improve Walsall's connectivity to the wider rail network. This route was identified in the Electrification RUS as one which should be further examined in the future as costs and demand emerges. At the current time, the analysis work carried out in the Electrification RUS suggests that it is unlikely that there is a value for money business case. Centro have an aspiration to progress this scheme based on the associated benefits that they have identified. These benefits include enabling electric services such as the Birmingham to Liverpool service to run via Walsall, helping to improve its connectivity to the national rail network and providing new commercial opportunities. The electrification scheme would also help to relieve capacity on the Birmingham New Street to Wolverhampton route and create an effective diversionary route for this corridor. The scheme would also deliver potential freight benefits.

Option 4 – Timetable study to consider direct services between Walsall and Wolverhampton

Direct rail services on the Walsall to Wolverhampton line (via Portobello Jn) which linked the two urban areas were withdrawn in December 2008. Journeys between the two locations now have to be made on a longer route via Birmingham New Street which has a journey time of around an hour. This is considered to be an inadequate journey time by rail which deters passengers and as a result stakeholders identified the lack of sufficient direct services between Walsall and Wolverhampton as a gap during the baseline stage of the RUS.

A timetable study has been undertaken to consider a half-hourly interval direct service between Walsall and Wolverhampton. The running time on the line via Portobello Jn with no intermediate stops is 13 minutes, and a six-minute turnaround time would be required at Wolverhampton. The operational analysis considered that two units would be required to run a self-contained half-hourly shuttle service. Due to the intensity of departures from Platforms 2, 3 and 4 at Wolverhampton towards Birmingham New Street, the analysis indicated that it is not possible to inter-work the Walsall – Wolverhampton (direct) service with the Walsall – Wolverhampton service that operates via Birmingham New Street. A radically different track layout would be required at Wolverhampton to enable the direct service to link to the Walsall-Wolverhampton service via Birmingham New Street, with an additional platform with independent access to/from the Portobello line for maximum flexibility. Due to the high capital expenditure that would be required to deliver this new layout, a business case appraisal was not carried out as it was considered that the expenditure was unlikely to be justified by the level of benefit that would be produced. This option is therefore not recommended.

A high level consideration of an hourly service has been carried out which shows that there is a potential to accommodate this service on the existing infrastructure. The RUS recognises that the half-hourly option is preferable to the hourly option and supports the strategic aspiration of Centro to continue work to develop this scheme. It is recognised that there are aspirations to open stations on the Walsall to Wolverhampton line, including at Willenhall, Darlaston and Portobello which may be considered as part of future scheme development.

6.8.3 Coventry corridor – option analysis

Table 6.12 – Coventry				
Gap reference	Consolidated gap	Gap type	Option reference	Option
OC-6	Inadequate peak capacity on the Coventry corridor.	On train capacity	-	Partly addressed in other RUSs (see section 6.5.2.1).
			Option 5	Train lengthening on all peak local services between Northampton/Coventry and Birmingham New Street.
			Option 6a	Timetable study to consider standard interval timetable for local stations.
			Option 6b	Timetable study to consider standard interval timetable for local stations (variance on option 6a).
			Option 6c	Timetable study to consider standard interval timetable for local stations and rerouting of Reading to Newcastle service (in each direction) in each hour from the Solihull route.
RC-5	Lack of direct services Birmingham International/Coventry – Derbyshire, Yorkshire and North East.	Connectivity	Option 7	Rerouting of the Reading to Newcastle service (in each direction) in each hour from the Solihull route.

The Coventry corridor is one of the busiest radial routes into Birmingham with a mix of long distance, interurban and suburban services. The loading analysis in **Chapter 5** shows that by 2020, even with committed schemes, the high-peak seated load factor on the local commuting services will be in excess of 100 per cent. It is predicted that one train in the high-peak hour would be operating in excess of capacity with standing likely to start from as far as Berkswell, which is more than 20 minutes from Birmingham New Street. On the long distance interurban services, standing will also be experienced as these services are used by both local commuters

and long distance travellers. The options of lengthening these services to meet forecast demand have been examined.

It should be noted that during the time the RUS option analysis was undertaken it was based on the assumption that additional vehicles would be provided on one morning high-peak service between Northampton and Birmingham New Street as part of London Midlands operation plan. The plan is still in development and subject to affordability. The findings presented in the assessment of Option 5 assume this plan in the base.

6. Gaps and options

Option 5 - Train lengthening on peak local services between Northampton/Coventry and Birmingham New Street

Assessment of Option 5	Train lengthening peak local Coventry/Northampton to Birmingham service	
Gaps addressed	Consolidated gap OC-6: Inadequate peak capacity on the Coventry corridor.	
Concept	Lengthen one morning peak and one evening peak Coventry to Birmingham New Street service by one EMU (of 4-car) each.	
Operational analysis	No additional services required. Additional vehicles beyond the assumed capacity plan are required.	
Infrastructure required	No additional infrastructure is required to support this option	
Passenger impact	Increased capacity would help to reduce crowding by 2020.	
Freight impact	Current and future freight demand can be accommodated	
Financial and economic analysis	The main costs relate to rolling stock The following table outlines the appraisal results.	
	30-year appraisal £million (2002 PV)	
	Costs (present value)	
	Investment cost	0.0
	Operating cost	8.7
	Revenue	-3.0
	Other Government impacts	0.5
	Total costs	6.2
	Benefits (present value)	
	Rail users benefits	5.1
	Non-users benefits	1.5
	Total quantified benefits	6.5
	NPV	0.35
Quantified benefit cost ratio	1.1	
Link to other options	None	
Conclusion	It is not value for money to lengthen peak local services on this corridor beyond the CP4 Operational Plan by 2020. This option is therefore not recommended. The RUS supports the requirement for additional vehicles as proposed in the CP4 Operational Plan. These vehicles should be utilised to maximise the level of capacity provided in the morning and evening peak. Further demand assessment should be undertaken to ensure that the future additional vehicles are used on the busiest train to alleviate crowding and generate maximum benefits.	

Option 6a – Timetable study to consider standard interval timetable for local stations on the Coventry corridor

Assessment of Option 6a	Timetable study to consider standard interval timetable for local stations on the Coventry corridor
Gaps addressed	Part of Consolidated gap OC-6: Inadequate peak capacity on the Coventry corridor.
Concept	The option provides all local stations on the Coventry corridor with two trains per hour.
Operational analysis	Recast London Midland local services to provide two trains per hour between Birmingham New Street and Coventry in each direction, and two trains per hour between Birmingham New Street and Northampton calling at Birmingham International, Coventry, Rugby and Long Buckby. All other passenger services would remain as current. The sub option of overtaking local services at Birmingham International was considered.
Infrastructure required	Extensive four tracking would be required between Marston Green and Berkswell to resolve conflicts, with or without the sub option of overtaking at Birmingham International.
Passenger impact	Passengers would benefit from having a more evenly spaced timetable for local services on the Coventry corridor. However, this could only be done at the expense of fewer services than current at some local stations (e.g. Marston Green which has three trains per hour currently)
Freight impact	Current and future freight demand can be accommodated.
Financial and economic analysis	No business case has been undertaken due to the high capital cost and the marginal benefits provided by this option. A more evenly spaced timetable leads to less frequent services at some local stations. Therefore it is anticipated that this option would offer no value for money.
Link to other options	Option 6b, and 6c.
Conclusion	This option is not recommended due to the high level capital expenditure and marginal benefits it would provide.

6. Gaps and options

Option 6b – Timetable study to consider standard interval timetable for local stations on the Coventry corridor

Assessment of Option 6b	Timetable study to consider standard interval timetable for local stations (variation on option 6a in terms of calling pattern at certain stations)																										
Gaps addressed	Part of Consolidated gap OC-6: Inadequate peak capacity on the Coventry corridor.																										
Concept	The option provides a minimum of two trains per hour at all stations except Marston Green and Tile Hill (which would be served by three trains per hour) and Adderley Park (which would be served by one train per hour).																										
Operational analysis	<p>The recast of local services would provide:</p> <p>In both directions:</p> <ul style="list-style-type: none"> – two trains per hour (fast, but with one calling at Marston Green) to Birmingham International and then all stations to Coventry. <p>In both directions:</p> <ul style="list-style-type: none"> – two trains per hour (all stations, although one would omit Adderley Park) to Birmingham International and then fast to Coventry (one calling at Tile Hill). These would then continue to Northampton. <p>All other passenger services would remain as current.</p>																										
Infrastructure required	<p>Local trains would require an electrified turnback siding at Coventry as the turn round time would be 30 and 39 minutes.</p> <p>A two-minute signalling headway between Birmingham New Street and Birmingham International would be required to ensure a robust timetable.</p>																										
Passenger impact	Passengers would benefit from having a more evenly spaced timetable for local services on the Coventry corridor, whilst maintaining current service frequency.																										
Freight impact	Current and future freight demand can be accommodated																										
Financial and economic analysis	<p>To operate this option, additional train crew (12 drivers and 10 train managers including spares) and two additional 4-car units would be required.</p> <p>This option requires significant capital expenditure and operating cost.</p> <p>The following shows the appraisal result</p> <table border="1"> <thead> <tr> <th>60-year appraisal</th> <th>£million (2002 PV)</th> </tr> </thead> <tbody> <tr> <td colspan="2">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td>14.9</td> </tr> <tr> <td>Operating cost</td> <td>51.1</td> </tr> <tr> <td>Revenue</td> <td>-6.8</td> </tr> <tr> <td>Other Government impacts</td> <td>1.5</td> </tr> <tr> <td>Total costs</td> <td>60.7</td> </tr> <tr> <td colspan="2">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td>14.4</td> </tr> <tr> <td>Non-users benefits</td> <td>4.9</td> </tr> <tr> <td>Total quantified benefits</td> <td>19.3</td> </tr> <tr> <td>NPV</td> <td>-41.1</td> </tr> <tr> <td>Quantified benefit cost ratio</td> <td>0.3</td> </tr> </tbody> </table>	60-year appraisal	£million (2002 PV)	Costs (present value)		Investment cost	14.9	Operating cost	51.1	Revenue	-6.8	Other Government impacts	1.5	Total costs	60.7	Benefits (present value)		Rail users benefits	14.4	Non-users benefits	4.9	Total quantified benefits	19.3	NPV	-41.1	Quantified benefit cost ratio	0.3
60-year appraisal	£million (2002 PV)																										
Costs (present value)																											
Investment cost	14.9																										
Operating cost	51.1																										
Revenue	-6.8																										
Other Government impacts	1.5																										
Total costs	60.7																										
Benefits (present value)																											
Rail users benefits	14.4																										
Non-users benefits	4.9																										
Total quantified benefits	19.3																										
NPV	-41.1																										
Quantified benefit cost ratio	0.3																										
Link to other options	Options 6a and 6c																										
Conclusion	This option is not recommended due to the high capital expenditure and operating cost not justified by the level of benefit.																										

Option 6c – Timetable study to consider standard interval timetable for local stations and rerouting of Reading to Newcastle service (in each direction) in each hour from the Solihull route.

Assessment of option 6c	Timetable study to consider standard interval timetable for local stations and rerouting of Reading to Newcastle service (in each direction) in each hour from the Solihull route. This is in effect a combination of Option 6a and 7.
Gaps addressed	Consolidated gap OC-6: Inadequate peak capacity on the Coventry corridor. Consolidated gap OC-15 Overcrowding on Leamington Spa-Coventry services in the morning and evening peak and throughout the day.
Concept	This is a combination option of Option 6a and Option 7. Diverting the CrossCountry Reading to Newcastle via Birmingham International and Coventry (currently routed via Solihull) would provide connectivity between the North East/East Midlands and Birmingham Airport. The option also provides all local stations on the Coventry corridor with two trains per hour (except Marston Green and Tile Hill with 3tph and Adderley Park with 1tph) on a more even timetable.
Operational analysis	The recast of local services would provide: <ul style="list-style-type: none"> – two trains per hour fast to Birmingham International then all stations to Coventry but with one train per hour calling also at Marston Green. – two trains per hour all stations to Birmingham International, then fast to Coventry, continuing to Northampton (one would omit Adderley Park and one call also at Tile Hill) <p>The Newcastle to Reading service would be diverted via the Coventry corridor and call at Birmingham International and Coventry.</p>
Infrastructure required	Local trains would require a turn back facility at Coventry. To operate the service robustly would require a two-minute signalling headway. Double tracking with a four minute headway would be required between Kenilworth and Milverton Jn for the second CrossCountry service via Coventry.
Passenger impact	Passengers would benefit from having a more evenly spaced timetable for local services on the Coventry corridor. Passengers from the North East would have direct service to Birmingham International and Coventry. This also increases capacity on the Coventry corridor.
Freight impact	Current and future freight demand can be accommodated with the additional infrastructure
Financial and economic analysis	Additional train crew (12 drivers and 10 train managers including spares) and two 4-car units would be required. The standalone business case for the local option (Option C-2c) shows that it offers no value for money due to the high capital expenditure and operating cost. On this basis, this combined option does not offer value for money.
Link to other options	Option 6a, 6b and 7.
Conclusion	This package of options is not recommended due to the high capital and operating cost that is required for the local option.

6. Gaps and options

Option 7– Rerouting of the Reading to Newcastle service (in each direction) in each hour from the Solihull route.

Currently there are no direct rail services from the North East/Yorkshire/East Midlands to Birmingham

International and Coventry and consequently this suppresses rail demand. Options to address this connectivity gap have been developed. Furthermore, options to provide a more even timetable for passengers on local services on this route have been developed.

Assessment of option 7	Rerouting of the Reading to Newcastle service (in each direction) in each hour from the Solihull route.
Gaps addressed	Consolidated RC-5: Lack of direct service Coventry/Birmingham International – Derbyshire, Yorkshire and North East suppressing rail demand Consolidated gap OC-6: Inadequate peak capacity on the Coventry corridor Consolidated gap OC-15: Overcrowding on Leamington Spa-Coventry services in the morning and evening peak and throughout the day
Concept	The CrossCountry service from Reading to Newcastle is currently routed via Solihull and Leamington Spa. Diverting it via the Coventry corridor would provide connectivity between the North East/East Midlands and Birmingham Airport.
Operational analysis	Initial timetable analysis has suggested that all other passenger services remain as current, with a minor retiming of London Midland Birmingham New Street to Northampton services and Arriva Trains Wales services between Shrewsbury and Birmingham International. Performance analysis indicated that performance was affected mostly in the Birmingham to Coventry direction, ie. in the section before the double track being proposed. Freight services that currently recess at Birmingham International station would not be able to do so, following the redoubling option, due to longer dwell times at the station constraining the timetable. Analysis using historic annual data of delay minutes was undertaken to estimate the impact on performance for all affected train operators. This impact is then included in the business case which is proved to be very sensitive to the performance assumptions. Consequently two scenarios: a) with and b) without Performance Impact, are developed to show the range of value for money of this option. It is recognised that other committed schemes, in development, may alter the performance impact by offering performance improvement benefits. These schemes include the development of Reading and Oxford station areas, Birmingham New Street resignalling, Seven day railway schemes and the Evergreen 3 project. It is recognised that this option would release capacity between Leamington Spa and Birmingham and therefore could stimulate a service review on the route via Solihull.
Infrastructure required	Linespeed improvements west of Wolverhampton to enable Arriva Trains Wales services to be accelerated would be required to enable this option to work. This scheme has a current funding shortfall following the Government's Comprehensive Spending Review late last year and remains an uncommitted scheme at this time. Double track between Kenilworth and Milverton Jn to accommodate both passenger and freight traffic (current and future). It should be noted that a GRIP 2 study has been commissioned to determine the infrastructure required to accommodate freight growth to 2030 and the rerouting of these services on this corridor. Emerging results are indicating: a) that 2019 freight growth can be accommodated between Coventry and Leamington Spa on the current infrastructure, b) rerouting of Newcastle –Reading services (in both directions) and provision of a) above would require redoubling of Milverton Jn to Kenilworth, c) to accommodate freight growth to 2030 and the rerouting of the Newcastle –Reading services (in both directions) redoubling of Milverton Jn to Kenilworth, further double tracking and possible interventions in the Coventry station area may be required. These results will be confirmed following further GRIP development work for this scheme. GRIP 2 results will be finalised after the publication of this RUS.

Assessment of option 7	Rerouting of the Reading to Newcastle service (in each direction) in each hour from the Solihull route.																																										
Passenger impact	<p>Passengers from the North East would have direct connectivity to Birmingham International and Coventry. This would also improve train frequency between Coventry and Birmingham New Street.</p> <p>This option would help to reduce crowding on the Manchester Piccadilly to Bournemouth service. The existing Reading – Newcastle service is less crowded than the Manchester Piccadilly to Bournemouth service as identified by the Great Western RUS, March 2010. The diversion of the Reading – Newcastle service via Birmingham International and Coventry would help to manage demand and provide extra capacity for passengers travelling from Reading to Coventry/Birmingham International. This option would release capacity between Leamington Spa and Birmingham Moor Street, although this potential benefit has not been included in the business case.</p>																																										
Freight impact	<p>Future freight demand can only be accommodated with the identified additional infrastructure.</p> <p>A potential positive freight performance and capacity impact is delivered by this option as it will release some capacity on the Leamington Spa and Chiltern corridor. This capacity will also be increased by the Evergreen 3 project.</p>																																										
Financial and economic analysis	<p>The Benefit Cost Ratio of this option is very sensitive to performance impact. Its BCR ranges from 3.5 (high value for money) to 1.4 (poor value for money) dependant on the performance projection. The business case presented below has not included any potential freight benefits. This will be reviewed in further development work once the GRIP 2 report is completed.</p> <table border="1" data-bbox="627 909 1474 1552"> <thead> <tr> <th data-bbox="627 909 986 943" style="text-align: left;">30-year appraisal</th> <th colspan="2" data-bbox="994 909 1474 943" style="text-align: center;">£million (2002 PV)</th> </tr> <tr> <th data-bbox="627 954 986 1003"></th> <th data-bbox="994 954 1225 1003" style="text-align: center;">Scenario A: With Performance Impact</th> <th data-bbox="1233 954 1474 1003" style="text-align: center;">Scenario B: Without Performance Impact</th> </tr> </thead> <tbody> <tr> <td data-bbox="627 1014 986 1048">Costs (present value)</td> <td data-bbox="994 1014 1225 1048"></td> <td data-bbox="1233 1014 1474 1048"></td> </tr> <tr> <td data-bbox="627 1059 986 1093">Investment cost</td> <td data-bbox="994 1059 1225 1093" style="text-align: center;">31.9</td> <td data-bbox="1233 1059 1474 1093" style="text-align: center;">31.9</td> </tr> <tr> <td data-bbox="627 1104 986 1137">Operating cost</td> <td data-bbox="994 1104 1225 1137" style="text-align: center;">0.0</td> <td data-bbox="1233 1104 1474 1137" style="text-align: center;">0.0</td> </tr> <tr> <td data-bbox="627 1149 986 1182">Revenue</td> <td data-bbox="994 1149 1225 1182" style="text-align: center;">-0.8</td> <td data-bbox="1233 1149 1474 1182" style="text-align: center;">-20.9</td> </tr> <tr> <td data-bbox="627 1193 986 1227">Other Government impacts</td> <td data-bbox="994 1193 1225 1227" style="text-align: center;">1.8</td> <td data-bbox="1233 1193 1474 1227" style="text-align: center;">4.3</td> </tr> <tr> <td data-bbox="627 1238 986 1272">Total costs</td> <td data-bbox="994 1238 1225 1272" style="text-align: center;">25.6</td> <td data-bbox="1233 1238 1474 1272" style="text-align: center;">15.4</td> </tr> <tr> <td data-bbox="627 1283 986 1317">Benefits (present value)</td> <td data-bbox="994 1283 1225 1317"></td> <td data-bbox="1233 1283 1474 1317"></td> </tr> <tr> <td data-bbox="627 1328 986 1361">Rail users benefits</td> <td data-bbox="994 1328 1225 1361" style="text-align: center;">34.4</td> <td data-bbox="1233 1328 1474 1361" style="text-align: center;">45.4</td> </tr> <tr> <td data-bbox="627 1373 986 1406">Non-users benefits</td> <td data-bbox="994 1373 1225 1406" style="text-align: center;">2.9</td> <td data-bbox="1233 1373 1474 1406" style="text-align: center;">8.8</td> </tr> <tr> <td data-bbox="627 1417 986 1451">Total quantified benefits</td> <td data-bbox="994 1417 1225 1451" style="text-align: center;">37.3</td> <td data-bbox="1233 1417 1474 1451" style="text-align: center;">54.2</td> </tr> <tr> <td data-bbox="627 1462 986 1496">NPV</td> <td data-bbox="994 1462 1225 1496" style="text-align: center;">11.6</td> <td data-bbox="1233 1462 1474 1496" style="text-align: center;">38.8</td> </tr> <tr> <td data-bbox="627 1507 986 1541">Quantified benefit cost ratio</td> <td data-bbox="994 1507 1225 1541" style="text-align: center;">1.4</td> <td data-bbox="1233 1507 1474 1541" style="text-align: center;">3.5</td> </tr> </tbody> </table>	30-year appraisal	£million (2002 PV)			Scenario A: With Performance Impact	Scenario B: Without Performance Impact	Costs (present value)			Investment cost	31.9	31.9	Operating cost	0.0	0.0	Revenue	-0.8	-20.9	Other Government impacts	1.8	4.3	Total costs	25.6	15.4	Benefits (present value)			Rail users benefits	34.4	45.4	Non-users benefits	2.9	8.8	Total quantified benefits	37.3	54.2	NPV	11.6	38.8	Quantified benefit cost ratio	1.4	3.5
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Link to other options	<p>Options 6c.</p> <p>On this corridor, there is a third party scheme promoting a new station at Kenilworth. Associated station scheme development work will have to take account of the future capacity requirements on this line, to understand the impact on the design and funding of the potential new station.</p>																																										
Conclusion	<p>This option offers value for money, however its level of benefits are sensitive to the impact on service performance. This option is recommended, subject to further development in order to fully understand the capacity, performance and infrastructure implications.</p>																																										

6. Gaps and options

6.8.4 Cross City and Lickey corridor – option analysis

Gap reference	Consolidated gap	Gap type	Option reference	Option
JT-2	Inappropriate journey time Birmingham to the South West (Birmingham New Street – Bristol Temple Meads).	Journey time	-	Addressed by committed scheme (see section 6.5.1.4)
OC-7	Inadequate capacity between Bromsgrove and Birmingham New Street to accommodate demand.	On train capacity	-	Addressed by committed scheme (see section 6.5.1.5)
OC-8	Inadequate capacity between Redditch and Birmingham New Street to accommodate demand.	On train capacity	-	Addressed by committed scheme (see section 6.5.1.5)
OC-9	Inadequate peak and all day capacity on the Cross City and Lickey corridor.	On train capacity	Option 8	Lengthening of morning peak services between Birmingham New Street and Lichfield
OC-10	Inadequate capacity to meet demand on long distance high speed services between Bristol Temple Meads and Birmingham New Street and beyond.	On train capacity	-	Addressed in other RUSs (see section 6.5.2.2)
SC-1	Limited station capacity at University station to accommodate future growth.	Station Capacity	-	Addressed by committed scheme (see section 6.5.1.6)

Option 8 – Lengthening of morning peak services between Birmingham New Street and Lichfield City

As discussed in **Chapter 4**, the committed service enhancements to Bromsgrove and to Redditch are planned in CP4. This brings additional vehicles and capacity to the Cross City south services (between Birmingham New Street and Redditch/Bromsgrove via Longbridge) and consequently this

will help to meet increased passenger demand. Passenger loadings analysis presented in **Chapter 5** shows that even with the committed increased capacity, several services on the Cross City North corridor (between Birmingham New Street and Four Oaks/Lichfield City) are predicted to have more passengers than the nominal train capacity on the approach to Birmingham in the morning peak. Options to address this crowding have therefore been developed.

<i>Assessment of Option 8</i>	<i>Lengthening of morning peak services between Birmingham New Street and Lichfield City</i>																										
Gaps addressed	Consolidated gap OC-9: Inadequate peak and all day capacity on the Cross City and Lickey corridor.																										
Concept	Lengthening one morning peak service and one evening service between Birmingham New Street and Lichfield City by one unit (three-car) each.																										
Operational analysis	The analysis includes London Midland's CP4 proposed operational plan that increases seats to the Cross City north corridor in the three-hour morning peak. Analysis shows that despite the CP4 additional capacity, the busiest high-peak service would still have more passengers than the nominal train capacity on the approach to Birmingham New Street by 2020. The appraisal assesses the business case for train lengthening beyond the CP4 operational plan.																										
Infrastructure required	None.																										
Passenger impact	Increased capacity and reduced crowding on Cross City north peak services.																										
Freight impact	Current and future freight demand can be accommodated.																										
Financial and economic analysis	<p>The main costs relate to rolling stock.</p> <p>The following table outlines the appraisal results:</p> <table border="1"> <thead> <tr> <th>30-year appraisal</th> <th>£m (2002 PV)</th> </tr> </thead> <tbody> <tr> <td colspan="2">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td>0</td> </tr> <tr> <td>Operating cost</td> <td>3.8</td> </tr> <tr> <td>Revenue</td> <td>-0.6</td> </tr> <tr> <td>Other Government impacts</td> <td>0.1</td> </tr> <tr> <td>Total Costs</td> <td>3.2</td> </tr> <tr> <td colspan="2">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td>3</td> </tr> <tr> <td>Non-users benefits</td> <td>0.3</td> </tr> <tr> <td>Total quantified benefits</td> <td>3.2</td> </tr> <tr> <td>NPV</td> <td>0.1</td> </tr> <tr> <td>Quantified BCR</td> <td>1.0</td> </tr> </tbody> </table> <p>With a BCR of 1.0, the option provides poor value for money.</p>	30-year appraisal	£m (2002 PV)	Costs (present value)		Investment cost	0	Operating cost	3.8	Revenue	-0.6	Other Government impacts	0.1	Total Costs	3.2	Benefits (present value)		Rail users benefits	3	Non-users benefits	0.3	Total quantified benefits	3.2	NPV	0.1	Quantified BCR	1.0
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Total quantified benefits	3.2																										
NPV	0.1																										
Quantified BCR	1.0																										
Link to other options	None.																										
Conclusion	This option is not recommended for implementation as it represents poor value for money.																										

6. Gaps and options

6.8.5 Derby and Nuneaton corridor – option analysis

Gap reference	Consolidated gap	Gap type	Option reference	Option
JT-4	Inadequate journey time between Birmingham New Street and Leicester/Stansted Airport.	Journey time	-	Addressed in other RUSs (see section 6.5.2.3)
JT-5	Inadequate journey time between Birmingham New Street and Nottingham.	Journey time	Option 9	Recast of timetable on Nottingham to Birmingham New Street corridor
OC-11	Inadequate capacity on the Derby, Nuneaton corridor.	On train capacity	-	Addressed to an extent in other RUSs (see section 6.5.2.4)
			Option 10	Train lengthening on long distance services between Nottingham and Birmingham New Street/Cardiff
			Option 11a	Additional half-hourly service between Tamworth and Birmingham New Street (forming cross-Birmingham service to Worcester/Hereford)
			Option 11b	Additional hourly service between Tamworth and Birmingham New Street (forming cross-Birmingham service to Hereford)
			Option 11c	Additional trains in each hour between Tamworth and Birmingham New Street calling at new stations (Kingsbury, Castle Bromwich and Fort)
OC-12	Inadequate capacity between West Midlands and West Yorkshire.	On train capacity	-	Addressed in other RUSs (see section 6.5.2.5)
OC-13	Inadequate capacity to accommodate demand between Birmingham New Street, Leicester, Peterborough, Cambridge and Stansted Airport.	On train capacity	-	Addressed in other RUSs (see section 6.5.2.6)
OC-13a	Inadequate capacity to accommodate local demand between Hinckley/Nuneaton and Birmingham New Street	On train capacity	Option 12a	Additional hourly Nuneaton to Birmingham New Street service
			Option 12b	Additional hourly Nuneaton to Birmingham New Street and additional hourly Tamworth to Birmingham New Street service package
RI-2	Limited interchange opportunities with the West Coast Main Line on the Derby and Nuneaton corridor.	Rail interchange	-	Addressed in other RUSs (see section 6.5.2.7)

Crowding is forecast to become more acute by 2019 on the interurban and long distance services which connect key urban centres in the North East, Yorkshire, East Midlands and West Midlands. Standing above train capacity is predicted on several peak hour services as shown in **Chapter 5**. The demand for these services is high since they serve long distance travellers as well as local commuters. Increased capacity through train lengthening and service enhancement is proposed to meet passenger demand and to reduce the level of crowding on the long distance services.

During the consultation period, the timetable option for additional services between Tamworth and Birmingham New Street, linking to services on the Hereford/Worcester corridor has been reviewed. **Table 6.14** reports the revised options and concludes that an additional hourly, as opposed to half-hourly, service between Tamworth and Birmingham New Street is adequate to meet increased demand on the Derby, Tamworth and Birmingham Corridor.

Option 9 – Recast of timetable on Nottingham to Birmingham New Street/ Cardiff corridor

Assessment of Option 9	Recast of timetable on Nottingham to Cardiff services
Gaps addressed	Inadequate journey time between Nottingham and Birmingham New Street
Concept	<p>Reduction of journey times and line speed improvements on the Nottingham to Birmingham New Street corridor to enable a journey time saving on Cross Country Nottingham to Cardiff services.</p> <p>The Nottingham to Birmingham New Street corridor is a mixed traffic route serving the long distance market, local commuters and freight services that operate to key West Midlands freight terminals. The Derby to Birmingham section of the route is capable of 125 mph running, whereas the section between Nottingham and Derby has numerous linespeed changes, with restrictions as low as 15mph. Due to the varying linespeed profile in addition to timetabling constraints, journey times are deemed inadequate. This is particularly so when compared to other journey times over similar distances, for services operating from other cities to Birmingham.</p> <p>The East Midlands RUS published in February 2010 has also identified journey time improvements as a gap on this corridor, and evaluated various options that could solve it. The key conclusion was for improving linespeeds at every opportunity presented in planned and proposed renewals. For the East Midlands area, these are:</p> <p>CP4 – Trent East Jn redoubling, enhancing the Nottingham station area and improvement of linespeeds. There is a CP4 scheme at Nottingham that is being delivered in 2013. This will provide performance and flexibility at the west end of Nottingham.</p> <p>CP5 – Derby station area remodelling. Derby station is seen as a key bottleneck on this corridor due to the number of conflicting moves at the throat of the station. There is an ongoing GRIP2 study that is reviewing the layout at Derby station aligned to planned resignalling work. This study will make recommendations on optimising the layout in order to reduce the amount of conflicting moves and reducing some of the delays caused to CrossCountry Nottingham to Birmingham service. This will provide the opportunity to speed up the Nottingham to Birmingham service.</p> <p>CP6 – Wichnor Jn to Burton-on-Trent signalling renewals will look to optimise layouts and speeds between these two locations, in order to speed up services through Burton-on-Trent. It is recommended that journey time improvements on this route be tackled on a 'corridor' basis, not only taking advantage of infrastructure renewals planned but by reviewing the opportunities that a CrossCountry timetable recast would give once the Nottingham and Derby signalling renewals have been implemented (CP5 onwards).</p>
Operational analysis	Nottingham Resignalling Derby Resignalling
Passenger impact	Improved journey times for passengers travelling from Nottingham to Birmingham New Street and a more competitive mode of transport.
Freight impact	Current and future freight demand can be accommodated.
Link to other options	The proposed additional hourly Tamworth – Birmingham New Street service in Option 12b would help to alleviate peak crowding from Tamworth to Birmingham New Street.
Conclusion	It is recommended that once the Nottingham resignalling scheme has been implemented in 2013, opportunities are sought to reduce journey times for Nottingham to Birmingham New Street services through timetabling improvements in the East Midlands. The potential for further benefits should subsequently be explored following Derby resignalling in CP5.

6. Gaps and options

Option 10 - Train lengthening on long distance services between Nottingham and Birmingham New Street/Cardiff

Assessment of option 10	Train lengthening on Nottingham – Birmingham New Street – Cardiff services		
Gaps addressed	Inadequate capacity on the Derby and Nuneaton corridor.		
Concept	Lengthen the busiest morning and evening peak A) Nottingham - Birmingham New Street - Cardiff central and B) Nottingham - Birmingham New Street services by one car each		
Operational analysis	No additional services are required. It assumes the additional vehicles will be utilised to serve the busiest peak services. It is assumed that each additional vehicle cannot be uncoupled during the off peak and therefore it is assumed that each vehicle has to make at least three round trips per day.		
Infrastructure required	None.		
Passenger impact	This will eliminate most standing between Nottingham and Birmingham New Street. However, some standing may still be observed on some sections of the route particularly during the morning and evening peak at key urban centres when the services are used by both commuters and long distance travellers.		
Freight impact	None.		
Financial and economic analysis	30-year appraisal		
		Option A Lengthening of Nottingham - Birmingham New Street – Cardiff Central services	Option B Lengthening of Nottingham - Birmingham services
	Costs (present value)		
	Investment cost	0.0	0.0
	Operating cost	2.7	3.1
	Revenue	-0.7	-0.5
	Other Government impacts	0.1	0.1
	Total costs	2.1	2.6
	Benefits (Present Value)		
	Rail users benefits	2.1	1.5
	Non-users benefits	0.4	0.3
	Total quantified benefits	2.5	1.8
	NPV	0.4	-0.9
Quantified BCR	1.2	0.7	
Link to other options	The proposal to lengthen services links to the lengthening of long distance services between Plymouth and Edinburgh Waverley (see section 6.5.2.2) and would help to alleviate peak crowding from Tamworth to Birmingham New Street. The option also links to Option 11b to introduce an additional hourly (all day) service from Tamworth to Birmingham New Street, linking to the existing Birmingham New Street to Hereford service.		
Conclusion	The results of the analysis indicated that crowding on the Cardiff to Nottingham services is mainly a localised issued between Tamworth and Birmingham New Street in the peak hours, although there are some services that are overcrowded from as far out as Burton-on Trent. Reducing localised crowding by lengthening the long distance Cardiff Central – Birmingham New Street – Nottingham services incurs significant mileage-related cost and lengthening the Nottingham – Birmingham New Street services is a more cost effective solution. However with the assumption that the lengthening unit is in operation throughout the day, the option would offer poor value for money. Both options 1 and 2 are not recommended as the operating cost is higher than the level of benefits generated by the options.		

Option 11a – Additional half-hourly service from Tamworth to Birmingham New Street (forming cross-Birmingham service to Worcester/Hereford)

Assessment of Option 11a	Additional half-hourly service between Tamworth and Birmingham New Street (all day)
Gaps addressed	This option addresses the gap: Lack of capacity between Birmingham New Street and Derby, which is part of Consolidated gap OC-11 – Inadequate capacity on the Derby and Nuneaton corridor.
Concept	Provide two additional trains per hour in each direction between Tamworth and Birmingham New Street calling at Water Orton.
Operational analysis	<p>Class 170 two-car unit assumed.</p> <p>Analysis of platform capacity at Birmingham New Street shows that the proposed additional services between Tamworth and Birmingham New Street are required to link to the proposed half-hourly Birmingham New Street to Hereford/Worcester services via Bromsgrove (Option O-13). Timetable analysis shows that it is possible to connect these services and consequently provide connectivity from Tamworth through to Worcester.</p> <p>Two scenarios have been tested:</p> <p>Option 1 links a half-hourly Tamworth to Birmingham New Street service to Worcester/Hereford and can call at either Worcester Shrub Hill or Worcester Foregate Street. There are infrastructure costs associated with this option and no journey time saving between Worcester and Malvern Link.</p> <p>Option 2 links a half-hourly Tamworth to Birmingham New Street service to Worcester/Hereford and can call at both Worcester Shrub Hill and Worcester Foregate Street. There are infrastructure costs at Tamworth and Worcester associated with this option and it produces a one-minute journey time saving between Worcester and Malvern Link.</p> <p>To avoid conflict with the proposed service, the southbound Leicester to Birmingham New Street services would need to depart three minutes earlier at all stations and not call at Water Orton.</p>
Infrastructure required	This option requires a new turnback facility at Tamworth. Option 2 also requires additional infrastructure in the Worcester area.
Passenger impact	<p>Improved capacity and reduced crowding on services between Birmingham New Street and Tamworth.</p> <p>More frequent Tamworth – Water Orton – Birmingham New Street services.</p> <p>Connectivity between Tamworth and Hereford/Worcester.</p> <p>Journey time saving of 2.5 minutes on the southbound Leicester to Birmingham New Street service between Nuneaton and Birmingham New Street.</p>
Freight impact	Current and future freight demand can be accommodated.

6. Gaps and options

Assessment of Option 11a	Additional half-hourly service between Tamworth and Birmingham New Street (all day)		
Financial and economic analysis	<p>The appraisal assumes three trains per hour to Bromsgrove and Redditch in the base. It requires additional resources (four Class 170 two-car units, 20 drivers and 19 train managers including spares). The benefit of relieving crowding on the Nottingham to Birmingham/Cardiff services has been included in the business case.</p> <p>The analysis has been revised during the consultation period as the number of current passenger journeys has been overstated in the business case. This is due to the MOIRA version being used in the Draft for Consultation having all passenger journeys at Coleshill Parkway allocated to Water Orton. The revised business case rectified this.</p>		
	60-year appraisal	£ million (2002 PV)	£ million (2002 PV)
		Option 1	Option 2
	Costs (present value)		
	Investment cost	2.3	7.1
	Operating cost	43.9	36.1
	Revenue	-12.4	-16.5
	Other Government impacts	2.6	3.4
	Total Costs	36.5	30.1
	Benefits (present value)		
	Rail users benefits	58.7	44.8
	Non-users benefits	7.5	8.7
	Total quantified benefits	66.2	53.5
	NPV	29.7	23.5
Quantified BCR	1.8	1.8	
Link to other options	Option 11b, 11c and Option 12b.		
Conclusion	It is proposed that this is not recommended due to it not having a high value for money business case and that on further analysis, a half-hourly service over provides capacity on this route.		

Option 11b – Additional hourly service from Tamworth to Birmingham New Street (forming cross-Birmingham service to Hereford)

Assessment of Option 11b	Additional hourly service between Tamworth and Birmingham New Street (all day)																																	
Gaps addressed	This option addresses the gap: Lack of capacity between Birmingham New Street and Derby, which is part of Consolidated gap OC-11 – Inadequate capacity on the Derby and Nuneaton corridor. This table reports the analysis as a stand alone scheme. It has also been analysed as part of a package to relieve crowding on both the Nuneaton and Tamworth corridors and this is presented in Option 12b.																																	
Concept	Provide an additional all day hourly service (in each direction) between Tamworth and Birmingham New Street calling at either Wilnecote or Water Orton.																																	
Operational analysis	<p>Class 170 two car unit assumed.</p> <p>Analysis of platform capacity at Birmingham New Street shows that the proposed additional services between Tamworth and Birmingham New Street are required to link to the existing Birmingham New Street to Hereford via Bromsgrove service. Timetable analysis shows that it is possible to connect these services and consequently provide efficient use of rolling stock and train crews.</p> <p>Analysis assumes two additional units and 11 drivers. Capacity and demand analysis shows that one additional train per hour is adequate to reduce the localised crowding between Tamworth and Birmingham New Street.</p> <p>Performance analysis will be required during any further development work to determine the impact of the additional service and any infrastructure required to remove any performance risks that this option may introduce.</p>																																	
Infrastructure required	<p>This option requires a new turnback facility at Tamworth.</p> <p>Potential further infrastructure is required for this option:</p> <ol style="list-style-type: none"> 1. Water Orton West Jn to Wichnor Jn four aspect signalling to provide the necessary additional capacity for this option 2. Improved access to the Kingsbury branch from the north (which would also offer potential performance benefits to services accessing Kingsbury from the south) <p>It should be noted that a GRIP 2 study is nearing completion to determine the infrastructure required to accommodate the additional Tamworth services and freight growth up to 2030. This work also considers what infrastructure would be required to support the medium to long term strategy outlined in the Yorkshire and Humber RUS of an additional long distance service running via this route from Yorkshire to Birmingham. The emerging results of this study are indicated in the following scenarios chart. This shows what options are required to support each of the three scenarios, and also indicates the potential for performance implications:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Option</th> <th colspan="3">Scenarios</th> <th rowspan="2">Potential performance implications?</th> </tr> <tr> <th>Freight growth</th> <th>Tamworth service</th> <th>Yorkshire to Birmingham service</th> </tr> </thead> <tbody> <tr> <td>A: Four aspect signalling</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">X</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>B: Four aspect signalling and Tamworth turnback</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>C: Kingsbury stand-alone</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> </tr> <tr> <td>D: Kingsbury and four aspect signalling</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">X</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">X</td> </tr> <tr> <td>E: Four aspect signalling, Tamworth turnback and Kingsbury</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">X</td> </tr> </tbody> </table> <p>The results of this study will be finalised following the publication of the RUS.</p>	Option	Scenarios			Potential performance implications?	Freight growth	Tamworth service	Yorkshire to Birmingham service	A: Four aspect signalling	✓	X	✓	✓	B: Four aspect signalling and Tamworth turnback	✓	✓	✓	✓	C: Kingsbury stand-alone	✓	X	X	X	D: Kingsbury and four aspect signalling	✓	X	✓	X	E: Four aspect signalling, Tamworth turnback and Kingsbury	✓	✓	✓	X
Option	Scenarios			Potential performance implications?																														
	Freight growth	Tamworth service	Yorkshire to Birmingham service																															
A: Four aspect signalling	✓	X	✓	✓																														
B: Four aspect signalling and Tamworth turnback	✓	✓	✓	✓																														
C: Kingsbury stand-alone	✓	X	X	X																														
D: Kingsbury and four aspect signalling	✓	X	✓	X																														
E: Four aspect signalling, Tamworth turnback and Kingsbury	✓	✓	✓	X																														

6. Gaps and options

Assessment of Option 11b	Additional hourly service between Tamworth and Birmingham New Street (all day)																																							
Passenger impact	<p>Improved capacity and reduced crowding on services between Birmingham New Street and Tamworth.</p> <p>More frequent Tamworth – Wilnecote/Water Orton – Birmingham New Street services.</p> <p>Connectivity between Tamworth, Wilnecote/Water Orton and Hereford.</p> <p>Performance analysis will be required during any further development work to determine the impact of the additional service and any infrastructure required to remove any performance risks this option may introduce.</p>																																							
Freight impact	<p>Performance analysis will be required during any further development work to determine the impact of the additional service and any infrastructure required to remove any performance risks this option may introduce.</p>																																							
Financial and economic analysis	<p>The appraisal assumes three trains per hour to Bromsgrove and Redditch in the base. The benefit of relieving crowding on the Nottingham to Birmingham New Street/Cardiff Central services has been included in the business case.</p> <p>The option would potentially offer the opportunity to improve journey time on the long distance services by changing their calling patterns. The effect of this has not been included in the business case. The high level cost estimate of a new turnback at Tamworth is included in the business case. Other potential capital expenditure has not been included.</p> <table border="1"> <thead> <tr> <th colspan="2">60-year appraisal</th> <th>£ million (2002 PV) Option 1</th> </tr> </thead> <tbody> <tr> <td colspan="3">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td></td> <td>2.3</td> </tr> <tr> <td>Operating cost</td> <td></td> <td>20.6</td> </tr> <tr> <td>Revenue</td> <td></td> <td>-4.6</td> </tr> <tr> <td>Other Government impacts</td> <td></td> <td>1.0</td> </tr> <tr> <td>Total Costs</td> <td></td> <td>19.4</td> </tr> <tr> <td colspan="3">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td></td> <td>37.3</td> </tr> <tr> <td>Non-users benefits</td> <td></td> <td>3.0</td> </tr> <tr> <td>Total quantified benefits</td> <td></td> <td>40.3</td> </tr> <tr> <td>NPV</td> <td></td> <td>21.0</td> </tr> <tr> <td>Quantified BCR</td> <td></td> <td>2.1</td> </tr> </tbody> </table> <p>The business case shows that the option would offer high value for money and help to relieve crowding on the Derby – Tamworth – Birmingham New Street corridor.</p>	60-year appraisal		£ million (2002 PV) Option 1	Costs (present value)			Investment cost		2.3	Operating cost		20.6	Revenue		-4.6	Other Government impacts		1.0	Total Costs		19.4	Benefits (present value)			Rail users benefits		37.3	Non-users benefits		3.0	Total quantified benefits		40.3	NPV		21.0	Quantified BCR		2.1
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Quantified BCR		2.1																																						
Link to other options	Option 11a, 11c and 12b.																																							
Conclusion	This option provides high value for money however Option 12b is preferred to this option as this addresses crowding on both the Tamworth and Nuneaton corridors.																																							

Option 11c - Additional local services between Tamworth and Birmingham Moor Street calling at new stations (Kingsbury, Castle Bromwich and Fort)

The RUS acknowledges Centro's aspirations for providing additional local services from Tamworth to Birmingham Moor Street via a proposed new chord line at Camp Hill. This new service would also support Centro's aspirations to open new stations at Kingsbury, Castle Bromwich and in the Fort area.

Option 12a: Additional services between Nuneaton and Birmingham (forming cross-Birmingham service to Hereford)

The East Midlands RUS has carried out some extensive analysis of these gaps which involved identifying the locations where there is current crowding both in the off-peak and peak times and forecasting the extent of this crowding up to 2019. Analysis has shown that by 2019, trains arriving and leaving Birmingham New Street on the route to Stansted Airport in the morning and evening three-hour peaks are expected to reach seated load factors of 120 per cent at Birmingham. CrossCountry plans to lengthen some interurban services from three to

four cars which will address crowding in the short term. This will not require additional rolling stock but will involve platform lengthening at Stansted Airport along with the fitment of selective door opening operation to some of the Class 170 fleet. In addition to this planned train lengthening, the East Midlands RUS recommends further train lengthening requiring six additional vehicles targeted at relieving the remaining crowding as soon as rolling stock becomes available. It also proposes to combine this further train lengthening with the extension of the existing Birmingham New Street to Leicester service through to Cambridge from 2011.

The West Midlands and Chilterns RUS has undertaken further capacity analysis on this corridor to understand whether these interventions will be adequate up to 2020. Analysis has shown that in 2018, extra capacity would be required to eliminate passengers from standing for more than 20 minutes in the morning and evening peak services between Nuneaton and Birmingham New Street. This RUS has therefore developed a further option to provide capacity on the Nuneaton to Birmingham New Street corridor which would help to relieve crowding predicted in 2020.

Assessment of Option 12a	Additional hourly service between Nuneaton and Birmingham New Street (all day)
Gaps addressed	This table reports the analysis as a stand alone scheme. It has also been analysed as part of a package to relieve crowding on both the Nuneaton and Tamworth corridors and this is presented in Option 12b. Gap OC-13a: Inadequate capacity to accommodate local demand between Hinckley/ Nuneaton and Birmingham
Concept	Provide an additional all day hourly service (in each direction) between Nuneaton and Birmingham New Street calling at Coleshill Parkway and Water Orton
Operational analysis	Class 170 two car unit assumed. Analysis of platform capacity at Birmingham New Street shows that the proposed additional services between Nuneaton and Birmingham New Street are required to link to the existing Birmingham New Street to Hereford via Bromsgrove service. Timetable analysis shows that it is possible to connect these services and consequently provide efficient use of rolling stock and train crews. Analysis assumes two additional units and 11 drivers and shows that one additional train per hour is adequate to reduce the localised crowding between Nuneaton and Birmingham New Street. This analysis assumes the East Midlands RUS recommendation in the base. The timetable assessment looks at operating the service to Nuneaton only however, further development of this option could consider the service extending to Leicester calling at Hinckley. This would help to address crowding at Hinckley. Performance analysis will be required during any further development work to determine the impact of the additional service and any infrastructure required to remove any performance risks this option may introduce
Infrastructure required	None.
Passenger impact	Improved capacity and reduced crowding on services between Birmingham New Street and Nuneaton. More frequent Nuneaton – Coleshill Parkway - Water Orton – Birmingham New Street services. Connectivity between Nuneaton and Worcester Foregate Street/Hereford.
Freight impact	Current and future freight demand can be accommodated.

6. Gaps and options

Assessment of Option 12a	Additional hourly service between Nuneaton and Birmingham New Street (all day)	
Financial and economic analysis	The appraisal assumes three trains per hour to Bromsgrove and Redditch in the base. The benefit of relieving crowding on the Stansted Airport/ Nuneaton to Birmingham New Street services has been included in the business case.	
	30-year appraisal £ million (2002 PV) Option 1	
	Costs (present value)	
	Investment cost	0.0
	Operating cost	15.6
	Revenue	-4.0
	Other Government impacts	0.9
	Total Costs	12.5
	Benefits (present value)	
	Rail users benefits	31.7
	Non-users benefits	2.4
	Total quantified benefits	34.1
	NPV	21.6
	Quantified BCR	2.7
Link to other options	Option 12b.	
Conclusion	This option provides high value for money however Option 12b is preferred to this option as this addresses crowding on both the Tamworth and Nuneaton corridors.	

Option 12b: Inadequate capacity to accommodate demand between Tamworth/ Nuneaton and Birmingham - Package

Assessment of Option 12b	Additional hourly service between Nuneaton and Birmingham New Street (all day) and additional hourly service between Tamworth and Birmingham New Street (all day)																																				
Gaps addressed	<p>This option addresses two gaps: Inadequate capacity between Nuneaton and Birmingham New Street and inadequate capacity between Tamworth and Birmingham New Street (which are both part of Consolidated gap OC-11 – Inadequate capacity on the Derby and Nuneaton corridor).</p> <p>This is a combination of Option 11b and Option 12a.</p>																																				
Concept	<p>Provide an additional all day hourly service (in each direction) between:</p> <ul style="list-style-type: none"> ● Nuneaton and Birmingham New Street calling at Coleshill Parkway and Water Orton, and ● Tamworth and Birmingham New Street calling at Wilnecote/Water Orton. 																																				
Operational analysis	<p>Class 170 two car unit assumed.</p> <p>Analysis of platform capacity at Birmingham New Street shows that the proposed additional services between Nuneaton/Tamworth and Birmingham New Street are required to link to services on the Worcester/Hereford corridor as follows:</p> <ul style="list-style-type: none"> ● Nuneaton to Birmingham New Street connecting to the RUS proposed Worcester services (terminating at Worcester Shrub Hill) in Option 23, ● Tamworth and Birmingham New Street connecting to existing Hereford services. <p>Timetable analysis shows that it is possible to connect these services and consequently provide efficient use of rolling stock.</p> <p>Analysis assumes 4 additional units and 19 drivers and shows that one additional train per hour is sufficient to reduce the localised crowding between Nuneaton/Tamworth and Birmingham New Street.</p> <p>Performance analysis will be required during any further development work to determine the impact of the additional service and any infrastructure required to remove any performance risks this option may introduce.</p>																																				
Infrastructure required	<p>This option requires a new turnback facility at Tamworth.</p> <p>Potential further infrastructure is required for this option:</p> <ul style="list-style-type: none"> ● Water Orton West Jn to Wichnor Jn four aspect signalling to provide the necessary additional capacity for this option ● Improved access to Kingsbury Oil Terminal from the north <p>It should be noted that a study is nearing completion to determine the infrastructure required to accommodate the additional Tamworth services and freight growth up to 2030. This work also considers what infrastructure would be required to support the medium to long term strategy outlined in the Yorkshire and Humber RUS of an additional long distance service running via this route from Yorkshire to Birmingham. The emerging results of this study are indicated in the following scenarios chart. This shows what options are required to support each of the three scenarios, and also indicates the potential for performance implications:</p> <table border="1"> <thead> <tr> <th rowspan="2">Option</th> <th colspan="3">Scenarios</th> <th rowspan="2">Potential performance implications?</th> </tr> <tr> <th>Freight growth</th> <th>Tamworth service</th> <th>Yorkshire to Birmingham service</th> </tr> </thead> <tbody> <tr> <td>A: Four aspect signalling</td> <td>✓</td> <td>✗</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>B: Four aspect signalling and Tamworth turnback</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>C: Kingsbury stand-alone</td> <td>✓</td> <td>✗</td> <td>✗</td> <td>✗</td> </tr> <tr> <td>D: Kingsbury and four aspect signalling</td> <td>✓</td> <td>✗</td> <td>✓</td> <td>✗</td> </tr> <tr> <td>D: Four aspect signalling, Tamworth turnback and Kingsbury</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✗</td> </tr> </tbody> </table> <p>The results of this study will be finalised following the publication of the RUS.</p>				Option	Scenarios			Potential performance implications?	Freight growth	Tamworth service	Yorkshire to Birmingham service	A: Four aspect signalling	✓	✗	✓	✓	B: Four aspect signalling and Tamworth turnback	✓	✓	✓	✓	C: Kingsbury stand-alone	✓	✗	✗	✗	D: Kingsbury and four aspect signalling	✓	✗	✓	✗	D: Four aspect signalling, Tamworth turnback and Kingsbury	✓	✓	✓	✗
Option	Scenarios			Potential performance implications?																																	
	Freight growth	Tamworth service	Yorkshire to Birmingham service																																		
A: Four aspect signalling	✓	✗	✓	✓																																	
B: Four aspect signalling and Tamworth turnback	✓	✓	✓	✓																																	
C: Kingsbury stand-alone	✓	✗	✗	✗																																	
D: Kingsbury and four aspect signalling	✓	✗	✓	✗																																	
D: Four aspect signalling, Tamworth turnback and Kingsbury	✓	✓	✓	✗																																	

6. Gaps and options

Assessment of Option 12b	Additional hourly service between Nuneaton and Birmingham New Street (all day) and additional hourly service between Tamworth and Birmingham New Street (all day)																																							
Passenger impact	Improved capacity and reduced crowding on services between Birmingham New Street and Nuneaton/Tamworth. More frequent Nuneaton – Coleshill Parkway - Water Orton – Birmingham New Street services. More frequent Tamworth – Wilnecote/Water Orton – Birmingham New Street services. Connectivity between Nuneaton and Worcester Shrub Hill. Performance analysis will be required during any further development work to determine the impact of the additional service and any infrastructure required to remove any performance risks this option may introduce.																																							
Freight impact	Performance analysis will be required during any further development work to determine the impact of the additional service and any infrastructure required to remove any performance risks this option may introduce.																																							
Financial and economic analysis	<p>The appraisal assumes three trains per hour to Bromsgrove and Redditch in the base. It requires additional resources (assumed to be four Class 170 two-car units, 19 drivers and train managers including spares). The benefit of relieving crowding on the Nottingham to Birmingham New Street/Cardiff Central services and on the Stansted Airport/Leicester to Birmingham New Street services has been included in the business case. This business case includes the high level cost estimate of a new turnback at Tamworth but excludes other potential infrastructure costs yet to be identified by the study being undertaken currently.</p> <table border="1"> <thead> <tr> <th colspan="2">60-year appraisal</th> <th>£ million (2002 PV)</th> </tr> </thead> <tbody> <tr> <td colspan="3">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td></td> <td>2.3</td> </tr> <tr> <td>Operating cost</td> <td></td> <td>44.4</td> </tr> <tr> <td>Revenue</td> <td></td> <td>-12.2</td> </tr> <tr> <td>Other Government impacts</td> <td></td> <td>2.6</td> </tr> <tr> <td>Total Costs</td> <td></td> <td>37.1</td> </tr> <tr> <td colspan="3">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td></td> <td>84.7</td> </tr> <tr> <td>Non users benefits</td> <td></td> <td>7.4</td> </tr> <tr> <td>Total quantified benefits</td> <td></td> <td>92.0</td> </tr> <tr> <td>NPV</td> <td></td> <td>54.9</td> </tr> <tr> <td>Quantified BCR</td> <td></td> <td>2.5</td> </tr> </tbody> </table> <p>This package option offers high value for money and helps to reduce crowding between Nuneaton/Tamworth and Birmingham New Street.</p>	60-year appraisal		£ million (2002 PV)	Costs (present value)			Investment cost		2.3	Operating cost		44.4	Revenue		-12.2	Other Government impacts		2.6	Total Costs		37.1	Benefits (present value)			Rail users benefits		84.7	Non users benefits		7.4	Total quantified benefits		92.0	NPV		54.9	Quantified BCR		2.5
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NPV		54.9																																						
Quantified BCR		2.5																																						
Link to other options	Option 11a and 12a.																																							
Conclusion	Due to the option having a high value for money business case and it addressing crowding gaps on both the Tamworth and Nuneaton corridors, this option is preferred to options 11a and 12a. This option is recommended, subject to further development in order to fully understand the capacity, performance and infrastructure implications.																																							

6.8.6 Leamington Spa and Chiltern Moor Street corridor – option analysis

Table 6.15 – Leamington Spa and Chiltern

Gap reference	Consolidated gap	Gap type	Option reference	Option
JT-5	Unattractive journey time: London Marylebone – Birmingham on Chiltern route.	Journey time	-	Addressed by committed scheme (see section 6.5.1.7)
JT-6	Inappropriate journey time Oxford – Birmingham New Street.	Journey time	Option 13	Consider future opportunities for journey time improvements between Oxford and Birmingham
OC-14	Inadequate capacity on the Leamington Spa and Chiltern corridor.	On train capacity	Option 14	Assessment of demand and timetable opportunities following implementation of the Evergreen 3 project
RC-6	Poor service provision at some smaller stations within the Chilterns area.	Connectivity	Option 14	Assessment of demand and timetable opportunities following implementation of the Evergreen 3 project
RC-7	Limited rail access to London Heathrow Airport to meet London air passenger demand growth forecasts.	Connectivity	-	Addressed by other worksteam (see section 6.5.3.3)
RI-3	Limited interchange opportunities between Birmingham Central stations.	Rail interchange	-	Addressed by other worksteam (see section 6.5.3.4)
SC-2	Inadequate station capacity at Birmingham Moor Street and Birmingham Snow Hill stations.	Station capacity	-	Addressed by other worksteam (see section 6.5.3.5)
SC-3	Future station congestion at London Marylebone resulting from increased demand on Chiltern services.	Station capacity	-	Addressed by other RUSs (see section 6.5.2.8)

Option 13 – Consider future opportunities for journey time improvements between Oxford and Birmingham

Inappropriate journey time between Oxford and Birmingham New Street has been identified as a gap by stakeholders. The RUS recommends that opportunities to improve journey time on this route section be considered as part of future planned renewals and other potential capability improvement schemes.

Option 14 - Assessment of demand and timetable opportunities following implementation of the Evergreen 3 project

When assessing future capacity requirements on the Leamington Spa and Chiltern corridor, the RUS acknowledges that Chiltern Railways have a 20-year Franchise Agreement which requires them to deliver incremental additional capacity to ensure that overcrowding does not exceed set limits through the period of the Franchise Agreement. As discussed in detail in **Chapter 4**, the Chiltern Railways' commitment to provide additional capacity is being enabled in CP4 through the Evergreen 3 project and the latest timetable and train diagrams have been

included as part of the base within the RUS analysis. This project will help deliver capacity and timetable improvements to services into London Marylebone. However, the RUS analysis, presented in **Chapter 5**, indicates that without further interventions some passengers are predicted to be standing on the busiest high-peak hour services by 2020 on arrival at London Marylebone. The RUS predicts that the average high-peak hour load factor at London Marylebone on the long distance services (from Oxford and from Birmingham) would increase to approximately 120 per cent against the expected Evergreen 3 project capacity. Analysis also shows that by 2020 one long distance service from High Wycombe to Birmingham in the morning high-peak is likely to operate above train capacity.

Standing is also predicted on the suburban and commuting services into Birmingham Moor Street, although in general this is for relatively short distance and within train capacity.

The RUS has considered what might be required to address the potential crowding and connectivity issues on the route into London Marylebone. As a first step, the RUS would consider a train lengthening option as this would be likely to alleviate any future crowding on peak hour services. No business case has been undertaken at the current

6. Gaps and options

time based on an appreciation that the delivery of the Evergreen 3 project timetable, particularly for services into London Marylebone in the high-peak hour, has the potential to significantly affect demand on individual services. The RUS is currently unable to estimate passenger loadings accurately on a train-by-train level or predict what the response of other competitors may be. The RUS therefore proposes that capacity and initiatives on the Leamington Spa and Chiltern corridor should be re-assessed after a sensible period of operation of the Evergreen 3 project timetable when the full impact of this major timetable and service specification change is known. This is aligned to the commitment that Chiltern Railways has in its Franchise Agreement to review demand and capacity provision in its long-term timetable planning.

During the consultation period stakeholders requested that further consideration be given to the service provision at some smaller stations on the Chiltern route in the Greater London area. It is

suggested that the current provision of one train per hour for some stations on the Chilterns route does not provide sufficient access to employment opportunities or support planned housing growth in the next 10 years.

The RUS recognises that these areas are also served by nearby LUL stations, although the LUL services can be crowded at peak times and have longer journey times than Chiltern services. The RUS therefore proposes that the review of future demand and capacity following the introduction of the Evergreen 3 project and during the planning of future timetables on the Chiltern route includes consideration of service provision at stations in the Greater London area.

It should be noted that any enhancement to the service provision at smaller stations needs to be assessed as part of the wider route, taking into account the need to make the most effective and efficient use of the capacity available on the network.

6.8.7 Leamington Spa and Nuneaton corridor – option analysis

Gap reference	Consolidated gap	Gap type	Option reference	Option
OC-15	Overcrowding on Leamington Spa – Coventry services in the morning and evening peak, and throughout the day.	On train capacity	Option 7 (see Coventry corridor 6.8.3)	Timetable study to consider standard interval timetable for local stations and re-routeing of Reading to Newcastle service (in each direction) in each hour from the Solihull route.
RC-8	Limited access to the rail network from Kenilworth.	Connectivity	-	Addressed by other worksteam (see section 6.5.3.6)
RC-9	Limited rail provision between Nuneaton and Coventry to meet demand for rail services to Ricoh Arena and Bermuda Park.	Capacity	-	Addressed by other worksteam (see section 6.5.3.7)

Option 7 which is outlined in **section 6.8.3** considers the issue of limited capacity on the single line between Coventry and Leamington Spa as part of the options analysis for diverting the hourly Reading to Newcastle service via Coventry and Birmingham International. Overcrowding on current services between Leamington Spa and Coventry was also identified as a gap in the RUS. The requirements to support passenger and freight capacity on this line have been considered as part of the timetable study work for the Coventry corridor gaps. This timetable study work assessed whether the network could accommodate current passenger services, forecast freight growth and the proposed option to divert a Reading to

Newcastle service (in each direction) in each hour from the Solihull route. The option table outlined in **section 6.8.3** shows the results of this analysis which concluded that an infrastructure enhancement of track redoubling would be required between Milverton Jn and Kenilworth to enable current passenger services, future freight growth and the RUS option to divert the CrossCountry services to be accommodated.

As outlined in **section 6.5.3.6**, a third party project is in progress to develop a new station at Kenilworth. The RUS recognises that at the time of publication the options and timescales for development are still under consideration and are dependent on the

establishment of funding for the project. The RUS advises that any further development of the project should take account of the outputs of the capacity study outlined in **section 6.8.3** and in particular any requirement for redoubling the line between Milverton Jn and Kenilworth. As the station is

proposed to be built on this line, the project will need to consider requirements for a new station on a double track railway and ongoing communication with Network Rail is therefore recommended to ensure that the requirements are fully captured.

6.8.8 Shrewsbury – option analysis

Table 6.17 - Shrewsbury

Gap reference	Consolidated gap	Gap type	Option reference	Option
JT-7	Inadequate journey time between Wolverhampton and Shrewsbury.	Journey time	-	Addressed by other workstream (see section 6.5.3.8)
OC-16	Inadequate peak and all day capacity for passenger services between Shrewsbury and central Birmingham.	On train capacity	Option 15	Train lengthening on all service groups
RC-10	Inadequate/irregular timetable interval between rail services from Telford and Birmingham New Street.	Rail connectivity	Option 16	Wolverhampton to Shrewsbury shuttle service

Option 15a – Train lengthening of Arriva Trains Wales peak services between Shrewsbury and Birmingham International

Analysis presented in **Chapter 5** indicates that crowding on the long distance services between Shrewsbury and Birmingham New Street is predicted to become more prevalent by 2020, with some passengers having to stand for more than 30 minutes on the busiest morning peak services. The latest version of the CP4 operational plan is considered as part of the base for the option analysis to lengthen the busiest services from Shrewsbury (both London Midland and Arriva Trains Wales) to address this crowding. Based on the CP4 operational plan available at the time, the Draft for Consultation recommended train lengthening on one morning and one evening Arriva Trains Wales service by one vehicle each (attached/detached at Shrewsbury) in addition to the lengthening of two London Midland morning and evening services by one vehicle each.

Following the consultation period, the analysis has been updated following requests from stakeholders. Consultation responses suggested that demand had increased on the Shrewsbury line in excess of that predicted by the RUS which would strengthen the business case for further train lengthening. Requests were made for the business case to be reviewed based on 2010 and 2011 Arriva Trains Wales weekday passenger counts.

As the latest CP4 operational plan shows that additional capacity is provided on the Shrewsbury to Birmingham New Street services, both the Arriva Trains Wales and London Midland business cases have been revised to examine the case for further intervention over and above the CP4 operational plan. The results of the analysis are presented below.

6. Gaps and options

Assessment of Option 15a	Lengthening of Arriva Trains Wales peak services between Shrewsbury and Birmingham International																										
Gaps addressed	Consolidated gap OC-16: Inadequate peak and all day capacity for passenger services between Shrewsbury and central Birmingham.																										
Concept	Lengthen two morning and two evening peak Arriva Trains Wales services between Shrewsbury and Birmingham International.																										
Operational analysis	Analysis shows that by 2020 passengers would be standing for more than 30 minutes in the peak. This analysis assesses the case of providing more vehicles. It is assumed that two morning peak Aberystwyth to Birmingham International services would have an additional vehicle attached to the train at Shrewsbury and they make three round trips per day.																										
Infrastructure required	None.																										
Passenger impact	Reduced crowding between Shrewsbury and Birmingham.																										
Freight impact	Current and future freight demand can be accommodated.																										
Financial and economic analysis	<p>The main costs relate to the mileage covered by the additional vehicles. The case was considered for starting the vehicles at Aberystwyth but the mileage related costs were too high to give a good value-for-money business case. The option of attaching and detaching the additional vehicles at Shrewsbury is considered and the following reports the business case:</p> <table border="1"> <thead> <tr> <th>30-year appraisal</th> <th>£ million (2002 PV)</th> </tr> </thead> <tbody> <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>5.7</td> </tr> <tr> <td>Revenue</td> <td>-1.7</td> </tr> <tr> <td>Other Government impacts</td> <td>0.3</td> </tr> <tr> <td>Total Costs</td> <td>4.4</td> </tr> <tr> <td colspan="2">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td>5.4</td> </tr> <tr> <td>Non-users benefits</td> <td>1.2</td> </tr> <tr> <td>Total quantified benefits</td> <td>6.6</td> </tr> <tr> <td>NPV</td> <td>2.2</td> </tr> <tr> <td>Quantified BCR</td> <td>1.5</td> </tr> </tbody> </table>	30-year appraisal	£ million (2002 PV)	Costs (present value)		Investment cost	0.0	Operating cost	5.7	Revenue	-1.7	Other Government impacts	0.3	Total Costs	4.4	Benefits (present value)		Rail users benefits	5.4	Non-users benefits	1.2	Total quantified benefits	6.6	NPV	2.2	Quantified BCR	1.5
30-year appraisal	£ million (2002 PV)																										
Costs (present value)																											
Investment cost	0.0																										
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Revenue	-1.7																										
Other Government impacts	0.3																										
Total Costs	4.4																										
Benefits (present value)																											
Rail users benefits	5.4																										
Non-users benefits	1.2																										
Total quantified benefits	6.6																										
NPV	2.2																										
Quantified BCR	1.5																										
Link to other options	Option 15b.																										
Conclusion	<p>A medium value for money business case exists to lengthen two morning and two evening services by one vehicle each.</p> <p>This option is recommended for implementation as soon as rolling stock becomes available. With option O-15b the overall recommendation for lengthening between Wolverhampton and Shrewsbury is three morning Shrewsbury to Birmingham services (one for London Midland and two for Arriva Trains Wales that continue to Birmingham International) by one vehicle each. These additional vehicles can then be used to lengthen three evening Birmingham to Shrewsbury services.</p>																										

Option 15b – Train lengthening of London Midland peak services between Birmingham New Street and Shrewsbury

Assessment of Option 15b	Lengthening of London Midland peak services between Shrewsbury and Birmingham New Street																										
Gaps addressed	Consolidated gap OC-16: Inadequate peak and all day capacity for passenger services between Shrewsbury and central Birmingham.																										
Concept	Lengthening one morning and one evening peak London Midland services by one vehicle each.																										
Operational analysis	<p>The latest London Midland's CP4 operational plan will deliver more capacity than previously planned for between Shrewsbury and Birmingham New Street. Analysis shows that by 2020, standing would be observed on one morning and one evening Shrewsbury to Birmingham New Street service with some passengers having to stand for more than 30 minutes.</p> <p>The option assesses the business case of providing additional vehicles for this service by 2020.</p>																										
Infrastructure required	None.																										
Passenger impact	Lengthening these services helps to reduce on-train crowding.																										
Freight impact	Current and future freight demand can be accommodated.																										
Financial and economic analysis	<p>The main costs relate to rolling stock. It is assumed that each additional vehicle would make three round trips per day.</p> <p>The following table outlines the appraisal results:</p> <table border="1"> <thead> <tr> <th>30 year appraisal</th> <th>£m (2002 PV)</th> </tr> </thead> <tbody> <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>2.0</td> </tr> <tr> <td>Revenue</td> <td>-1.0</td> </tr> <tr> <td>Other Government impacts</td> <td>0.2</td> </tr> <tr> <td>Total Costs</td> <td>1.3</td> </tr> <tr> <td colspan="2">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td>1.9</td> </tr> <tr> <td>Non-users benefits</td> <td>0.5</td> </tr> <tr> <td>Total quantified benefits</td> <td>2.3</td> </tr> <tr> <td>NPV</td> <td>1.1</td> </tr> <tr> <td>Quantified BCR</td> <td>1.9</td> </tr> </tbody> </table> <p>This option provides medium value for money business case.</p>	30 year appraisal	£m (2002 PV)	Costs (present value)		Investment cost	0.0	Operating cost	2.0	Revenue	-1.0	Other Government impacts	0.2	Total Costs	1.3	Benefits (present value)		Rail users benefits	1.9	Non-users benefits	0.5	Total quantified benefits	2.3	NPV	1.1	Quantified BCR	1.9
30 year appraisal	£m (2002 PV)																										
Costs (present value)																											
Investment cost	0.0																										
Operating cost	2.0																										
Revenue	-1.0																										
Other Government impacts	0.2																										
Total Costs	1.3																										
Benefits (present value)																											
Rail users benefits	1.9																										
Non-users benefits	0.5																										
Total quantified benefits	2.3																										
NPV	1.1																										
Quantified BCR	1.9																										
Link to other options	Option 15a.																										
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available. With option O-15a the overall recommendation for lengthening between Wolverhampton and Shrewsbury is three morning Shrewsbury to Birmingham services (one London Midland and two Arriva Trains Wales) by one vehicle each. These additional vehicles can then be used to lengthen three evening Birmingham to Shrewsbury services.																										

6. Gaps and options

Option 16 – Wolverhampton to Shrewsbury shuttle service

A new gap was identified during the consultation period based on the uneven timetable intervals at some stations on the route between Wolverhampton and Shrewsbury. The RUS was asked to consider in particular the need to address this issue in light of the planned expansion of Telford and Cosford areas. Stakeholders suggest that the irregular spacing of current services could deter passengers from using rail and therefore impede economic growth in these towns.

The RUS has considered potential constraints which influence the current service intervals on

the route. A high level assessment was undertaken of the benefits of introducing a Wolverhampton to Shrewsbury shuttle service, either to replace or as an addition to the current London Midland Birmingham New Street to Shrewsbury service. Analysis has demonstrated that this would be difficult to achieve with the current service mix due to timetabling conflicts. The option would also not serve wider requirements for travel between Shrewsbury and Birmingham. The RUS therefore concludes that operational solutions should be sought in future timetable recasts, as this would be the best time to review the whole of the corridor, not just services at one station.

6.8.9 Stafford and Wolverhampton – option analysis

Table 6.18 - Stafford and Wolverhampton

Gap reference	Consolidated gap	Gap type	Option reference	Option
JT-8	Inadequate journey time between Birmingham New Street and Manchester Piccadilly.	Journey time	-	Addressed in other RUSs (see section 6.5.2.9)
OC-17	Inadequate peak and all day capacity on the Stafford and Wolverhampton corridor.	On train capacity	Option 17	Train lengthening of one local peak Wolverhampton to Birmingham New Street service
OC-18	Inadequate capacity between Manchester Piccadilly and Birmingham New Street.	On train capacity	-	Addressed in other RUSs (see section 6.5.2.9)
OC-19	Inadequate capacity between Stafford and Birmingham New Street.	On train capacity	Option 18	Train lengthening between Birmingham New Street and Liverpool Lime Street

The Stafford and Wolverhampton corridor has a mixture of interurban long distance and local suburban services. It is predicted that by 2020, several long distance services would have passengers standing from Wolverhampton. On the busiest trains, standing would start even further back, such as from Stafford. The level of crowding is high on these services as they both serve long distance travellers as well as local commuters. Crowding is more prevalent in the morning peak.

Option 17 – Train lengthening of one local peak Wolverhampton to Birmingham New Street service

Assessment of Option 17	Train lengthening one local peak Wolverhampton to Birmingham New Street service
Gaps addressed	Gap OC-17: Inadequate peak and all day capacity on the Stafford and Wolverhampton corridor.
Concept	Lengthen the busiest service starting at Wolverhampton that calls at intermediate stations by one vehicle.
Operational analysis	Require additional rolling stock.
Infrastructure required	No additional infrastructure is required to support this option.
Passenger impact	Reduce number of passengers standing.
Freight impact	Current and future freight demand can be accommodated.
Financial and economic analysis	Analysis shows that by 2020 there would be some passenger standing on the busiest peak train, however all standing would be within train capacity (including standing capacity) and no passengers would be required to stand for more than 20 minutes. Consequently train lengthening is unlikely to generate enough benefit to justify the additional vehicle leasing and mileage-related cost.
Link to other options	None.
Conclusion	There is not a value for money business case to lengthen one peak local Wolverhampton to Birmingham service on this corridor by 2020. This option is therefore not recommended.

Option 18 – Train lengthening between Birmingham New Street and Liverpool Lime Street

The RUS has analysed the business case for lengthening the local peak Wolverhampton to Birmingham New Street services and the Liverpool Lime Street/Crewe to Birmingham New Street services.

6. Gaps and options

Assessment of Option 18	Lengthening of Liverpool Lime Street to Birmingham New Street peak services																																										
Gaps addressed	Consolidated gap OC-17: Inadequate peak and all day capacity on the Stafford and Wolverhampton corridor.																																										
Concept	Lengthen one morning Liverpool Lime Street to Birmingham New Street and one evening Birmingham New Street to Liverpool Lime Street peak train.																																										
Operational analysis	No additional services required.																																										
Infrastructure required	No additional infrastructure is required to support this option.																																										
Passenger impact	Without lengthening the busiest Liverpool Lime Street to Birmingham New Street service, standing would be observed between Wolverhampton and Birmingham New Street. Lengthening this service helps to alleviate crowding.																																										
Freight impact	Current and future freight demand can be accommodated.																																										
Financial and economic analysis	<p>The main costs relate to rolling stock. The option of lengthening by one-car is considered and its gives a medium value for money business case. However it is not practical to lengthen the existing Class 350 (EMU of four cars per unit) by one vehicle each. Consequently the business case for lengthening by one unit of Class 350 (four-car) is considered. The following table outlines the appraisal results:</p> <table border="1"> <thead> <tr> <th colspan="3" style="text-align: right;">£million (2002 PV)</th> </tr> <tr> <th style="text-align: left;">30-year appraisal</th> <th style="text-align: center;">Option 1: Add one car</th> <th style="text-align: center;">Option 2: Add one unit (of 4-car)</th> </tr> </thead> <tbody> <tr> <td colspan="3">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Operating cost</td> <td style="text-align: center;">3.0</td> <td style="text-align: center;">11.9</td> </tr> <tr> <td>Revenue</td> <td style="text-align: center;">-1.3</td> <td style="text-align: center;">-3.3</td> </tr> <tr> <td>Other Government impacts</td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.5</td> </tr> <tr> <td>Total costs</td> <td style="text-align: center;">1.8</td> <td style="text-align: center;">9.1</td> </tr> <tr> <td colspan="3">Benefits (present value)</td> </tr> <tr> <td>Rail users benefits</td> <td style="text-align: center;">2.0</td> <td style="text-align: center;">4.6</td> </tr> <tr> <td>Non-users benefits</td> <td style="text-align: center;">0.6</td> <td style="text-align: center;">1.6</td> </tr> <tr> <td>Total quantified benefits</td> <td style="text-align: center;">2.7</td> <td style="text-align: center;">6.2</td> </tr> <tr> <td>NPV</td> <td style="text-align: center;">0.9</td> <td style="text-align: center;">-2.9</td> </tr> <tr> <td>Quantified BCR</td> <td style="text-align: center;">1.5</td> <td style="text-align: center;">0.7</td> </tr> </tbody> </table> <p>The option offers no value for money business case if the service is to be lengthened by four vehicles.</p>	£million (2002 PV)			30-year appraisal	Option 1: Add one car	Option 2: Add one unit (of 4-car)	Costs (present value)			Investment cost	0	0	Operating cost	3.0	11.9	Revenue	-1.3	-3.3	Other Government impacts	0.1	0.5	Total costs	1.8	9.1	Benefits (present value)			Rail users benefits	2.0	4.6	Non-users benefits	0.6	1.6	Total quantified benefits	2.7	6.2	NPV	0.9	-2.9	Quantified BCR	1.5	0.7
£million (2002 PV)																																											
30-year appraisal	Option 1: Add one car	Option 2: Add one unit (of 4-car)																																									
Costs (present value)																																											
Investment cost	0	0																																									
Operating cost	3.0	11.9																																									
Revenue	-1.3	-3.3																																									
Other Government impacts	0.1	0.5																																									
Total costs	1.8	9.1																																									
Benefits (present value)																																											
Rail users benefits	2.0	4.6																																									
Non-users benefits	0.6	1.6																																									
Total quantified benefits	2.7	6.2																																									
NPV	0.9	-2.9																																									
Quantified BCR	1.5	0.7																																									
Link to other options	Train lengthening options on long distance services between Manchester Piccadilly and Bournemouth and on local services between Shrewsbury and Birmingham will help to increase capacity between Wolverhampton and Birmingham New Street. These options would help to further address crowding between Wolverhampton and Birmingham New Street.																																										
Conclusion	<p>This option is not recommended as the crowding levels are not high enough to justify the extra unit of rolling stock and mileage-related cost. However if the opportunity of vehicle cascade arises, then it should consider operating the Liverpool Lime Street to Birmingham New Street peak hour service with higher capacity rolling stock.</p> <p>The timetable interventions between Birmingham New Street and Manchester Piccadilly considered in the West Coast Main Line RUS may help to increase capacity between Stafford/Wolverhampton and Manchester Piccadilly and therefore crowding is likely to be reduced on the Liverpool Lime Street to Birmingham New Street services on the approach to Birmingham New Street.</p>																																										

6.8.10 Stourbridge – option analysis

Gap reference	Consolidated gap	Gap type	Option reference	Option
JT-10	Inappropriate journey time between Birmingham, Stourbridge and Kidderminster.	Journey time	Option 19	Consider future opportunities for journey time improvements between Worcester and Birmingham, via Stourbridge
OC-20	Inadequate peak capacity for passenger services between and Stourbridge and Birmingham.	On train capacity	Option 20	Train lengthening between Stourbridge and Birmingham

Option 19 – Consider future opportunities for journey time improvements between Birmingham and Stourbridge

The RUS recommends that opportunities to improve journey time on the Stourbridge line be considered as part of future planned renewals and other potential capability improvement schemes.

The RUS recognises the option of a turn back facility at Rowley Regis being considered by Centro as part of this review. This facility would enable a timetable pattern change to facilitate an inner suburban all-stations service and the speeding up of outer-suburban services.

Option 20 – Train lengthening between Worcester and Birmingham via Stourbridge

This corridor is one of the busiest corridors in the West Midlands and Chilterns RUS area and it has been identified that in 2020, standing for more than 20 minutes would become more common. Options of lengthening the busiest service have been developed to address crowding.

Assessment of Option 20	Train lengthening one morning peak Worcester to Birmingham via Stourbridge service
Gaps addressed	Consolidated gaps OC-20: Inadequate peak capacity for passenger services between Stourbridge and Birmingham. Inadequate capacity to meet growth in demand for rail services between Birmingham and Stourbridge.
Concept	Lengthen one morning peak and one evening peak Worcester to Birmingham Snow Hill service via Stourbridge.
Operational analysis	Require additional rolling stock.
Infrastructure required	No additional infrastructure is required to support this option.
Passenger impact	The London Midland franchise has a commitment to replace the current Class 150 fleet with new Class 172's. The Class 172 vehicle has a greater capacity volume in comparison with the Class 150, due to more available standing space. Subsequently, the London Midland HLOS capacity proposal injects additional vehicles through the retention in a small fleet of Class 150 vehicles. The base includes the additional capacity generated by the design of the Class 172 vehicle and the proposed London Midland operational plan which deploys retained Class 150 vehicles. Analysis shows that even with these vehicles, one morning peak hour service would still have passengers standing for more than 20 minutes and lengthening this train will help to alleviate crowding. This option assesses the business case for providing vehicles beyond the CP4 operational plan.
Freight impact	Current and future freight demand can be accommodated.

6. Gaps and options

Assessment of Option 20	Train lengthening one morning peak Worcester to Birmingham via Stourbridge service	
Financial and economic analysis	The main costs relate to rolling stock. The option assumes each additional vehicle makes three round trips per day as it cannot be detached/attached at Birmingham Snow Hill in the off-peak hours. The following table outlines the appraisal results.	
	30-year appraisal £ million (2002 PV)	
	Costs (present value)	
	Investment cost	0
	Operating cost	2.4
	Revenue	-0.6
	Other Government impacts	0.1
	Total Costs	2.0
	Benefits (present value)	
	Rail users benefits	1.5
	Non-users benefits	0.3
	Total quantified benefits	1.8
	NPV	-0.2
	Quantified BCR	0.9
Link to other options	None.	
Conclusion	<p>This option is therefore not recommended as it is not value for money to lengthen peak local services on this corridor beyond the Control Period 4 Delivery plan by 2020.</p> <p>The RUS acknowledges that a review of the service patterns on this corridor is planned which may identify the requirement for additional infrastructure and/or timetable intervention. The RUS recognises the potential option of a turn back facility at Rowley Regis being considered by Centro as part of this review. This facility would enable a timetable pattern change to facilitate an inner suburban all stations service and the speeding up of outer suburban services.</p> <p>In addition to this, it has been identified that the ability to reattach units at Birmingham Snow Hill station to strengthen services is currently constrained due to signalling arrangements in the station area. This is preventing optimal use of rolling stock deployment which could help relieve overcrowding on this corridor. In association with the timing of the Birmingham City Centre Metro scheme, a GRIP Stage 2 feasibility study is currently underway to review the platforming requirements at Birmingham Snow Hill station. If this scheme progresses to GRIP Stage 3 (option development), it will review and estimate costs of the signalling work required to enable units to be reattached at the station to improve utilisation of rolling stock on this corridor in order to increase capacity.</p>	

6.8.11 Stratford-upon-Avon – option analysis

Table 6.20- Stratford-upon-Avon

Gap reference	Consolidated gap	Gap type	Option reference	Option
OC-21	Inadequate peak and all day capacity between Stratford-upon-Avon and Birmingham Moor Street.	On train capacity	Option 21	Train lengthening of one morning peak service between Stratford-upon-Avon and Birmingham.

Option 21 – Train lengthening of one morning peak service between Stratford-upon-Avon and Birmingham

Assessment of Option 21	Train lengthening one morning peak Stratford–upon–Avon to Birmingham service
Gaps addressed	Consolidated gap OC-21: Inadequate peak and all day capacity between Stratford-upon-Avon and Birmingham Moor Street.
Concept	Lengthen the busiest Stratford-upon-Avon/Shirley to Birmingham service by one vehicle.
Operational analysis	Requires additional rolling stock.
Infrastructure required	No additional infrastructure over and above what is already committed for CP4 is required to support this option.
Passenger impact	The London Midland franchise has a commitment to replace the current Class 150 fleet with new Class 172's. The Class 172 vehicle has a greater capacity volume in comparison with the Class 150. Subsequently, the London Midland CP4 operational plan proposal provides additional vehicles through the retention of a small fleet of displaced Class 150 vehicles. The base includes the additional capacity generated by the design of the Class 172 vehicle and the proposed London Midland CP4 operational plan which deploys retained Class 150 vehicles.
Freight impact	Current and future freight demand can be accommodated.
Financial and economic analysis	Analysis shows that with the planned CP4 vehicles, there would be sufficient capacity to meet expected demand in 2020. Some standing for less than 20 minutes would still be observed on the busiest services. However it is anticipated that the benefit of crowding relief from train lengthening beyond the CP4 operational plan would not be high enough to justify the additional vehicle and mileage related cost. The business case is weakened by the fact that it assumes the additional vehicle(s) would have to operate all day because at present it is not possible to split the trains at Birmingham Snow Hill due to signalling constraints.
Link to other options	None.
Conclusion	It is not value for money to lengthen peak local services on this corridor beyond the CP4 operational plan by 2020. This option is therefore not recommended. It has been identified that the ability to reattach units at Birmingham Snow Hill station to strengthen services is currently constrained due to signalling arrangements in the station area. In association with the timing of the Birmingham City Centre Metro scheme, a GRIP Stage 2 feasibility study is currently underway to review the platforming requirements at Birmingham Snow Hill station. If this scheme progresses to GRIP Stage 3 (option development), it will review and estimate costs of the signalling work required to enable units to be reattached at the station. If signalling is improved at Birmingham Snow Hill station there may be an opportunity to review the utilisation of rolling stock on this corridor in order to increase capacity.

6. Gaps and options

6.8.12 Worcester and Hereford – option analysis

Table 6.21 - Worcester and Hereford				
Gap reference	Consolidated gap	Gap type	Option reference	Option
OC-22	Inadequate capacity to meet growth in demand for rail services between Birmingham New Street and Worcester/Hereford.	On train capacity	Option 22	Train lengthening on all services groups between Birmingham New Street and Worcester/Hereford via Bromsgrove
			Option 23	Timetable intervention to provide additional services in the off peak hours between Birmingham New Street and Worcester/Hereford
			Option 24	Consider future opportunities for infrastructure interventions between Worcester and Hereford to improve capacity and journey times
JT-10	Inappropriate journey time Worcester and Hereford.	Journey time	Option 24	Consider future opportunities for infrastructure interventions between Worcester and Hereford to improve capacity and journey times
RC-11	Limited rail service provision between Worcester and areas south of Worcester	Connectivity	Option 25	Timetable interventions to provide additional services from Worcester to the south

Option 22 – Train lengthening on all service groups between Worcester/ Hereford via Bromsgrove

Demand for rail services on the Hereford and Worcester corridor is expected to increase. In particular at Hereford, improving access to employment opportunities and services in the surrounding urban areas is a key objective in Hereford's Local Transport Plan. The RUS also notes the recent growth at Worcester University, which is close to Worcester Foregate station.

In both Hereford and Worcester, it is recognised that there is the need for improved rail access, in the

context of population changes, housing developments and to support sustainable economic growth.

The RUS capacity analysis predicts that by 2020 one Hereford to Birmingham New Street service via Bromsgrove in the morning peak will have passengers standing from Worcester (which is more than half an hour from Birmingham city centre). In order to address this overcrowding and to help improve rail access for both areas, options for train lengthening and timetable interventions have been assessed. This will enable increases in service frequency between Worcester and Birmingham New Street via the Lickey Line to accommodate forecast passenger demand.

Assessment of Option 22	Train lengthening on all service groups between Birmingham New Street and Worcester/Hereford via Bromsgrove																																							
Gaps addressed	Consolidated gap OC-22: Inadequate capacity to meet growth in demand for rail services between Birmingham New Street and Worcester/Hereford.																																							
Concept	Lengthening one morning peak service Hereford to Birmingham New Street via Bromsgrove and one evening peak service in the opposite direction by one vehicle each.																																							
Operational analysis	The base includes London Midland's CP4 operational plan which increases capacity in the three-hour morning peak to the Hereford – Birmingham New Street service group. This option assesses additional vehicles beyond the CP4 operational plan.																																							
Infrastructure required	No additional infrastructure is required. However this option assumes selective door operation will be used at some stations to avoid the cost of platform lengthening.																																							
Passenger impact	Increased capacity and reduced crowding on services between Birmingham New Street and Worcester/Hereford. More detailed timetable modelling work will be required during the further development of this option to understand the capacity implications for routeing further services on the route between Bromsgrove and Birmingham New Street.																																							
Freight impact	More detailed timetable modelling work will be required during the further development of this option to understand the capacity implications for routeing further services on the route between Bromsgrove and Birmingham New Street.																																							
	<p>One morning and one evening peak train to become six-car rather than five-car as per the CP4 Operational Plan. Assume each additional vehicle can be attached and detached during the off-peak hours to minimise operating costs and the appraisal assumes it makes one round trip per day. Sensitivity test of three round trips. The main costs relate to rolling stock.</p> <p>The following table outlines the appraisal results:</p> <table border="1"> <thead> <tr> <th>30-year appraisal</th> <th>Assume one round trip per day £m (2002 PV)</th> <th>Assume three round trips per day £m (2002 PV)</th> </tr> </thead> <tbody> <tr> <td colspan="3">Costs (present value)</td> </tr> <tr> <td>Investment cost</td> <td>0</td> <td>0</td> </tr> <tr> <td>Operating cost</td> <td>2.4</td> <td>3.7</td> </tr> <tr> <td>Revenue</td> <td>-1.7</td> <td>-1.7</td> </tr> <tr> <td>Other Government impacts</td> <td>0.3</td> <td>0.3</td> </tr> <tr> <td>Total costs</td> <td>1.1</td> <td>2.3</td> </tr> <tr> <td colspan="3">Benefits (Present Value)</td> </tr> <tr> <td>Rail users benefits</td> <td>2.7</td> <td>2.7</td> </tr> <tr> <td>Non-users benefits</td> <td>0.8</td> <td>0.8</td> </tr> <tr> <td>Total quantified benefits</td> <td>3.5</td> <td>3.5</td> </tr> <tr> <td>NPV</td> <td>2.4</td> <td>1.2</td> </tr> <tr> <td>Quantified BCR</td> <td>3.2</td> <td>1.5</td> </tr> </tbody> </table> <p>It is noted that some demand at Bromsgrove may shift to the Cross City service group following the HLOS service changes and therefore demand on the Hereford via Bromsgrove services may not be as high, however this would not affect the value for money of the business case. This is because standing is predicted to start from as far as Worcester by 2020 and the morning peak service considered for lengthening does not call at Bromsgrove currently. This appraisal does not include the cost of platform lengthening at a number of stations that cannot accommodate a six-car service and therefore this recommendation can only be made subject to the use of selective door operation.</p>	30-year appraisal	Assume one round trip per day £m (2002 PV)	Assume three round trips per day £m (2002 PV)	Costs (present value)			Investment cost	0	0	Operating cost	2.4	3.7	Revenue	-1.7	-1.7	Other Government impacts	0.3	0.3	Total costs	1.1	2.3	Benefits (Present Value)			Rail users benefits	2.7	2.7	Non-users benefits	0.8	0.8	Total quantified benefits	3.5	3.5	NPV	2.4	1.2	Quantified BCR	3.2	1.5
30-year appraisal	Assume one round trip per day £m (2002 PV)	Assume three round trips per day £m (2002 PV)																																						
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Total quantified benefits	3.5	3.5																																						
NPV	2.4	1.2																																						
Quantified BCR	3.2	1.5																																						
Link to other options	None.																																							
Conclusion	Analysis has identified that a high value for money business case exists for train lengthening of one Hereford to Birmingham New Street morning and evening service. It is noted that selective door operation would be required due to the short platforms at some stations on the route. This option is recommended, subject to further development taking into account freight growth and committed passenger service extensions on the route between Birmingham New Street and Bromsgrove.																																							

6. Gaps and options

Option 23 – Timetable intervention to provide additional services in the off-peak hours between Birmingham New Street and Worcester/Hereford

Assessment of Option 23	Timetable intervention to provide additional services in the off-peak hours between Birmingham New Street and Worcester/Hereford
Gaps addressed	Consolidated gap OC-22: Inadequate capacity to meet growth in demand for rail services between Birmingham New Street and Worcester/Hereford.
Concept	Provision of an additional service between Birmingham New Street and Worcester Foregate Street in the off-peak hours which would provide a half-hourly service between Birmingham New Street and Worcester throughout the day. This option includes an opportunity for wider cross Birmingham connectivity through the potential to link this service to the proposed additional services between Nuneaton/Tamworth and Birmingham New Street (Option O-12b).
Operational analysis	<p>Two timetable options were analysed:</p> <p>Option 1: Nuneaton/Tamworth – Birmingham New Street – Worcester Foregate Street, then run empty stock to Henwick to reverse and layover in the Up Refuge Siding.</p> <p>Option 2: Nuneaton/Tamworth – Birmingham New Street – Worcester Foregate Street – Worcester Shrub Hill.</p> <p>The HLOS plan of extension of the Cross City service from Longbridge to Bromsgrove and Redditch was considered in the base.</p> <p>It is recognised that the option can support extension of the service from Worcester to Hereford in some hours only (Further analysis has indicated this would require an intervention at Hereford station as additional services may introduce a performance risk). Option 2 helps to increase the provision of the additional off-peak hours service to Hereford.</p> <p>The platform analysis of Birmingham New Street shows that the proposed additional hourly service between Nuneaton/Tamworth and Birmingham New Street (Option 12b) are required to link to the Worcester/Hereford services due to platform constraint at Birmingham New Street.</p>
Infrastructure required	<p>Both options require a new turnback facility at Tamworth.</p> <p>For option 2 a remodelled junction layout would be required to allow trains to run between Birmingham New Street and Worcester Shrub Hill via Worcester Foregate Street. As part of this remodelling the signalling would have to cater for three-minute headways and three-minute platform re-occupations at Worcester Foregate Street, and the lines between Henwick and east of Worcester Foregate Street would need to remain bi-directional.</p> <p>The proposed infrastructure would also allow a reduction in journey time between Worcester and Hereford due to the removal of single line restrictions through Worcester Foregate Street and the 15mph crossover at Henwick. This journey time saving has been factored into the business case.</p>
Passenger impact	<p>Increased capacity and reduced crowding on services between Birmingham New Street and Worcester.</p> <p>Connectivity between Nuneaton/Tamworth and Worcester/Hereford.</p> <p>Reduced journey time between Worcester and Hereford.</p>
Freight impact	Due to the need for further detailed analysis to understand freight requirements on the route via the Lickey Incline and the impact on capacity of increased passenger services to Bromsgrove, further development work is advised as part of this option. This further work should be undertaken, in partnership with passenger and freight operators, and take into account the anticipated changes in freight demand to 2019.

Assessment of Option 23	Timetable intervention to provide additional services in the off-peak hours between Birmingham New Street and Worcester/Hereford																																								
<p>Financial and economic analysis</p>	<p>The business case for both options 1 and 2 has been appraised as a package with Option 12b: additional hourly all day services from Nuneaton/Tamworth to Birmingham New Street. The main operating costs relate to rolling stock and staff cost. The business case assumes 19 additional drivers and train managers (including spares) are required to operate a half-hourly Hereford/Worcester – Birmingham New Street – Nuneaton/Tamworth service. The following table outlines the appraisal results:</p> <table border="1" data-bbox="627 495 1469 1120"> <thead> <tr> <th data-bbox="627 495 1007 566">60-year appraisal</th> <th data-bbox="1015 495 1246 566">£m (2002 PV) Option 1</th> <th data-bbox="1254 495 1469 566">£m (2002 PV) Option 2</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="627 577 1469 607">Costs (present value)</td> </tr> <tr> <td data-bbox="627 618 1007 647">Investment cost</td> <td data-bbox="1015 618 1246 647">2.3</td> <td data-bbox="1254 618 1469 647">7.1</td> </tr> <tr> <td data-bbox="627 658 1007 687">Operating cost</td> <td data-bbox="1015 658 1246 687">44.4</td> <td data-bbox="1254 658 1469 687">36.1</td> </tr> <tr> <td data-bbox="627 698 1007 728">Revenue</td> <td data-bbox="1015 698 1246 728">-12.2</td> <td data-bbox="1254 698 1469 728">-16.5</td> </tr> <tr> <td data-bbox="627 739 1007 768">Other Government impacts</td> <td data-bbox="1015 739 1246 768">2.6</td> <td data-bbox="1254 739 1469 768">3.4</td> </tr> <tr> <td data-bbox="627 779 1007 808">Total Costs</td> <td data-bbox="1015 779 1246 808">37.1</td> <td data-bbox="1254 779 1469 808">30.1</td> </tr> <tr> <td colspan="3" data-bbox="627 853 1469 882">Benefits (present value)</td> </tr> <tr> <td data-bbox="627 893 1007 922">Rail users benefits</td> <td data-bbox="1015 893 1246 922">84.7</td> <td data-bbox="1254 893 1469 922">44.8</td> </tr> <tr> <td data-bbox="627 934 1007 963">Non-users benefits</td> <td data-bbox="1015 934 1246 963">7.4</td> <td data-bbox="1254 934 1469 963">8.7</td> </tr> <tr> <td data-bbox="627 974 1007 1003">Total quantified benefits</td> <td data-bbox="1015 974 1246 1003">92.0</td> <td data-bbox="1254 974 1469 1003">53.5</td> </tr> <tr> <td data-bbox="627 1048 1007 1077">NPV</td> <td data-bbox="1015 1048 1246 1077">54.9</td> <td data-bbox="1254 1048 1469 1077">23.5</td> </tr> <tr> <td data-bbox="627 1088 1007 1117">Quantified BCR</td> <td data-bbox="1015 1088 1246 1117">2.5</td> <td data-bbox="1254 1088 1469 1117">1.8</td> </tr> </tbody> </table> <p>The business case is very sensitive to the number of train crew required to operate this option. If 18 sets of train crew were required instead of the 19 being assumed, then both options would offer high value for money (BCR of 2 or above). Due to the capital expenditure required to support the infrastructure in option 2, this business case has a lower value for money business case.</p>		60-year appraisal	£m (2002 PV) Option 1	£m (2002 PV) Option 2	Costs (present value)			Investment cost	2.3	7.1	Operating cost	44.4	36.1	Revenue	-12.2	-16.5	Other Government impacts	2.6	3.4	Total Costs	37.1	30.1	Benefits (present value)			Rail users benefits	84.7	44.8	Non-users benefits	7.4	8.7	Total quantified benefits	92.0	53.5	NPV	54.9	23.5	Quantified BCR	2.5	1.8
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Link to other options	Option 12b																																								
Conclusion	<p>Option 1: It is proposed that this option is a RUS recommendation, subject to further development in order to fully understand the capacity, performance and infrastructure implications.</p> <p>Option 2: Due to the higher capital expenditure that cannot be justified by the additional benefits, the RUS does not recommend further development of this option at this time but should be considered when opportunities are presented as part of future renewals and enhancement schemes. The RUS has considered other potential opportunities which would help to support the extension of the service option from Worcester to Hereford, as outlined in Option 24 (below).</p>																																								

6. Gaps and options

Option 24 – Infrastructure interventions to improve capacity and journey time between Worcester Foregate Street and Hereford

There are a number of infrastructure constraints on this corridor. These exist along the length of the corridor and also in the Worcester and Hereford station areas. These constraints include the single line sections between Great Malvern and Hereford, and in the Worcester stations area. The nature of these constraints restricts the ability to deliver enhancement opportunities, in particular journey time improvements and increased service frequency.

Whilst performance is not seen as a significant issue on this corridor, operational flexibility in the Worcester and Hereford station areas is currently a constraint in times of perturbation and is another factor which affects the ability to increase service provision and speed up journey times.

A key constraint on this corridor is the junction layout in the Worcester area. As outlined in **Option 23**, the RUS has identified a potential infrastructure intervention to remodel the junction at Rainbow Hill. This would improve the layout releasing capacity to enable additional trains to extend beyond Worcester Shrub Hill. This would also help to speed up services between Worcester and Hereford. At the current time, due to the high capital cost associated with this intervention, the RUS recognises that the most efficient way to deliver this enhancement would be through alignment with renewals opportunities.

The planned scope of the current signalling life extension works does not offer this opportunity for alignment at this time. It is therefore advised that passenger demand on this corridor should continue to be reviewed on a regular basis. This will enable the industry to understand when a business case would be strong enough to support further work to develop and deliver appropriate interventions in the Worcester area.

In addition to the single line constraints outlined above, it is recognised that improvements can be gained on the line between Worcester and Hereford through smaller scale interventions. In the Malvern area, capacity and capability is currently limited due to the signalling and track layout. It is recognised that introducing additional crossovers to the east of Great Malvern and turnback signalling on the station platforms would help to facilitate more efficient turnaround of terminating trains.

At Hereford station, similar issues restrict operational flexibility to services to and from Birmingham. This is a contributing factor to the weak business case for **Option 23** to extend additional Birmingham New Street services from Worcester to Hereford throughout the day. In advance of a sufficient value for money business case justifying more extensive infrastructure interventions, the Draft for Consultation identified that a short-term interim measure at Hereford station should be considered. A GRIP Stage 2 feasibility study is underway for the introduction of a new turnback facility at Hereford station. Currently there is no facility to reverse from the north as the layout is uni-directional. This means that significant capacity is absorbed by empty stock movements as a result of trains arriving from the north into Platform 1 or 2 and then traversing as empty stock across the main lines south of the station. If a turnback facility was provided, significant capacity could be released for the benefit of services bound towards Birmingham. Emerging results have shown that an engineering solution has been developed to create a turnback facility. It is only possible to run additional London Midland services in the hours that services from London Paddington do not run. This is due to the single line constraint between Shelwick Jn and Ledbury. This scheme is due to conclude its GRIP Stage 2 findings in May 2011, when its cost estimates and business case can be reviewed and a decision taken on whether it can progress further into GRIP Stage 3 (option development).

Option 25 - Additional services from Worcester to the South

A new gap was raised during the consultation period of the RUS regarding service provision from Worcester to the south. It was noted that there is limited service provision from the Worcester area to key locations south of the city such as Bristol, Gloucester and the south coast. The SMG agreed that there is no standard hourly pattern to key locations which is deemed to limit connectivity and suppress rail demand. A high level timetable assessment and business case has been undertaken on three service options. These are outlined below.

Assessment of Option 25	Timetable interventions to provide additional services from Worcester to the South
Gaps addressed	Consolidated gap RC-11: Limited rail service provision between Worcester and areas south of Worcester
Concept	<p>Provision of an additional hourly service between Worcester Shrub Hill and Cheltenham Spa which would provide greater connectivity for Worcester services to the south. Three options have been analysed:-</p> <p>Option 1: Extend the Bristol Temple Meads – Gloucester services to Worcester Shrub Hill</p> <p>Option 2: Extend (Maesteg) – Cardiff Central – Cheltenham Spa services to Worcester Shrub Hill</p> <p>Option 3: Extend Birmingham Snow Hill – Worcester Shrub Hill services to Gloucester</p>
Operational analysis	<p>Option 1 : Extension of Bristol Temple Meads–Gloucester service to Worcester</p> <p>A high level timetable assessment showed the services would fit into the existing Bristol Temple Meads – Great Malvern service to provide an hourly service. This involved long layovers at Worcester and would require a shunting move into the sidings. Layovers would be 53 minutes at Worcester Shrub Hill or 45 minutes at Worcester Foregate Street. This service would require two extra units.</p> <p>Option 2 : Extension of Cardiff Central–Cheltenham Spa services</p> <p>This service would require two units and a recast of the Cheltenham Spa to Cardiff Central services. In the high level timetable assessment these services would not fit with the existing Bristol Temple Meads– Great Malvern service without a timetable recast. The service option was found to conflict with CrossCountry services at Abbotswood Jn. Shorter layovers were required at Worcester – fifteen minutes at Worcester Shrub Hill or eight minutes at Worcester Foregate Street.</p> <p>Option 3 : Extension of Birmingham Snow Hill to Worcester Shrub Hill services</p> <p>This service was broken down into two further options:-</p> <p>Option 3a) considered extending these services via Stourbridge to Gloucester</p> <p>Option 3b) considered extending the Draft for Consultation recommendation for additional Tamworth to Worcester Shrub Hill services to Gloucester</p> <p>This service would require an extra two units and would not serve Worcester Foregate Street as it assumes no additional infrastructure enhancement in the Worcester area. To fit best with the existing Bristol Temple Meads to Great Malvern service the option would be required to divert away from Worcester Foregate Street to Worcester Shrub Hill. It would have potentially long dwell times at Worcester Shrub Hill on some through trains or very long layovers at Gloucester. This service also conflicted with some existing CrossCountry services without a timetable recast.</p>
Infrastructure required	None.
Passenger impact	Increased connectivity to locations south of Worcester. The journey times for passengers are assumed to be the same as existing services.
Freight impact	Current and future freight demand can be accommodated.

6. Gaps and options

<i>Assessment of Option 25</i>	<i>Timetable interventions to provide additional services from Worcester to the South</i>				
Financial and economic analysis	The high level economic and capacity analysis shows that the options are unlikely to offer medium value for money.				
	£million (2002 PV)				
	30-year appraisal	Option 1	Option 2	Option 3a	Option 3b
	Costs (present value)				
	Investment cost	0.0	0.0	0.0	0.0
	Operating cost	14.0	17.5	13.9	13.9
	Revenue	-3.5	-2.5	-3.5	-3.2
	Other Government impacts	0.8	0.5	0.8	0.7
	Total costs	11.3	15.5	11.2	11.4
	Benefits (present value)				
	Rail users benefits	9.3	6.5	9.1	8.1
	Non-users benefits	2.1	1.6	2.0	1.8
	Total quantified benefits	11.5	8.1	11.1	9.9
NPV	0.2	-7.5	-0.1	-1.5	
Quantified benefit cost ratio	1.0	0.5	0.9	0.9	
Link to other options	Option 12b				
Conclusion	The RUS does not recommend this option due to the weak business case for all options appraised. Further detailed timetable analysis is likely to show many conflicts with other passenger and freight services, therefore further reducing the value for money business case. The business case is very sensitive to the resource requirement of providing these extended services. It is recommended that resources (unit requirements and crew numbers) be reviewed to see how these could be reduced in order to improve the business case.				

6.9 Peak hour crowding

The RUS analysis has indicated that for many routes within the RUS area where crowding is evident, there is currently no medium or high value for money business case available to support train lengthening. In many cases, the analysis has shown that crowding is evident during the high-peak hours or even confined to an individual train. The RUS has concluded that on corridors where this is the case, demand should be kept under review in order to review the business case at a future date when crowding benefits may be sufficient to support a case for train lengthening or an alternative solution type from the RUS 'toolkit'.

In the interim period, the RUS advises that on corridors where no direct intervention is recommended, opportunities to address crowding are sought through minor infrastructure interventions such as turnback facilities and minor signalling enhancements which can help to address crowding. For example, on the Stourbridge corridor the RUS advises that future consideration be given to the option of a turnback facility at Rowley Regis or an improved signalling layout at Birmingham Snow Hill to help address localised crowding.

The RUS also recognises that on routes where crowding is confined to peak hours or specific trains, there may be value in developing demand management techniques alongside the conventional capacity enhancement options such as train lengthening, particularly when business cases or additional subsidy may not be available. There are a range of options that can be used to encourage passengers to travel on more lightly used trains during the shoulder peak period including the use of smartcards, travel plans and marketing techniques and more sophisticated pricing strategies. Based on the analysis undertaken, the RUS strategy proposes that these techniques may offer a potential solution to crowding on the Coventry, Cross City North and Stourbridge corridors, subject to more detailed examination.

It is appreciated that before introducing any demand management techniques, there is a need for assurance that passenger numbers on individual trains can be accurately measured prior to attempting to price tickets more accurately by individual train.

6.10 Birmingham New Street

Option O-42 – Operational Analysis – Birmingham New Street (on approach and within the station)

The Draft for Consultation reported that the RUS scope area would be modelled to assess any overall capacity and performance constraints on the central core through Birmingham New Street, arising out all the interventions recommended within the RUS. This work has been concluded and confirms that Birmingham New Street can handle the proposed additional services recommended to bridge capacity gaps between Tamworth/Nuneaton, and Worcester/Hereford, together with other proposed services that are recommended to be lengthened. In considering the medium to longer term capacity requirements that will be placed on Birmingham New Street, **Chapter 8** considers the impact of the new High Speed Line 2 between London and Birmingham and beyond.

6.11 Freight gaps

6.11.1 Introduction

During the gap analysis process the Stakeholder Management Group considered a number of freight issues that were raised on the corridors within the RUS area. These issues were considered together at a holistic level, as part of the overall analysis undertaken to consider freight growth forecasts and requirements within the RUS area. As outlined in Chapter 5, the growth forecasts used in this analysis are those agreed as part of the Strategic Freight Network (SFN) for 2019 and 2030. These forecasts have been reviewed by the freight operators within the RUS Stakeholder Management Group. Options appraisal sub groups were held to undertake option analysis with a specific focus on freight requirements, in terms of capacity and routing.

6.11.2 Freight growth up to 2030

The key findings of this analysis are that freight growth within the RUS area can be accommodated up to 2019 on the baseline infrastructure and timetable, with potentially the exception of the route between Birmingham and Bromsgrove due to uncertainties about when freight growth will materialise.

It is considered that the route between the South West and Birmingham via Bromsgrove and the Lickey Incline, will become an increasing constraint as capacity pressures on this part of the network will be exacerbated during CP4 due to the extension of electric Cross City services to Bromsgrove.

In the medium term, up to 2019, agreed industry freight forecasts and capacity analysis, indicate that there is unlikely to be a requirement for additional freight paths on this route. This is driven to a certain extent, by the expected decline in coal traffic as legislation comes into force restricting power stations that do not have fully equipped flue gas desulfurisation (FGD) technology.

Beyond 2019, the proposed Bristol Deep Sea Container Terminal in the South West is expected to generate the need for further capacity and capability enhancements within the RUS area, particularly with regard to the routing of freight trains on this corridor. The steep prevailing gradient over the Lickey Incline, introduction of the Bromsgrove electric services, and the RUS recommendation for proposed additional services each hour to Worcester present significant constraints to operating an increased number of longer and heavier freight trains on this route. However, the specifics of traffic destinations and the exact volume of trains originating from the Bristol Deep Sea Container Terminal is currently unknown. This adds to the industry uncertainty over the exact type of paths required and the timing of when freight growth will materialise on this corridor.

The RUS recognises the need to develop a strategy to cater for freight growth on this corridor in view of the uncertainties that exist with regard to when freight growth will materialise. Network Rail intends to undertake further detailed timetable and performance modelling work in CP4 to consider a number of options to accommodate projected passenger and freight growth on the route between Birmingham and Bromsgrove. Undertaking this work in CP4 will reduce the risk of not having a sufficiently developed scheme, ready to implement as and when additional freight paths are required. Timescales for the implementation of this scheme will be dictated by the nature of freight growth and when it materialises. The RUS therefore recommends more detailed analysis of the routing and timing of freight trains across this part of the network, in order to optimise the efficient use of train paths. Network Rail will develop this feasibility study in CP4.

6. Gaps and options

This development work will include a review, to at least feasibility level, of the Centro scheme which looked at the benefits of reopening the disused route between Round Oak and Walsall. The scheme has an estimated capital cost of £98m and involves reinstating the double tracks between Round Oak and Pleck Jn in Walsall, reinstating the Bescot Curve line, altering tracks at Round Oak and providing new signals. Initial analysis suggests that this scheme offers high value for money. It includes the freight benefits of accommodating freight growth by rail which is currently routed via the Bromsgrove route. Centro's work has also identified wider benefits for potential new passenger services and local area regeneration. The business case included the benefits of operating longer and heavier freight trains, the use of the route as a diversionary option for freight services, the potential to support new passenger services on the Camp Hill and Tamworth lines and Centro's proposal for a tram service in the area.

On the Derby to Birmingham corridor, it has been identified that the freight terminal at Kingsbury will need to accommodate three paths per hour from the north. The high level analysis carried out in the RUS also shows that an intervention at Kingsbury is required during Control Period 5 (2014-2019). It has also been identified that four-aspect signalling between Kingsbury and Water Orton to improve the signalling headways will also be required to support the capacity requirements on this route. This signalling intervention would be most efficiently delivered as part of a package of interventions which would include improved access to Kingsbury terminal from the north. The improvements to signalling headways is also required to accommodate the RUS recommendation for an additional hourly Tamworth to Birmingham all day service.

The RUS proposes that these inventions are developed through a feasibility study to consider potential implementation in CP5 (subject to business case and affordability) in order to support passenger and freight service requirements and address performance related issues. A GRIP Stage 2 study is currently in progress to undertake high level timetable and capacity analysis on the interventions outlined above. This package of work is recommended by this RUS for further development.

6.12 Summary

Table 6.22 summarises the RUS conclusions for specific option work undertaken during the development of this strategy.

Table 6.22: West Midlands and Chilterns RUS Option Conclusions				
Gap	Gap description	Option	Option description	RUS recommendation
Aylesbury Corridor				
JT-1	Inadequate journey time on the Aylesbury corridor.	-	Addressed by other workstream.	Options to be determined by separate workstream.
OC-3	Inadequate capacity and poor service mix on the Aylesbury corridor.			
RC-1	Poor rail connectivity between the north and south of Buckinghamshire, particularly from Aylesbury.			
Cannock and Walsall Corridor				
OC-5	Inadequate peak capacity on the Cannock and Walsall line.	Option 1	Train lengthening on all peak service groups (central scenario).	Recommended subject to further development.
RC-2	Limited access to the rail network from the Aldridge/ Brownhills area to cater for housing growth and regeneration.	Option 2	Extension of Birmingham New Street to Walsall electric services to a new station at Aldridge.	RUS supports further business case development by Centro.
RC-3	Lack of direct rail connectivity from Walsall to the north.	Option 3	Extension of Rugeley Trent Valley services to Stafford.	Not recommended.
RC-4	Limited connectivity between Walsall and Wolverhampton.	Option 4	Timetable study to consider direct services between Walsall and Wolverhampton.	RUS supports further business case development by Centro.
Coventry Corridor				
OC-6	Inadequate peak capacity on the Coventry corridor.	Option 5	Train lengthening (beyond the CP4 Delivery Plan) on all peak local service between Northampton/Coventry and Birmingham New Street.	Not recommended.
		Option 6a	Timetable study to consider standard interval timetable for local stations.	Not recommended.
		Option 6b	Timetable study to consider standard interval timetable for local stations (variation on 6a).	Not recommended.
		Option 6c	Timetable study to consider standard interval timetable for local stations and re-routing of Reading to Newcastle service (in each direction) in each hour from the Solihull route.	Not recommended.
RC-5	Lack of direct services Birmingham International/ Coventry – Derbyshire, Yorkshire and North East.	Option 7	Divert the hourly Reading to Newcastle service via Coventry and Birmingham International in both directions.	Recommended subject to further development.

6. Gaps and options

Table 6.22 (continued): West Midlands and Chilterns RUS Option Conclusions

Gap	Gap description	Option	Option description	RUS recommendation
Cross City and Lickey Corridor				
OC-9	Inadequate peak and all day capacity on the Cross City and Lickey corridor.	Option 8	Lengthening of morning peak services between Birmingham New Street and Lichfield Trent Valley.	Not recommended.
Derby and Nuneaton Corridor				
JT-4	Inadequate journey time between Birmingham New Street and Nottingham.	Option 9	Recast of timetable on Nottingham to Birmingham corridor.	Recommended (subject to further development) following implementation of Nottingham and Derby resignalling schemes.
OC-11	Inadequate capacity on the Derby, Nuneaton corridor.	Option 10	Train lengthening on long distance services between Nottingham and Birmingham.	Not recommended.
		Option 11a	Additional half-hourly service between Tamworth and Birmingham New Street (forming cross-Birmingham service to Worcester/Hereford).	Not recommended.
		Option 11b	Additional hourly service between Tamworth and Birmingham New Street (forming cross-Birmingham service to Hereford).	Not recommended as stand-alone (see Option 12b below).
		Option 11c	Additional trains in each hour between Tamworth and Birmingham New Street calling at new stations (Kingsbury, Castle Bromwich and Fort).	Centro's long-term aspiration is recognised.
OC-13a	Inadequate capacity to accommodate local demand between Hinckley/Nuneaton and Birmingham New Street	Option 12a	Additional hourly Nuneaton to Birmingham New Street service.	Not recommended as stand-alone (see Option 12b below).
		Option 12b	Additional hourly Nuneaton to Birmingham New Street and additional hourly Tamworth to Birmingham New Street service (package).	Recommended subject to further development.
Leamington Spa and Chiltern Corridor				
JT-6	Inappropriate journey time Oxford – Birmingham New Street.	Option 13	Consider future opportunities for journey time improvements between Oxford and Birmingham New Street.	To be kept under review.
OC-14	Inadequate capacity on the Leamington Spa and Chiltern corridor.	Option 14	Assessment of demand and timetable opportunities following implementation of the Evergreen 3 project	To be kept under review.
RC-6	Poor service provision at some smaller stations within the Chilterns area.			

Table 6.22 (continued): West Midlands and Chilterns RUS Option Conclusions

Gap	Gap description	Option	Option description	RUS recommendation
Leamington Spa and Nuneaton Corridor				
OC-15	Overcrowding on Leamington Spa – Coventry services in the morning and evening peak, and throughout the day.	Option 7 (see Coventry corridor)	Timetable study to consider standard interval timetable for local stations and re-routing of Reading to Newcastle service (in each direction) in each hour from the Solihull route.	Recommended subject to further development.
Shrewsbury Corridor				
OC-16	Inadequate peak and all day capacity for passenger services between Shrewsbury and central Birmingham.	Option 15	Train lengthening on all service groups.	Recommended subject to further development.
RC-10	Inadequate/irregular timetable interval between rail services from Telford and Birmingham New Street.	Option 16	Wolverhampton to Shrewsbury shuttle service.	Not recommended.
Stafford and Wolverhampton corridor				
OC-17	Inadequate peak and all day capacity on the Stafford and Wolverhampton corridor.	Option 17	Train lengthening of one local peak Wolverhampton to Birmingham service.	Not recommended.
OC-19	Inadequate capacity between Stafford and Birmingham New Street.	Option 18	Train lengthening between Birmingham New Street and Liverpool Lime Street.	Not recommended.
Stourbridge corridor				
JT-9	Inappropriate journey time between Birmingham, Stourbridge, Kidderminster and Worcester.	Option 19	Consider future opportunities for journey time improvements between Worcester and Birmingham, via Stourbridge.	To be kept under review.
OC-20	Inadequate peak capacity for passenger services between Stourbridge and central Birmingham.	Option 20	Train lengthening on all services between Birmingham and Worcester via Stourbridge.	Not recommended. The RUS recognises other potential opportunities to address this gap.

6. Gaps and options

Table 6.22 (continued): West Midlands and Chilterns RUS Option Conclusions

Gap	Gap description	Option	Option description	RUS recommendation
Stratford-upon-Avon corridor				
OC-21	Inadequate peak and all day capacity between Stratford-upon-Avon and Birmingham Moor Street.	Option 21	Train lengthening of one morning peak service between Stratford-upon-Avon and Birmingham Moor Street.	Not recommended.
Worcester and Hereford corridor				
JT-10	Inappropriate journey time between Worcester and Hereford.	Option 24	Consider future opportunities for infrastructure interventions between Worcester and Hereford to improve journey times and service provision.	To be kept under review.
OC-22	Inadequate capacity to meet growth in rail demand between Birmingham New Street and Worcester/Hereford.	Option 22	Train lengthening on all services groups between Birmingham and Worcester/Hereford via Bromsgrove.	Recommended subject to further development.
		Option 23	Timetable intervention to provide additional services between Birmingham New Street and Worcester/Hereford.	Recommended subject to further development.
		Option 24	Consider future opportunities for infrastructure interventions between Worcester and Hereford to improve journey times and service provision.	To be kept under review.
RC-11	Limited rail service provision between Worcester and areas south of Worcester.	Option 25	Timetable interventions to provide additional services from Worcester to the south.	Not recommended.

7. Consultation process

7.1 The Draft for Consultation

The West Midlands and Chilterns Route Utilisation Strategy (RUS), Draft for Consultation was published on 11th November 2010 for a 12 week consultation period which ended on 4th February 2011.

The document presented a number of gaps which were identified between the capability of the baseline rail network within the RUS area (which included committed schemes) and the requirements for both passenger and freight traffic up to 2019. A set of options was proposed for bridging the gaps, and recommendations were made based on the results of the options analysis. In line with the Government White Paper (2007) 'Delivering a Sustainable Railway', the Draft for Consultation also considered the requirements for a 30 year horizon. In line with this, a longer term strategy was presented. This recognised opportunities to increase capacity or improve rail services within the RUS area which may arise from stakeholder aspirations, uncommitted schemes and the Government policy to introduce a new High Speed Line between London and the West Midlands and beyond.

7.2 Consultation responses

The Draft for Consultation was distributed to a wide range of stakeholders and made available publicly on the Network Rail website (<http://www.networkrail.co.uk/asp/4449.aspx>). During the consultation period stakeholders were invited, either collectively or individually, to briefing sessions facilitated by both Network Rail and Passenger Focus. A number of one-to-one meetings were also held with stakeholders as requested.

This chapter outlines the feedback and key outputs from the consultation period, explaining how the responses have helped shape the development of the final strategy.

The consultation received 77 responses and respondees fell into nine broad categories which are detailed in **Figure 7.1**.

Figure 7.1 Summary of responses

Response source	Number *
Campaigning organisations	4
Government departments and agencies	3
Local Authorities and Passenger Transport Executives	18
Members of the public	10
MPs and Councillors	5
Ports, Airports and other transport organisations	5
Rail Industry	12
Rail User Groups	19
Wider business community	1

* Note: multiple responses received from the same group or individual have been counted as one response only.

The responses which Network Rail received were well-considered and in a number of cases comprehensive. As a result, it is difficult to provide an individual précis of each one. Instead some of the key and recurring themes are summarised in **Section 7.3** below.

7.3 Key themes

In general, the reaction of respondents was positive, welcoming a strategy which focused in detail on the West Midlands and Chilterns rail network and observing the consultative approach which had been followed throughout each stage of the RUS development. Stakeholders appreciated the volume of baseline information and detailed forecasting work that forms the basis of the RUS strategy. Responses were generally supportive of the gaps identified, the work undertaken to analyse the gaps and the conclusions reached in the Draft for Consultation. The recommendations were, on the whole, welcomed by respondees including the option to provide an all day half-hourly service to Tamworth, train lengthening options on routes which were forecast to become crowded, additional services to Worcester and the option to consider an alternative freight route via Round Oak and Walsall.

The following section outlines the key themes which were the focus of the consultation responses. These can be summarised into the following categories:

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- requests for the RUS position to be reviewed;
- requests for further analysis to be undertaken on current gaps and options
- proposals for new gaps to be considered
- requests for consideration of additional stakeholder aspirations.

The Stakeholder Management Group (SMG) reviewed the key themes and agreed any further work or analysis to be carried out as part of the final strategy. A summary of this further work is included with reference to the relevant sections in **Chapter 6**.

7.3.1 Review RUS position

7.3.1.1 Control Period 4 and committed scheme assumptions

Many responses expressed concern about the risks to the delivery of any of the outputs for the Control Period 4 (CP4) Delivery Plan and other committed schemes. This focused in particular on the allocation of rolling stock and the status of third party schemes which are dependent on Government funding.

The Draft for Consultation recognised that the CP4 Delivery Plan and other committed schemes may be refined before publication of the final RUS strategy. The draft strategy therefore clearly stated that any refinement to the CP4 Delivery Plan or any other committed scheme, in the form of changes to the specified outputs and funding, would directly affect the assumptions made during the gaps and options analysis. The final RUS considers whether the changes in the CP4 Delivery Plan would have any material impact on the economic appraisal analysis and subsequently the strategy.

It is noted that the Government has confirmed that funding will be available for the proposed schemes identified and committed for CP4, which includes funding for the Birmingham Gateway project, extension of Cross City services to Bromsgrove and the Redditch branch enhancement. However, at the time of publication, negotiations are continuing with train operators regarding the allocation of rolling stock to support the CP4 train lengthening plans. Based on the uncertainties surrounding the rolling stock allocation, the numbers of vehicles assumed in the final RUS strategy has been based on the known position at the time of publication. The latest CP4 capacity plan has been assessed and the impact of any changes on the capacity and demand analysis undertaken for the draft RUS has been determined, including the impact on the recommendations that have been made.

Following the Government's Comprehensive Spending Review in October 2010, there is still uncertainty regarding the status of funding for some third party schemes. **Chapter 4** has outlined all the schemes affected by this Review.

7.3.1.2 RUS passenger forecasts

In general, stakeholders welcomed the detailed analysis on which the RUS forecasts are based. There were, however, some issues raised relating to some of the assumptions and the general methodology used to establish the forecasts.

In terms of RUS methodology, some consultees have questioned the reliability of using the Passenger Demand Forecasting Handbook (PDFH) approach as it is noted that it has historically under-forecast, demand. As explained in **Chapter 5** of the Draft for Consultation and the final RUS, backcasting analysis has been undertaken to examine how well PDFH would have estimated historic growth. It showed that PDFH has estimated historic growth in the RUS area correctly once all the rail interventions that occurred in the last 10 years have been included. It should be noted that the demand forecasts presented in **Chapter 5** represents a Do-Minimum growth scenario that takes into account committed schemes. The impact of uncommitted schemes are not presented in the growth forecast. However, demand stimulated by potential rail intervention schemes, is included in the economic appraisal presented in **Chapter 6**.

Since the forecasts for the RUS were produced, it should be noted that Government policy in respect of rail fares has changed, as the cap on regulated fares is to rise to Retail Price Index (RPI) plus three per cent 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 vary depending on the rail market.

The short distance market which is dominated by commuter travel is less elastic, as many commuters have fewer alternative options available to them especially as road congestion in the urban centres is increasing in the peak hours. It is predicted that the increase in regulated fares will result in only a small reduction in demand. Therefore, in terms of the forecasts, it may take an extra year at most for the predicted demand to materialise and it does affect any of the RUS recommendations.

The impact on long distance markets is more difficult to estimate, not least because only a small percentage of fares are regulated. Given the recent strong growth in this market, it is unlikely that the change in fares policy will have a material impact on this market.

In terms of specific corridor forecasts, responses received during the consultation indicated that demand on the Cannock and Walsall corridor had increased to a greater extent than originally forecast. It was suggested that there is evidence that there has been considerable growth on this line over the past 12 months, which is higher than the levels forecast in the Draft for Consultation. Respondents also suggested that the new and

improved facilities delivered on the Cannock line, as part of the National Stations Improvement Project (NSIP), may also encourage more passengers to use the stations. A request was therefore made for the forecasts to be carefully reviewed in light of more recent passenger counts, and if necessary for the train lengthening business case to be reviewed.

Consultation respondents also suggested that growth forecasts on the Leamington Spa and Chiltern corridor may have underestimated the scale and timing of additional demand following the delivery of the Evergreen 3 project. As part of the options analysis presented in **Chapter 6** the RUS recognises that it has been difficult to estimate passenger loadings accurately on a train by train level or the response of other rail and coach competitors following the Evergreen 3 project. It is therefore recommended that this corridor be reassessed once the new Evergreen 3 project timetable has been implemented and the full impact of this major change in timetable and service specification is known. Stakeholder requests to monitor demand on this route to ensure that action is taken to address higher than forecast growth are acknowledged.

7.3.2 Further analysis proposed on current gaps and options

Several requests were made for further analysis to be undertaken on current RUS gaps and options presented in the draft RUS.

7.3.2.1 Peak demand management

Based on the RUS passenger loadings analysis, it was suggested that there may be value in the use of peak demand management techniques to address the crowding highlighted on specific trains. The RUS analysis has indicated that for many routes within the RUS area crowding is evident on individual trains rather than being consistent throughout the peak or all day timetable. It is suggested that the development of demand management techniques could offer potential future solutions to crowding which should be considered alongside the conventional capacity enhancement options such as train lengthening, particularly when business cases or additional subsidy may not be available. There are a range of options that can be used to encourage passengers to travel on more lightly used trains during the shoulder peak period, including the use of smartcards, travel plans and marketing techniques and more sophisticated pricing strategies. There is a need for assurance that passenger numbers on individual trains can be accurately measured prior to attempting to price tickets more accurately by individual train. The value of this technique for services in the RUS area has been considered, and **Chapter 6** identifies where this may be an appropriate future option to consider within the RUS area.

7.3.2.2 Earlier and later services

Consultation responses welcomed the analysis presented in the Draft for Consultation showing the first and last trains into Birmingham. Requests were made to further enhance this analysis by including the results of a similar exercise for services into London Marylebone and by identifying the key services which should be highlighted as being particularly poor. Consultees suggested services to Walsall, Stratford-upon-Avon, Hereford and Birmingham International as those which require improved service provision in the mornings, evenings and weekends. A request was made for the RUS to consider any constraints that exist to improving services to these stations. These are presented in **Chapter 6**, in section 6.6.

7.3.2.3 Cannock and Walsall line train lengthening review

As outlined in section 7.3.1.2, requests were made for the growth forecasts to be reviewed on the Cannock and Walsall corridor, with a review of the train lengthening business case if required. Further analysis has been undertaken using the autumn 2010 passenger count data and taking into account the proposed changes to the CP4 operational plan. The analysis suggested a substantial difference in growth rate to that presented in the Draft for Consultation, and consideration has been given to the demand drivers behind this, including localised road works, timetable changes and improved train performance. Due to the fact that it is difficult to explain the causes of the growth or predict that this high rate would continue for the next 10 years, the SMG agreed that the final RUS would present a business case for a central growth scenario in addition to the analysis outlined in the draft. This central growth scenario provided a medium value to money business case to lengthen three morning and three evening peak services by one vehicle each. This business case is presented in **Chapter 6**, in section 6.8.2.

7.3.2.4 Lack of direct services between Derbyshire, Yorkshire and the North East to Birmingham International and Coventry

Further development work was requested during the consultation period to understand the capacity impact and requirements of diverting the Newcastle to Reading service via Coventry and Birmingham International. The Draft for Consultation presented business case analysis for this option which indicated that the business case was very sensitive to the performance impact. The Draft for Consultation proposed that further work would be required to understand what impact other timetable developments and planned infrastructure enhancements would have on the business case. Consultation responses also requested that further work be undertaken to fully determine what

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infrastructure requirements would be needed to support freight growth and the additional Reading to Newcastle service rerouted between Leamington and Coventry. The emerging conclusions of this further work indicates that the single line between Milverton Jn and Kenilworth would not be able to accommodate freight growth to 2030, even without the additional diverted passenger service. The analysis has been presented in **Chapter 6** (section 6.8.3) and outlines what infrastructure requirements will be needed to accommodate the 2019 and 2030 freight growth, and what further requirements are driven by the option to divert the Reading to Newcastle service.

7.3.2.5 Round Oak to Walsall

The Draft for Consultation analysed the capacity requirements for forecast freight growth in the West Midlands area. The analysis undertaken assessed whether the freight growth forecasts, agreed by the Strategic Freight Network, could be accommodated on current freight routes. Consideration was also given to the implications of other potential freight growth drivers, specifically the planned growth in intermodal traffic from the port of Avonmouth in Bristol. The Draft for Consultation analysis indicated that an intervention will be needed by 2019 in order to accommodate anticipated heavier and additional freight services on the route via the steeply graded Lickey Incline due to the impact on capacity of planned new passenger services between Birmingham and Bromsgrove. As a result, the Draft for Consultation examined the business case developed by Centro for reopening the route between Round Oak and Walsall as a potential alternative route for freight to traverse the West Midlands area. It was proposed that this scheme should be considered for further development during Control Period 5 (CP5), but due to the uncertainty regarding the level of additional growth from terminals like Avonmouth, the Draft for Consultation did not give a definitive date for implementation of the scheme.

Significant concern was raised during the consultation period regarding the impact of planned new passenger services to Bromsgrove on freight capacity routed via the Lickey Incline. Responses suggested that freight capacity may become an issue following the extension of Cross City services to Bromsgrove, which would be further exacerbated by the proposed RUS recommendation for an additional hourly service between Birmingham New Street and Worcester and by the potential Camp Hill services, which form a longer term aspiration.

Responses and subsequent discussion during option sub groups held during the consultation period pointed out that the pattern and timing of freight growth was uncertain, but that there was evidence to support the view that an intervention would be required following the extension of Cross City services to Bromsgrove. In light of this,

it was considered inadequate that the Draft for Consultation had suggested that the alternative route via the re-opened Round Oak to Walsall line would not be considered for development until CP5. Stakeholders requested that more detailed consideration be carried out to understand the impact of potentially increased volumes, lengths and weights of freight traffic on this route, and options be developed prior to CP5. This development work should analyse the emerging freight growth levels in order to determine the implementation date for the scheme.

The SMG agreed that the final RUS needed to be consistent with the SFN strategy as this was based on forecasts which have been agreed by the rail industry for 2019 and 2030. The final RUS has therefore reviewed the freight forecasts for the route via the Lickey Incline and sought guidance from the SFN steering group as to the timescales when an alternative routing may need to be established. Taking into account the further capacity pressures on the line following the increased passenger services, and the need to consider less defined freight traffic that was likely to emerge, the final RUS supports the need for a study to be undertaken in CP4 to understand freight requirements and develop potential options to support freight growth as it emerges. The study and the principal considerations are presented in more detail in **Chapter 6**, in section 6.11.2.

7.3.2.6 Water Orton capacity (including additional services to Tamworth option and access to Kingsbury Oil Terminal)

Whilst consultees generally welcomed the option to increase passenger services from Tamworth to Birmingham, concern was expressed about the impact of additional passenger services on performance and capacity on the line from Tamworth to Birmingham. Requests were made for option analysis to be completed for lengthening the Nottingham to Birmingham services to verify the conclusion in the Draft for Consultation that it would produce a poor value for money business case. Analysis has been undertaken and confirmed that the business case is very sensitive to the vehicle mileage and the utilisation of the trains that are lengthened. The train lengthening case is weakened by the distance trains have to travel and is marginal in comparison to a dedicated local service option. The train lengthening analysis provided further evidence that the capacity issues are mainly localised, which supports the recommendation to provide additional local services between Tamworth and Birmingham.

The analysis for the additional Tamworth services presented in the Draft for Consultation indicated that current and future freight services could be accommodated up to 2019, when a need for a signalling headway improvement and enhanced access to Kingsbury terminal would be required.

Consultees requested that further detailed work be undertaken as there was concern that the additional passenger services would constrain capacity available for freight traffic and also have a negative effect on performance. Further development work has been carried out to determine how planned freight growth, the option to provide additional services to Tamworth and the aspiration for an additional long distance service between Yorkshire and Birmingham would affect capacity and performance on the line. The results of this further analysis and the infrastructure requirements identified as necessary to support the service specifications on the line are presented in **Chapter 6**, in section 6.8.5.

7.3.2.7 Shrewsbury line train lengthening review

A request was made for a review of the Shrewsbury line train lengthening option as presented in the Draft for Consultation. This option recommended that one morning and one evening service from the Cambrian coast to be lengthened between Wolverhampton and Birmingham (with attachment/detachment at Shrewsbury). Consultation responses suggested that demand has increased on this line since the analysis was undertaken and a request was made for the business case to be reviewed in the light of recent growth to determine whether further lengthening should be recommended. The business case was reviewed based on data for a typical week day using count data for 2010 and 2011 supplied by Arriva Trains Wales. The business case analysis is outlined in **Chapter 6**, in section 6.8.8.

7.3.2.8 Walsall to Wolverhampton local service

Some responses did not support the Draft for Consultation conclusions in relation to the option to improve connectivity between Walsall and Wolverhampton. The Draft for Consultation concluded that significant capital expenditure would be required for infrastructure at Wolverhampton station to accommodate a half-hourly interval service, and further development was therefore recommended on an hourly interval option. Some stakeholders opposed this conclusion based on the view that an hourly service would not be sufficient to attract the demand that exists for travel between the two locations, and further work was requested to focus on a half-hourly service taking into account the new potential intermediate stations proposed on the route by Centro. The final RUS provides an update on the development of the Centro scheme including the aspirations for new stations on the route, in **Chapter 6**, section 6.8.2.

7.3.2.9 Hereford and Worcester area enhancements

Several responses requested further clarity on the opportunities that are likely to be available to support the delivery of RUS recommendations on the line between Hereford and Worcester. It was

noted that the amalgamation of this line with the Stourbridge line did not work for analysis purposes, as the options considered related to the Cross City route to Birmingham. To address this, the final RUS has separated the Hereford to Worcester line and dealt with it as a separate corridor. This is reflected in the revised corridor diagram in **Chapter 2**.

Consultation responses requested that the final RUS specified in more detail what measures could be progressed to help improve the service operation on the route between Birmingham and Worcester/Hereford. The option analysis carried out to assess additional services between Birmingham New Street and Worcester showed that these services could be accommodated at Worcester Shrub Hill but would not be able to extend to Worcester Foregate Street or Hereford unless further enhancements were delivered. The enhancement at Rainbow Hill Jn, which was outlined in the Draft for Consultation, would help to enable the service to run to extend to be extended to Worcester Foregate Street and Hereford. This enhancement would also improve journey times on the existing service between Birmingham New Street, Worcester Foregate Street and Hereford by eliminating the single line bottleneck through Worcester Foregate Street and the use of slow crossovers at Rainbow Hill Jn and Henwick. The final RUS has presented potential enhancements that would improve capacity, operational flexibility and performance at Hereford station and in the Malvern Wells area. These are presented in **Chapter 6**, in section 6.8.12.

7.3.3 New gaps proposed

Several consultation responses outlined issues which were not included as identified gaps in the Draft for Consultation. These issues were reviewed by the SMG and five were recognised as new gaps requiring analysis during the consultation period. These gaps are listed below and have been outlined in more detail in **Chapter 6** in the section for the relevant corridor of which it is part:

7.3.3.1 Lack of connectivity from Walsall to the north

Stakeholders considered that the Draft for Consultation should have identified a general connectivity gap for Walsall based on the fact that it is a major population centre which, despite its location and accessibility to other rail corridors, has poor direct service connectivity to locations north of the town. Currently, in order to travel to key locations such as Liverpool and Manchester, passengers are required to interchange (mainly at Birmingham New Street). The baseline analysis presented in **Chapter 3** shows that this lengthens the total journey time for passengers to the extent that it potentially deters passengers from using rail transport and it may also constrain the economic regeneration of the town. The SMG agreed that

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this gap should be considered by the RUS and recognition be given to opportunities to improve Walsall's linkages. A high level timetable assessment and economic appraisal was undertaken to consider the case for extending the existing Walsall to Rugeley Trent Valley service to Stafford, using both 75mph and 100mph rolling stock. The results of the analysis are presented in **Chapter 6** in section 6.8.2.

7.3.3.2 Inadequate journey time between Birmingham and Nottingham

A request was made for the journey time between Birmingham and Nottingham to be recognised as a gap in the final RUS. The baseline analysis presented in **Chapter 3** shows that the average journey time between Birmingham and Nottingham and the average speed by rail is slower than between Birmingham and other cities of comparable size and distance. A request was made for the RUS to consider a target journey time of 60 minutes, which is the time Nottingham County Council has formally adopted through its Local Transport Plan, following consultation with the local business community. The gap has previously been considered by the established East Midlands RUS which evaluated three options to deliver journey time improvements on the route. These options considered line speed improvements, alternative routing opportunities and the possible savings which could be gained from operating with faster rolling stock. The SMG reviewed these options and discussed the issues which related to current timetable constraints. It was agreed that further opportunities, in addition to the outputs from the East Midlands RUS, would be available if the cross country timetable was recast following signalling renewals at Nottingham in 2013 and Derby in CP5. Further details of this review are presented in **Chapter 6** in section 6.8.5.

7.3.3.3 Inadequate capacity to accommodate local demand between Hinckley/Nuneaton and Birmingham

Several responses outlined capacity issues on services between Nuneaton/Hinckley and Birmingham, and requested that consideration be given to options to address this gap in the final strategy. It was noted that crowding is evident on both peak and off peak services, and that further analysis of passenger demand should be undertaken. The East Midlands RUS identified a capacity gap on the route between Birmingham New Street and Cambridge, via Leicester and Stansted Airport. From the analysis undertaken it recommended that the busiest Birmingham New Street to Stansted Airport services be extended through to Cambridge. In order to understand the extent of future overcrowding at Nuneaton and Hinckley the RUS has considered how far the East Midlands RUS recommendation addressed the capacity issues at these stations. The results of this assessment and the further options analysis

undertaken as part of the final strategy are presented in **Chapter 6** in section 6.8.5.

7.3.3.4 Inadequate/irregular timetable interval between rail services from Telford and Birmingham

Many responses welcomed the RUS recommendation for train lengthening on the route between Shrewsbury and Birmingham, but a request was made for further analysis to be given to the service provision at Telford station. The RUS was asked to consider the planned expansion of Telford and at other locations such as Cosford, and the impact this would have on growth on the route. It was pointed out that the increase in train capacity may help to address the growth requirements on the route. However, it does not address the issue relating to the uneven spacing of services on this line. Currently Telford does not have an evenly patterned half-hourly service. The RUS has considered the constraints which influence the current service intervals on the route and the potential benefits of introducing an additional shuttle service on the route between Wolverhampton and Shrewsbury to help provide a more evenly spaced service. The analysis is presented in more detail in **Chapter 6** in section 6.8.12.

7.3.3.5 Lack of connectivity from Worcester to the south

Further consideration into the service provision from Worcester to the south was requested by consultees. It was noted that the service provision from Worcester to key locations south of the city, such as Bristol, Gloucester and the south coast was currently poor with no standard hourly pattern, which limits connectivity and suppresses rail demand. The SMG agreed that analysis should be undertaken to consider potential solutions to this gap, focusing on the aim to provide an hourly service which offered opportunities for onward connections to areas further south. A high level timetable assessment and business case was undertaken on three service options to identify the potential constraints on the route and rolling stock resources. The three options considered were to extend the Bristol Temple Meads to Gloucester services to Worcester, to extend the Maesteg to Cardiff Central and Cheltenham Spa services to Worcester and to extend the Birmingham Moor Street to Worcester services further south to Gloucester. The SMG concluded that the high level assessment would determine whether a more detailed timetable study would be required and agreed this would only be a useful exercise where options appear to offer medium value for money. The analysis took into account the availability of train paths following the North Cotswold line redoubling and the impact this has on the London Paddington services. The high level analysis is outlined in **Chapter 6** in section 6.8.12.

Some of the new issues suggested in consultation responses for further consideration were not taken forward as new RUS gaps following SMG review. The issues raised and factors determining the decisions made by the SMG are outlined below.

7.3.3.6 Lack of connectivity between Coventry/Warwickshire and Leicester and the East Midlands

The lack of direct services between Coventry/Warwickshire and the East Midlands was considered by the SMG following requests received in consultation responses. It was agreed that the lack of connectivity was not a gap due to the available service options through interchange at other stations. The SMG considered the required infrastructure changes that would be needed to enable a direct service between these locations which include the need to enable suitable timetabling of trains across the West Coast Main Line at Nuneaton. Due to the likely high capital cost of the infrastructure changes the lack of direct connectivity was identified as an aspiration based on the Route Utilisation Objective, and precluded from further detailed analysis.

7.3.3.7 Lack of direct service between Shropshire and London

Wrexham Shropshire and Marylebone Railway (the operator of open access services between Wrexham, Shrewsbury and London Marylebone) ceased to operate services on 28th January 2011. The loss of the direct services between Shropshire and London prompted many stakeholders to request that this now be identified as a RUS gap. The SMG has considered the service provision between Shropshire and London, as well as the opportunities that may be available through future franchise changes for addressing the loss of the direct service.

The SMG determined that due to the availability of good connectivity, the request for a direct service is considered an aspiration by the RUS. This aspiration is being promoted by Shropshire residents and MPs, who are currently seeking to reinstate the service as part of the new Inter City West Coast franchise which will commence in 2012. The RUS recognises that there may be future opportunities through franchise changes and future timetable recasts to consider reinstating direct service connectivity. Refranchising is a separate industry process, which a RUS can help to inform.

7.3.3.8 Connectivity from the Chiltern line to the wider London rail network

Respondents highlighted the need for improved onward connections into the wider London rail network from the Chilterns line and London Marylebone station. London Marylebone station is currently served by London Underground Bakerloo line services, but with other Underground routes available to passengers via a short walk to Baker Street station. Consultation responses

requested that consideration be given to potential improvements to support the needs of passengers wishing to travel into other London areas for commuting and leisure travel purposes.

Stakeholders identified the option of a new integrated interchange at West Hampstead between Chilterns, Thameslink, London Overground, and London Underground services. This would require platforms on the Chiltern route. The RUS recognises that the West Hampstead interchange scheme is a long-standing aspiration of some stakeholders, which has been considered by the rail industry and feasibility work undertaken. The scheme has connectivity benefits by improving links to the wider transport network from the Chiltern line, and it could potentially help to relieve future congestion at London Marylebone. However, taking into account the disbenefits that exist, including the high capital cost and the impact on passenger capacity at West Hampstead, which is already one of the busiest stations on the London Underground Jubilee line, a funded promoter for the scheme has currently not been found.

The West Midlands and Chilterns RUS notes the aspiration for improved connectivity into the wider London network from the Chiltern route, of which an improved interchange at West Hampstead forms one potential option.

7.3.4 Aspirations

Many of the responses received are categorised as aspirations according to the Route Utilisation Objective within the RUS process. However, respondents have requested that these proposals are referenced within the strategy, because although they still require funding solutions, they provide potential future opportunities and are of particular importance for planning and development purposes. The consultation responses included requests for further aspirations to be identified in the RUS, as well as updated text on aspirations already referenced in the strategy. The further aspirations identified in consultation responses have been incorporated into **Appendix D**. They include aspirations for new stations and for reopened lines for either freight or passenger services.

We are grateful to all those who responded to the Draft for Consultation. The volume and range of responses have been from right across the spectrum and the level of interest in the RUS area has been impressive. We hope that where possible, within our terms of reference, we have been able to take account of genuine concerns.

8. Route Utilisation Strategy and longer-term vision

8.1 Introduction

This chapter draws together the conclusions from both the Draft for Consultation and the final Route Utilisation Strategy (RUS) analysis into a consolidated strategy for the West Midlands and Chilterns area, up to 2019. This strategy has been refined in the light of the consultation responses received and further analysis and option appraisal undertaken, in order to form a concluding strategy. This strategy also takes into account the conclusions of work in associated RUSs that has either been completed or is still in development.

8.2 Strategy for Control Period 4 (2009–14)

The RUS is aligned with the delivery of the key outputs specified within the High Level Output Specification (HLOS) and Control Period 4 (CP4) Delivery Plan. These committed schemes, which are presented in detail in **Chapter 4**, are summarised below:

- delivery of the HLOS capacity metrics identified for the Birmingham major urban area (Birmingham central stations) and London Marylebone
- delivery of the HLOS programme relevant to the RUS area funded through the CP4 Delivery Plan including the following key outputs:
 - Bromsgrove electrification
 - Redditch branch enhancement
 - Westerleigh Jn
 - Barnt Green Linespeed increase
 - Birmingham New Street Gateway project
 - West Midlands platform lengthening
 - National Station Improvements Programme
 - Access for All Programme
 - Strategic Freight Network
 - Seven day railway
 - Cotswold line enhancement scheme.

The strategy for CP4 also encompasses the other committed schemes presented in **Chapter 4** which include:

- Evergreen 3 project
- Transport for London/London Underground Limited planned infrastructure and service changes
- Felixstowe to Nuneaton gauge enhancement (now completed)
- Southampton to West Coast Main Line gauge enhancement (now completed)
- West Midlands area resignalling schemes

The completion of the CP4 Delivery Plan and other committed schemes will develop the existing rail network. It will facilitate the delivery of an enhanced service level and longer trains on key routes within the RUS area. **Chapter 4** has outlined the committed changes to the network which will help to resolve a substantial number of the capacity gaps and issues which have been raised in this RUS. These include the additional HLOS vehicles planned on a number of routes and the specified outputs at Bromsgrove and Redditch which will deliver the extension of Cross City services to these stations.

The major signalling renewals programme planned on a number of routes within the RUS area between 2009 and 2014 will improve capacity, performance and journey time through headway improvements and other proposed enhancement schemes.

The committed Evergreen 3 project (including the associated CP4 enhancements) and the interventions planned on the London Underground Limited (LUL) network will also help to resolve a number of capacity issues on the Chiltern line. In addition to the journey time benefits, which will be delivered by the Evergreen 3 project, the linespeed enhancement and introduction of new rolling stock will help to create additional capacity into London Marylebone during peak times. The committed interventions on the London Underground network, including new higher capacity 'S' stock and resignalling, will increase capacity on the Metropolitan line by enabling additional peak hour services to operate.

The committed schemes outlined in **Chapter 4** also help to address other types of gaps that have been raised in the RUS. The need for journey time improvement was identified on the Chilterns route between London Marylebone and Birmingham Snow Hill, between Birmingham and the South West and between Wolverhampton and Shrewsbury. These capability gaps will be addressed respectively through the Evergreen 3 project, and Westerleigh Jn to Barnet Green linespeed improvement projects. For linespeed improvements between Wolverhampton and Shrewsbury, the industry is working on a plan to address the current funding shortfall.

The need for station facility improvements at a number of stations in the RUS area is also being addressed as part of the CP4 Delivery Plan. The limited facilities at stations on the Cannock line have recently been upgraded as part of the National Stations Improvement Programme (NSIP). Station capacity at University station on the Cross City line was also identified as a gap requiring improvements to enable it to accommodate the anticipated growth in passenger numbers associated with hospital and university developments in the locality. This station is also benefiting from improvements funded through the NSIP.

The Birmingham New Street Gateway project, which received committed funding in the CP4 Delivery Plan, will help to transform the station and meet the needs of current and future passengers. Birmingham New Street is one of the busiest and most important interchange stations on the national rail network, used by around 31 million passengers per year, a substantial number of which interchange between services. The redevelopment of the station will substantially improve passenger flow, capacity and interchange. It will enhance the provision of live passenger information to assist passengers in connecting to other services, including to Birmingham Airport. This will help to address issues specific to Birmingham New Street station and also assist with interchange into the wider network. Project development work has demonstrated that the new station will be able to manage passenger growth expectations up until 2035.

8.2.1 Timetable changes

The RUS recommends a continual review of existing timetables as an ongoing measure. This includes the review of the Evergreen 3 project timetable after a sensible period of operation to ensure it is delivering the optimum service pattern and accommodating demand. RUS analysis has indicated that there may be a need for further capacity into London Marylebone during peak hours in 2019, and it is also recognised that the enhanced timetable may stimulate further demand.

The RUS strategy for CP4 focuses on the delivery of the committed schemes that form the baseline and address many of the gaps raised. The RUS recognises that these CP4 commitments will deliver significant improvements to network capacity, capability and enhance the overall operation of the railway. The predominant focus of the RUS is on capacity improvements, and the CP4 Delivery Plan and other committed schemes outlined in the RUS are recognised as being the first step in addressing the capacity related issues within the RUS area.

As this recommended strategy for CP4 is based on the delivery of the committed outputs, it is important to recognise that should there be any refinement to these outputs in the form of changes to the specified outputs or funding, the RUS strategy would have to be reviewed. If for any reason the current plans to deliver the committed schemes do not materialise, the RUS would treat the lack of output as a gap for which the original planned scheme would form a potential option.

8.2.2 Stakeholder aspirations and uncommitted schemes

In addition to the committed schemes, the RUS appreciates that there is a potential to address some of the gaps raised through uncommitted enhancement schemes or aspirations which are being developed by third parties. These include aspirations for new services or service upgrades, new stations, and station improvements. A list of aspirations and their benefits, which have a relevance to the RUS area, are outlined in **Appendix D**. It is appreciated that they are at different stages of development, with some aiming to deliver an output in CP4 and others requiring more detailed development to determine funding availability and timescales for delivery. Those which are at a more developed stage with potential funding available to support their delivery are outlined in **Table 8.1** below.

8. Route Utilisation Strategy and longer-term vision

Table 8.1 – Status of key uncommitted schemes

Aspiration	Description	Benefits	Proposer	Timescales
East-West Rail Link	Options are being developed to re-introduce passenger services from Oxford and Aylesbury to Bletchley and Milton Keynes. The East-West Rail link is being planned in three distinct phases, with the section of the proposed route between Bicester and Oxford being developed as part of the committed Evergreen 3 project.	<ul style="list-style-type: none"> ● improve east-west connectivity between Oxford and Cambridge ● support growth and development in housing and employment, ● reduce road congestion ● potentially release rail capacity within the RUS area ● potential alternative freight route between the south of England and the Midlands. ● potential diversionary route during planned or emergency blockades. 	East-West Rail Consortium	CP5
Nuneaton to Coventry rail service upgrade	Proposals for a new service between Nuneaton and Coventry with new stations at Ricoh Arena and Bermuda Park. Plans include a new six-car bay platform at Coventry station and the extension of platforms at Bedworth station.	<ul style="list-style-type: none"> ● accommodate increasing demand in the local areas associated with retail, housing and leisure developments. 	Centro in partnership with local authorities.	CP4/CP5
Stourbridge line timetable review	This service review considers the option of a turn back facility at Rowley Regis which would enable a timetable change to provide a new inner suburban service calling at all stations and journey time improvements to an outer suburban service.	<ul style="list-style-type: none"> ● reduce localised crowding that is evident in some peak hours between Stourbridge and Birmingham. 	Centro	To be determined
Aldridge station	Development of business case to provide a new station for the Aldridge/Brownhills area. This has been evaluated by this RUS, as sufficient potential demand having to justify further detailed analysis. The RUS timetable study has demonstrated that a new station at Aldridge could be best served by an extension of the Birmingham New Street to Walsall electric services. Fulfilment of the project is dependent on further work by Centro to develop the business case for Aldridge station.	<ul style="list-style-type: none"> ● improve rail access from Aldridge and Brownhills to Birmingham City Centre ● reduce road congestion ● contributes to economic regeneration ● RUS analysis has shown that the potential exists to link the Aldridge/Walsall service to the Coventry corridor to provide cross-Birmingham opportunities and increase rail connectivity to Birmingham Airport. 	Centro	To be determined

Table 8.1 – Status of key uncommitted schemes

Aspiration	Description	Benefits	Proposer	Timescales
Kenilworth station	Project to develop a new station in Kenilworth. It is noted that there is a requirement for the developers of the Kenilworth scheme to understand the results of the capacity analysis work which is continuing on the line between Leamington and Coventry. At the time of publication, early indications suggest that redoubling of parts of the single line between Milverton and Kenilworth will be required to support freight growth to 2030 and the RUS option for diverting the Reading and Newcastle service via Coventry and Birmingham International. Further development of the Kenilworth station scheme will need to consider the implications of potential double tracking in terms of any new station infrastructure.	<ul style="list-style-type: none"> ● improve rail access from Kenilworth ● reduce road congestion ● meet an increasing demand for improved public transport. 	Warwickshire County Council	To be determined

8.3 Strategy for Control Period 5 (2014–19)

8.3.1 RUS recommendations

In order to accommodate the forecast levels of passenger and freight growth up to 2019, the RUS has made recommendations for train lengthening, changes to the service provision, and infrastructure enhancements where required to facilitate such growth of both passenger and freight markets.

Train lengthening

By carrying out an analysis of forecast passenger loadings on each RUS corridor, it has been possible to identify where there may be potential capacity issues by the end of Control Period 5 (CP5). Where necessary, a business case for train lengthening has been assessed based on forecast demand analysis. The results of this work demonstrate that in the majority of cases the latest proposed CP4 capacity schemes are sufficient to cater for forecast growth to 2019, but in some cases the option of train lengthening beyond HLOS interventions is recommended to alleviate localised crowding and accommodate forecast growth.

The RUS also notes the recommendation made in the Great Western RUS to lengthen selected Manchester Piccadilly to Bournemouth services which operate via Leamington Spa and Coventry, Manchester Piccadilly to Bristol Temple Meads and Edinburgh to Plymouth services and the East Midlands RUS proposal to lengthen the Birmingham New Street to Leicester/Stansted Airport service throughout the week and at weekends.

The RUS recommends the continual review of resource allocation to match supply to demand, where it is feasible and operationally practical to do so.

Timetable interventions

In some cases, the RUS strategy recommends a timetable intervention by means of an additional or new service to address capacity or connectivity gaps on specific routes. The Draft for Consultation identified that options exist to improve and enhance services by timetable intervention and the final RUS has built on this work and made further recommendations on a number of corridors. In some cases, infrastructure enhancements are required to support the recommended timetable intervention.

The recommendations for train lengthening and timetable interventions, including proposed enhancement options where appropriate, are outlined below by corridor:

Aylesbury

The RUS supports further consideration of timetable options on the Aylesbury line where national rail services and London Underground Limited (LUL) services operate over LUL infrastructure between Harrow-on-the-Hill and Amersham. In order to be effective this consideration should be a joint exercise between Network Rail, Transport for London, London Underground and the relevant train operators, and should align with the introduction of new 'S' type rolling stock on the LUL line and longer-term resignalling plans.

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Cannock and Walsall

The RUS recommends that demand on this corridor be kept under review as demand has sharply risen over the last two years. The RUS recommends lengthening of three morning and three evening peak services between Rugeley Trent Valley and Birmingham New Street, and recognises that further lengthening may be required in the future subject to demand growth and funding availability. The RUS recommends reviewing the passenger loadings in the medium term to determine the exact number of additional vehicles required and the timing of provision of them. In the longer term, as demand materialises it is likely that the business case to support platform lengthening business will also be strengthened.

The business case produced by Centro in conjunction with Network Rail shows that a new station at Aldridge would offer high value for money. The RUS supports work by Centro to further develop the business case for extending the Birmingham New Street to Walsall electric service.

A new gap was raised during consultation to consider direct connectivity of services from Walsall to the north. Assessments have indicated that currently the business case provides poor value for money for extension of services between Birmingham New Street and Rugeley Trent Valley to Stafford. Based on the fact that timetable paths on the busy West Coast Main Line, particularly on the two track section north of Colwich Jn, are in scarce supply, the RUS proposes that opportunities should be further considered as part of the future iterative recast of the West Coast Main Line timetable announced by the Office of Rail Regulation in March 2011. The RUS supports this future review of the timetable to achieve better service connectivity to the north.

Coventry

The RUS has considered re-routing of the Reading to Newcastle service (in both directions) from its existing routeing via Solihull to the Coventry corridor, in order to provide connectivity between Coventry and Birmingham International, and the East Midlands, Yorkshire and the North East. The analysis showed that the business case offers value for money, but its level of benefits is particularly sensitive to performance on the Coventry corridor and West Coast Main Line. Analysis suggests that the redoubling of at least part of the route between Kenilworth and Milverton Jn would also be required to support this option, as this service cannot be accommodated in light of the forecast freight growth on this route without this infrastructure enhancement. A feasibility study is currently being undertaken by Network Rail to consider the infrastructure requirements and associated business case analysis.

Cross City and Lickey Incline

The RUS notes the CP4 Delivery Plan which includes enhancements on the Redditch branch and improvements at Bromsgrove to increase capacity

on this corridor and meet passenger forecasts up to 2019. The RUS recognises that further detailed capacity and timetable modelling work is required to identify that sufficient capacity is available to support current freight and passenger service requirements in addition to the proposed Cross City service enhancements.

The RUS has assessed forecast freight growth on this corridor. Due to the uncertainty about future freight service volume, train length and trailing weight, aligned with network availability, the RUS supports the need to undertake a feasibility study in CP4 to understand freight requirements on the route between Bromsgrove and Birmingham to develop potential options to support freight growth. It is recognised that one potential option that has been examined is Centro's work to develop a business case to reopen the route between Walsall and Round Oak (which offers wider passenger benefits and local area regeneration). This scheme would offer a potential alternative route for freight traffic.

In conjunction with key stakeholders, this study will assess the passenger and freight requirements on this route and it will also consider freight train operating lengths and trailing weights of services operating over this route. Early development of this study is deemed appropriate at this time, although it is recognised that there are uncertainties as to when the additional capacity is exactly required. The timing of, and funding for, the implementation of any industry agreed solution will only be understood once there is clear conformation of the nature, volume and timing of freight growth. The RUS recommends continual monitoring of this growth as part of the ongoing forecasting work undertaken by the SFN. The RUS therefore supports the further detailed capacity and timetable modelling work that is required to understand the capacity requirements on the Birmingham to Bromsgrove corridor.

Derby and Nuneaton

Derby line

The Draft for Consultation identified that there was a value for money business case to provide two additional services per hour between Tamworth and Birmingham New Street to help reduce on-train crowding. Further analysis identified that the business case would support the extension of these services to Worcester to provide an all day half-hourly Tamworth to Worcester service. Following more detailed analysis of capacity and performance, the option of half-hourly services was found to over-provide capacity which could not be supported by the high operating cost of the extra resources required. It was identified that the optimum use of the network would be the provision of an additional hourly (all day) service from Tamworth to Birmingham New Street, connecting cross-Birmingham services onto Hereford. The RUS recommends an infrastructure intervention at Tamworth to support this new hourly service.

Nuneaton line

Consultation responses and subsequent assessment identified a further capacity gap relating to inadequate passenger capacity between Nuneaton and Birmingham New Street. Following detailed analysis of capacity on both the Tamworth and Nuneaton corridors, taking into account train lengthening recommendations in the East Midlands RUS, a preferred option has been identified to make optimal use of the available capacity on both routes. This option proposes a package of additional services comprising an hourly Tamworth to Birmingham New Street service and an hourly Nuneaton to Birmingham New Street. It is proposed that these additional services connect to existing and proposed new services that operate from Birmingham New Street to Worcester Foregate Street and Hereford. The introduction of these services will improve cross-city connectivity and reduce the requirement to turn back services at an already congested Birmingham New Street station.

Analysis has been undertaken to understand capacity requirements on the line between Derby and Birmingham taking into account forecast freight growth, the recommendation for additional services between Tamworth and Birmingham and the medium term strategy outlined in the Yorkshire and Humber RUS for a third long distance service between Yorkshire and Birmingham. This analysis indicates that infrastructure interventions are required in CP5 to support freight growth and facilitate passenger service requirements. These interventions are improved access from the north into the freight terminal at Kingsbury, four-aspect signalling between Wichnor Jn and Water Orton West Jn (to provide improved headways) and a turnback facility at Tamworth. The RUS proposes that these interventions are developed through a feasibility study to consider potential implementation in CP5 (subject to business case and affordability) to support passenger service proposals and address performance related issues on this line.

The West Coast Main Line RUS, which is due to be published in July 2011, is also considering the potential for an additional long distance off-peak service from London Euston to the north west that could create increased interchange opportunities with the West Midlands area. The current economic analysis, which will be reported in the West Coast Main Line RUS, suggests that stopping at Nuneaton has greater value than stopping at Tamworth. The West Coast Main Line RUS will consider the socio-economic benefits of stopping at the other main Trent Valley stations, which includes Lichfield Trent Valley.

Leamington Spa and Chiltern

The RUS analysis of forecast passenger demand on the Leamington Spa and Chiltern corridor has shown that overall the planned Evergreen 3 project timetable, interventions provide sufficient

capacity up to 2019. However, although there may be some standing evident on short distance journeys into Birmingham Moor Street and some peak and shoulder peak hour crowding on longer distance services into London Marylebone. The RUS recommends that further consideration should be given to the timetable on this corridor after a period of operation of the Evergreen 3 project timetable. Consideration should be given to ways to improve the utilisation of rolling stock and, to deliver potential changes in calling patterns in the high-peak hours to support additional calls at stations close to London.

The RUS recognises that the growth in passenger numbers following the implementation of the Evergreen 3 project timetable, will mean increased pressure on passenger capacity at London Marylebone. In addition to the options being examined by Chiltern Railways, the RUS notes the recommendations of the Draft for Consultation Network RUS: Stations RUS to address passenger congestion at London Marylebone station.

Leamington Spa and Nuneaton

To address the connectivity gap between the North East/East Midlands and Birmingham International/Coventry, the RUS recommends that the option to divert the Reading to Newcastle service via Coventry and Birmingham International be further developed to GRIP Stage 2 (feasibility). This will consider what interventions are required to support the predicted freight growth to 2030 and the diversion of the Reading to Newcastle service.

The RUS recognises the work in development for a new station at Kenilworth. This scheme development will need to take account of any future interventions identified through the feasibility study mentioned above.

Shrewsbury

The RUS recommends train lengthening of three morning and evening Shrewsbury to Birmingham services to address on-train demand on this corridor up to 2019.

Stafford and Wolverhampton

The RUS notes the train lengthening recommendations made in the Great Western RUS for additional vehicles on the routes between Manchester Piccadilly and Bournemouth and Manchester Piccadilly and Bristol Temple Meads/Paignton. The RUS recognises the analysis being finalised in the West Coast Main Line RUS to provide further additional capacity and journey time improvements between Manchester Piccadilly and Birmingham New Street. At the time of publication of this document, emerging conclusions indicate that no value for money business cases can be demonstrated for further train lengthening on this corridor. The West Coast Main Line RUS will report the final conclusions on potential journey time improvements.

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Stratford-upon-Avon

RUS analysis has assessed train lengthening in addition to the CP4 Delivery Plan on this corridor. At the current time there is a poor value for money business case for train lengthening. However, the RUS recognises opportunities that may arise which could strengthen the business case in the future.

Stourbridge

The RUS recognises that there are crowding issues on this corridor at peak times and it has assessed the business case for train lengthening. At the current time, a value for money business case cannot be found.

The RUS supports further work being undertaken by Centro to develop a turnback facility at Rowley Regis, which would enable a timetable recast to facilitate an inner suburban all stations service and journey time improvements for outer suburban services. In addition, the RUS has identified that future opportunities may arise to review signalling arrangements at Birmingham Snow Hill station which could unlock capacity by improvements to operational flexibility. This may potentially support a future business case for train lengthening on this corridor.

Worcester and Hereford

The RUS recommends train lengthening of one Hereford to Birmingham New Street morning and evening service to accommodate predicted passenger growth by 2019.

The RUS recommends further capacity improvements during the off peak hours through the provision of an additional hourly service between Worcester/Hereford and Birmingham New Street. The RUS business case for the additional services from Tamworth and Nuneaton recommends that these services are linked to the Worcester/Hereford services throughout the day. It is acknowledged that more detailed development is required to assess network capacity on the route between Birmingham New Street and Bromsgrove in view of the committed CP4 electrified services to Bromsgrove and existing and future freight requirements.

The RUS recognises that options for additional passenger services and opportunities for potential diversion of freight services via Worcester will require further development to consider optimising infrastructure capability in this area.

Network Rail is undertaking a GRIP Stage 2 feasibility study to identify additional infrastructure that would be required at Hereford and in the Malvern Wells area to support improved capacity, operational flexibility and performance.

8.3.2 Earlier and later services

Consideration has been given to the need to provide earlier, later and improved weekend services where these are currently limited within the RUS area, particularly on long distance interurban services. It has proven difficult to develop a detailed socio-economic business case for service enhancements as there is currently a lack of robust data to reflect current demand and localised studies would be required to understand the potential demand for these services.

The RUS therefore recommends that train operators, Centro and the local authorities identify the locations within the RUS area which receive particularly poor levels of service at these times and would be considered priorities for future service enhancements. Consideration should then be given to any constraints which exist that prevent train operating companies from running additional services if they recognise that a significant gap exists. It is recognised that the seven day railway initiatives may also offer opportunities for improved train operator access to the rail network which would help to facilitate service enhancements.

8.3.3 Birmingham New Street operational capacity

The RUS has undertaken high level analysis of the operational and performance impact of the recommendations on each of the corridor routes and at Birmingham New Street station. The analysis considered whether there was sufficient platform capacity at Birmingham New Street as a result of the recommendations made, taking into account recommendations from other RUSs and all committed schemes.

The committed schemes and recommendations included in this analysis are:

- additional Class 390 vehicles
- lengthening of Manchester Piccadilly to Bournemouth, Manchester Piccadilly to Bristol Temple Meads/Paignton and Edinburgh Waverley to Plymouth long distance services
- potential diversion of long distance services between Newcastle and Reading to run via Birmingham International
- recommendation of an all day hourly service between each of Tamworth/Nuneaton and Hereford/Worcester.

The analysis also included the potential acceleration of the Aberystwyth/Holyhead to Birmingham International services delivered through the Wolverhampton to Shrewsbury linespeed improvement. (The industry is working on a plan to fund the current shortfall on this scheme.)

The analysis determined that, provided the service between Nottingham and Birmingham is interworked with the services between Stansted Airport/Leicester and Birmingham, there will be sufficient capacity at Birmingham New Street station to accommodate the recommendations made in this RUS and with minimal impact on performance.

It should be noted that the potential recommendations of the West Coast Main Line RUS were not included in this analysis as this can only be done once they are finalised. Other stakeholder aspirations and uncommitted schemes have also not been factored as they do not form established changes to the network.

During the development of the RUS it has been evident that service perturbation within the West Midlands area and particularly through the central core of Birmingham New Street can have a critical impact on other areas of the rail network. The performance modelling has been undertaken to assess the effects of the proposed RUS interventions on performance throughout the RUS area. This has been taken into account in the final strategy and has been fed through into the appropriate feasibility studies that are currently being developed for the Derby and Nuneaton corridor and the Leamington and Chiltern corridor.

8.4 Strategy for Control Period 6 (2019–24) and beyond

8.4.1 Overview

The previous sections have outlined how the committed schemes and RUS recommendations will address the capacity requirements of the West Midlands and Chilterns RUS area up to 2019. In the longer term, the RUS has considered the Strategic Freight Network forecasts for freight services up to 2030, and has assessed the requirements to support this growth. In order to support passenger growth, the RUS recognises that a number of major developments are currently being considered to address future capacity requirements both within the RUS area, and nationally. These developments have the potential to significantly impact on the current capacity and capability of the network in a way that would influence the future strategy of the route.

8.4.2 Freight capacity beyond 2019

The RUS recognises that freight traffic is forecast to grow beyond 2019. Freight growth beyond 2019 has been analysed as part of the RUS option development work undertaken. Within the RUS area, high level analysis work and current development work has identified where there may be a requirement to implement interventions in order to accommodate 2030 freight growth. Specifically, on the Leamington to Nuneaton line analysis is indicating that interventions may be required on the single line in order to meet 2030 freight growth predictions

and for the diversion of the Reading to Newcastle service. The results of the CP4 capacity study on the Birmingham to Bromsgrove route may also indicate that interventions are required beyond 2019. This study is due to commence in order to determine the exact timing of any interventions required.

8.5 Electrification

The RUS notes the consideration given in the Network RUS: Electrification Strategy to future electrification schemes across the national rail network. The Network RUS: Electrification Strategy outlined a number of candidate electrification infill schemes within the West Midlands and Chilterns area to be taken forward for further analysis to evaluate their benefits and determine their affordability. The key routes identified included between Oxley Jn and Bushbury Jn, Nuneaton to Proof House Jn, Whitacre to Kingsbury, Walsall to Rugeley Trent Valley and on the Chiltern routes.

Electrification schemes which provide diversionary capability for services from other electrified routes improve maintenance accessibility, enabling operators to avoid the need for rail replacement buses and providing passengers with a continuous journey. The RUS supports further analysis to consider funding availability, affordability and rolling stock requirements for the key routes which have been identified.

The RUS acknowledges the work undertaken in the Network RUS: Electrification Strategy which has assessed the relative priorities for electrification on the routes between London Marylebone and Aylesbury, and between London Marylebone and Birmingham Snow Hill.

This RUS's analysis work assessed options to accommodate demand for rail in the Aldridge/Brownhills area. It concluded that the most favourable option for a new service would be an extension of the existing electric service between Birmingham New Street and Walsall. This would require the electrification of the line between Walsall and Aldridge. The West Midlands and Chilterns RUS supports the continued work to develop a new station at Aldridge.

8.6 Services between Yorkshire and Birmingham

The RUS notes the medium term strategy outlined in the Yorkshire and Humberside RUS for a third long distance high speed service between Yorkshire and Birmingham. If this service change was committed, infrastructure enhancements would be required within the RUS area, namely four-aspect signalling between Water Orton and Wichnor Jn and improved access at Kingsbury. These enhancements are also required to accommodate forecast freight growth up to 2030 and form part of the strategy for Control Period 5 presented in this RUS.

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8.7 Camp Hill Chords

Centro has aspirations to introduce new stations and services to address wider transport requirements in the West Midlands. One option being developed is to connect the Camp Hill lines with Birmingham Moor Street, with new station proposals at Hazelwell, Kings Heath and Moseley.

The feasibility study undertaken has demonstrated that rail is the most viable solution to the current congestion issues on the A435 corridor into Birmingham, with a 20 minute frequency local service between Kings Norton and Birmingham Moor Street calling at the new stations. Timetable work has indicated that the re-opening of the route between Round Oak and Walsall for freight services would strongly benefit the scheme. Infrastructure works at Kings Norton and a new terminal platform at Birmingham Moor Street would also be required in addition to the chord line south of Birmingham Moor Street station.

This project would create new routeing opportunities and additional capacity into central Birmingham. The Camp Hill chord lines would help to release capacity at Birmingham New Street by enabling services to be diverted into Birmingham Moor Street. This would also help to improve performance in the West Midlands.

The RUS recognises the work which has been undertaken by Centro and supports the continued development of this study as a future transport options to accommodate increasing demand for travel which cannot be served by current public transport options. The chord lines would offer an opportunity to divert some services away from Birmingham New Street and into Birmingham Moor Street.

8.8 High Speed 2

Although not yet a committed scheme, 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. The study found a strong case to take forward a self-contained high speed line from London to Birmingham, Manchester and Scotland, including a link via the East Midlands to Leeds.

HS2 Ltd was set up by the Government in 2009 to further consider the case for creating a new high speed rail line between London and the West Midlands, and the potential for high speed rail services linking London, East Midlands, northern England and Scotland. HS2 Ltd issued a report in 2009 which recommended a route between London and the West Midlands. Since that report and the establishment of a new Government, HS2 Ltd was asked to carry out further work to consider connecting the West Midlands, East Midlands, North East and North West. This is now the preferred network option, and further work will be undertaken in 2011 to define the 'Y' shaped high speed rail network and the locations it will serve. The RUS recognises that the Government is now consulting publicly on these proposals.

The rail network in the RUS area would be significantly affected by the construction of the new high speed line. In addition to the journey time benefits delivered, the introduction of services on a high speed line would create additional capacity on the current rail network. A comprehensive consideration of how this additional capacity might be used in the West Midlands, and elsewhere, will be required when the current HS2 Ltd plans are implemented.

9. Next steps

9.1 Introduction

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

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

9.2 Network Rail's Strategic Route Specifications

Network Rail Route Plans are in the process of being replaced with new Strategic Route Specifications. These documents will provide a high level strategic overview of how each route should be developed during the next 30 years. The initial draft of new Strategic Route Specification documents will be available on the Network Rail website from September 2011. The Route M (West Midlands and Chilterns) Strategic Route Specification will outline the strategy for the rail network covered by this RUS and will incorporate the analysis and recommendations included in this strategy.

9.3 Access charges review

The ORR review of Network Rail's funding requirements and access charges for Control Period 4 (2009-2014) were included as part of the baseline of this RUS.

The Office of Rail Regulation (ORR) review of Network Rail's funding requirements and access charges for Control Period 5 (2014-2019) is shortly to commence. This RUS will help to inform Network Rail's input to the review and contribute to the process for the final determination of funding that is likely to be available for Control Period 5 (CP5). A key consideration of any RUS is to be realistic as to the funding likely to become available in future years.

9.4 Initial Industry Plan and Control Period 5

Network Rail is currently undertaking further detailed work to shape and confirm the industry's plans for CP5. The first view as an industry will be issued as part of the Initial Industry Plan which is due to be published in September 2011. These plans will feed into the Government's next review of the funding requirements for the railway, which will be outlined in the High Level Output Specifications in 2012.

9.5 Ongoing access to the network

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

9.6 Review

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

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

Appendix A - Performance Analysis

This appendix shows the results of the performance analysis undertaken on a sample period (Period 13, 2007/08) for the RUS baseline exercise.

The **delay codes** are outlined to show the way in which primary delay is categorised. These delay codes are referenced in the maps and charts to show the main reasons for delay on each corridor.

The **matrix** provides a breakdown in delay minutes of corridor contained delay, imported delay from other corridors and reactionary delay exported to other corridors and outside of the RUS area. For example, the Aylesbury corridor has 1,121 minutes of corridor contained delay, and exported 211 minutes of reactionary delay to the Leamington Spa and Chiltern corridor, and 160 minutes outside of the RUS area. It also imported 345 minutes from the Leamington Spa and Chiltern corridor and small amounts from the Stratford-upon-Avon, Stourbridge

and Derby, Nuneaton and Camp Hill corridors.

The analysis shown in the **charts and maps** is broken down by corridor to show the overall corridor contained delay (primary delay and reactionary delay contained within a corridor), the resulting reactionary delay transported to other corridors and the main reasons for the delay.

The **corridor comparison chart** provides a summary of the total delay that was experienced during Period 13, 2007/08 across the RUS area. The orange bar shows the corridor contained delay, the purple bar shows the reactionary delay created by the corridor and exported to other corridors, and the green bar shows the total delay on a corridor which includes the corridor contained delay and the reactionary delay which it imported from other corridors.

Delay codes

Category	KPI Category Name	JPIP Category
101	Points failures	Points, signalling and Other Assets
102	Problems with trackside signs including TSR boards	Network Management / Other
103	Level crossing failures	Points, signalling and Other Assets
104A	TSR's Due to Condition of Track	Track
104B	Track faults (including broken rails)	Track
104C	Gauge Corner Cracking	Track
104D	Reactionary delay to P-coded TSRs	Track
105	Civil Engineering structures, earthworks & buildings	Severe weather /Autumn & Structures
106	Other infrastructure	Network Management / Other
106A	Track Patrols & related possessions	Network Management / Other
107A	Possession over-run and related faults	Network Management / Other
107B	Possession work left incomplete	Network Management / Other
108	Mishap - infrastructure causes	Network Management / Other
109	Animals on line	Points, signalling and Other Assets

<i>Delay codes</i>		
Category	KPI Category Name	JPIP Category
110A	Severe weather (beyond design capability of infrastructure)	Severe weather /Autumn & Structures
110B	Other weather (impact on infrastructure or network operation)	Severe weather /Autumn & Structures
111A	Wheel slip due to leaf fall	Severe weather /Autumn & Structures
111B	Vegetation Management failure	Network Management / Other
112	Fires starting on Network Rail infrastructure	External
150	Low adhesion inc. Autumn (Network Rail)	Severe weather /Autumn & Structures
201	OLE/Third rail faults	Points, signalling and Other Assets
301A	Signal failures	Points, signalling and Other Assets
301B	Track Circuit failures	Points, signalling and Other Assets
302A	Signalling System & Power Supply failures	Points, signalling and Other Assets
302B	Other signal equipment failures	Points, signalling and Other Assets
303	Telecoms failures	Points, signalling and Other Assets
304	Cable faults (signalling & comms)	Points, signalling and Other Assets
304A	Change of Aspects-NFF	Points, signalling and Other Assets
305	Track circuit failures - leaf fall	Severe weather /Autumn & Structures
401	Bridge strikes	External
402	External infrastructure damage - Vandalism/Theft	External
403	External level crossing/road incidents (not bridges)	External
501A	Network Rail Operations - signalling	Network Management / Other
501B	Network Rail Operations - control	Network Management / Other
501C	Network Rail Operations - railhead conditioning trains	Network Management / Other
501D	Network Rail Operations - other	Network Management / Other
502A	Operational Planning	Network Management / Other
502C	Network Rail commercial takeback / other	Network Management / Other
503	External fatalities and trespass	External
504	External police on line/security alerts	External
505	External fires	External
506	External other	External
601	All Z codes - Unexplained	Network Management / Other
701A	Non-technical Fleet delays	Fleet
701B	Train Operations	Operations
701C	Traincrew causes	Traincrew
701D	Technical Fleet delays	Fleet
701E	Station delays	Stations
701F	External causes (Train Operator)	TOC Other
701G	Freight Terminal/Yard delays	TOC Other
750	Low Adhesion inc. Autumn (Train Operator)	TOC Other

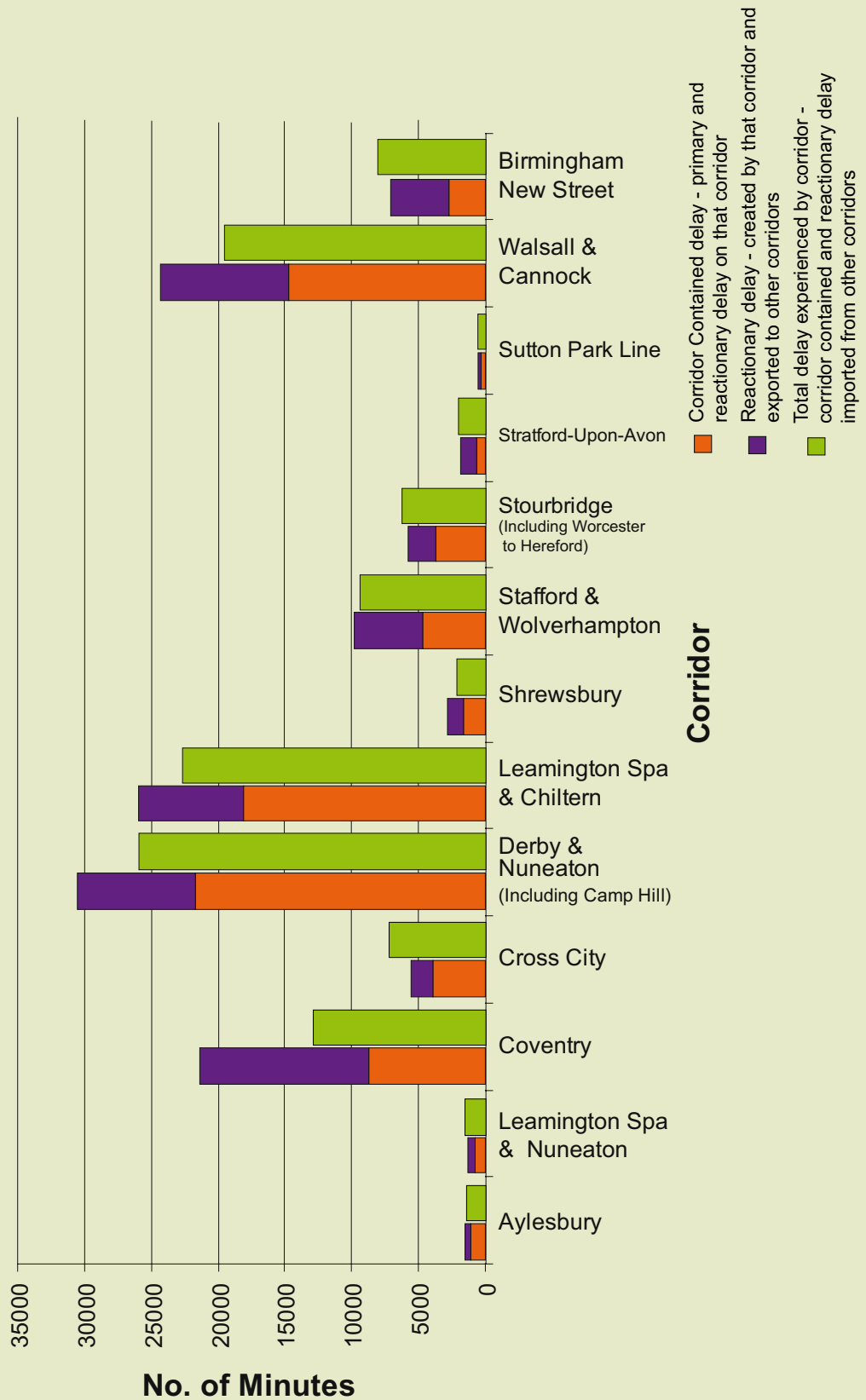
3. Appendix A - Performance matrix.

Performance Matrix - Period 13 2008

Delay Corridor	Corridor Impact													Total Delay Created By Corridor		
	Aylesbury	Leamington Spa & Nuneaton	Coventry	Cross City	Derby & Nuneaton (inc Camp Hill)	Leamington Spa & Chiltern	Shrewsbury	Stafford & Wolverhampton	Stourbridge (inc Worcester to Hereford)	Stratford-Upon-Avon	Sutton Park Line	Walsall & Cannock	Birmingham New Street		Outside of Area	
Aylesbury	1121	0	0	0	0	211	0	0	0	0	0	0	0	0	160	1492
Leamington Spa & Nuneaton	0	752	97	9	140	53	0	0	0	0	0	0	21	207	1279	
Coventry	0	137	8753	585	370	392	148	2595	70	0	15	2496	1657	4116	21344	
Cross City	0	13	209	3956	91	64	4	108	123	0	0	151	408	383	5510	
Derby & Nuneaton (inc Camp Hill)	2	531	559	511	21644	1260	0	109	55	4	47	295	520	4940	30477	
Leamington Spa & Chiltern	345	116	661	224	1002	18087	64	207	1375	846	0	179	663	2134	25903	
Shrewsbury	0	8	86	9	0	18	1583	277	0	0	0	291	177	405	2854	
Stafford & Wolverhampton	0	26	1013	355	283	274	227	4711	75	21	8	871	755	1246	9865	
Stourbridge (inc Worcester to Hereford)	3	3	5	104	54	1234	0	22	3635	420	0	6	59	170	5775	
Stratford-Upon-Avon	3	0	6	9	0	751	0	0	311	707	0	0	3	25	1815	
Sutton Park Line	0	0	0	3	3	0	0	0	0	0	274	237	12	58	587	
Walsall & Cannock	0	15	975	329	1949	132	79	896	107	7	210	14699	1088	3788	24274	
West Midlands Orbital	0	22	565	1089	358	210	99	446	88	10	0	296	2752	1183	7118	
Total Delay Experienced by Corridor	1474	1623	12929	7183	25894	22686	2204	9371	5899	2015	554	1952	8115	18815		

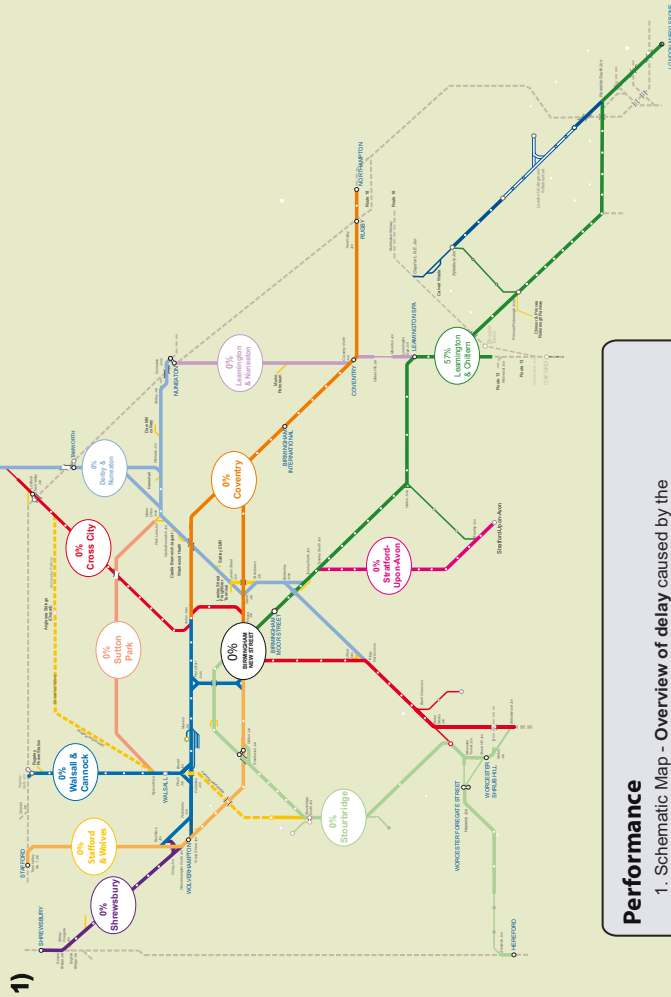
4. Appendix A - Corridor Comparison

Corridors Comparison P13 2007/8 - Summary

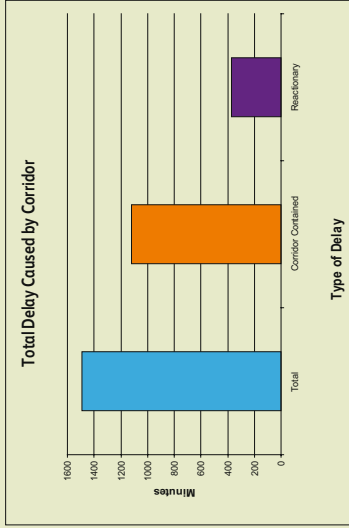


5. Appendix A - Aylesbury & Marylebone

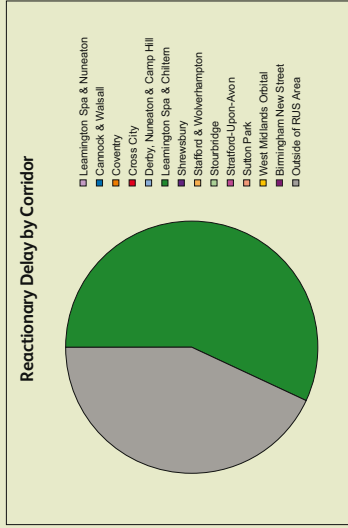
Delay by corridor : Aylesbury



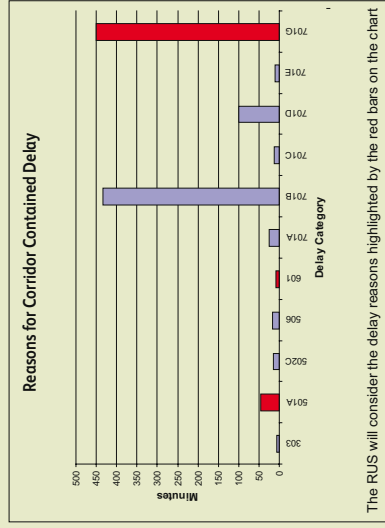
2)



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4)



The RUS will consider the delay reasons highlighted by the red bars on the chart

Performance

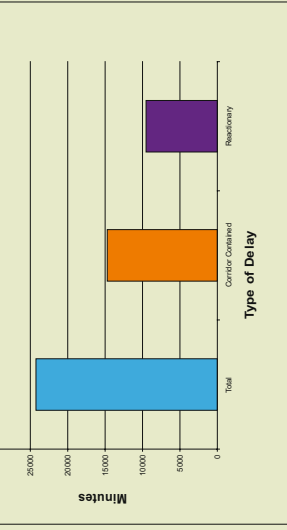
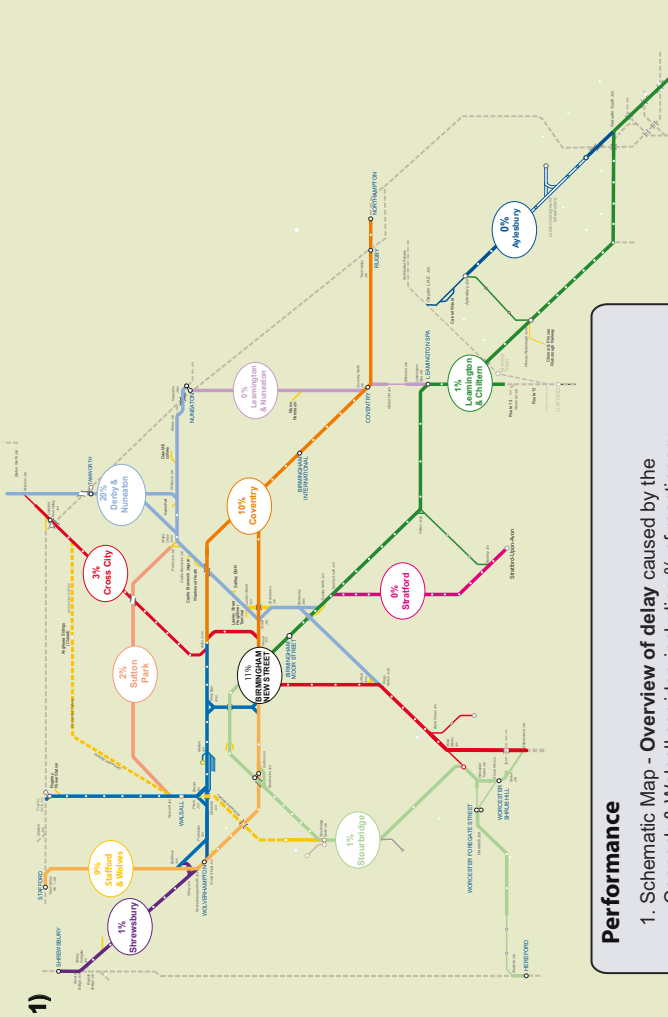
1. Schematic Map - Overview of delay caused by the Aylesbury corridor, including % of reactionary delay on other corridors
2. Bar Chart - total minutes delay broken down into corridor contained and reactionary
3. Bar Chart - break down of reactionary delay (by corridor)
4. Bar Chart - reasons for corridor contained delay

Notes:

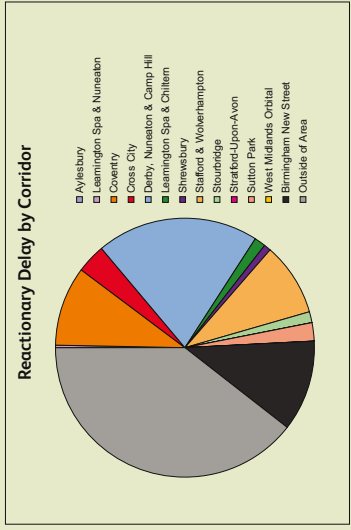
Of the total reactionary delay on this corridor, 43% impacted 'Outside of the RUS Area'
 Information based on period 13 2008 data supplied by Network Rail Performance team.
 Corridor Contained delay includes primary delay and self contained reactionary delay on the corridor

7. Appendix A - Cannock and Walsall

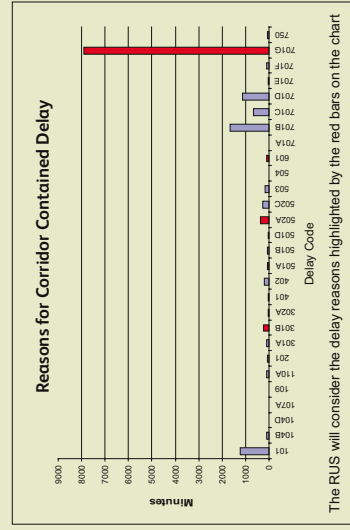
Delay by corridor : Cannock & Walsall Lines



2)



3)



4)

The RUS will consider the delay reasons highlighted by the red bars on the chart

Performance

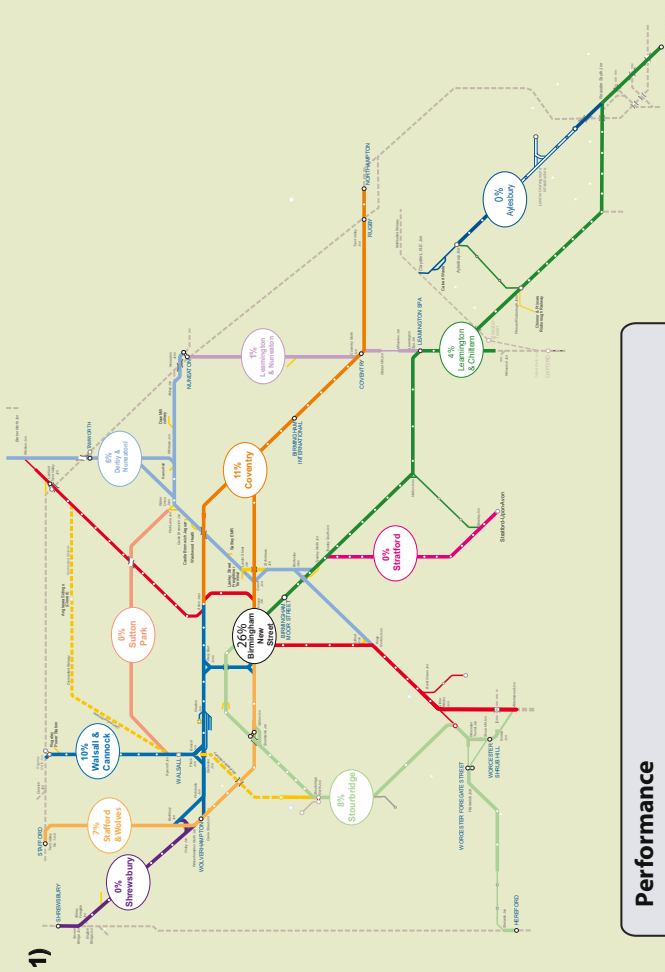
1. Schematic Map - Overview of delay caused by the Cannock & Walsall corridor, including % of reactionary delay on other corridors
2. Bar Chart - total minutes delay broken down into primary and reactionary
3. Pie Chart - break down of reactionary delay (by corridor)
4. Bar Chart - reasons for corridor contained delay

Notes:
 Of the total reactionary delay on this corridor, 40% impacted 'Outside of RUS Area'

Information based on period 13 2008 data supplied by Network Rail Performance team.
 Corridor Contained delay includes primary delay and self contained reactionary delay on the corridor

9. Appendix A - Cross City

Delay by corridor : Cross City & Lickey Incline



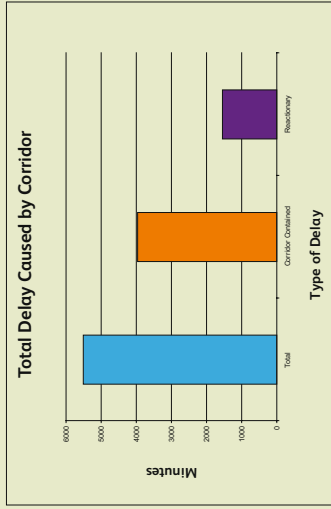
Performance

1. Schematic Map - Overview of delay caused by the Cross City corridor, including % of reactionary delay on other corridors
2. Bar Chart - total minutes delay broken down into corridor contained and reactionary
3. Pie Chart - break-down of reactionary delay (by corridor)
4. Bar Chart - reasons for corridor contained delay

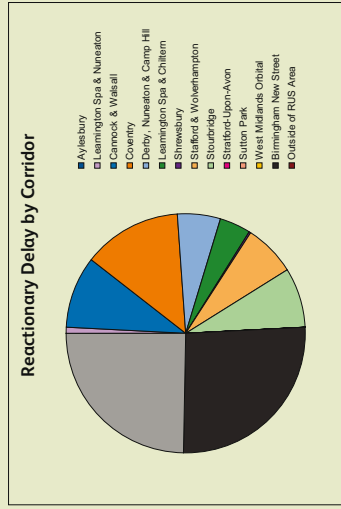
Notes:

Of the total reactionary delay on this corridor, 25% impacted 'Outside of the RUS Area'
 Information based on period 13 2008 data supplied by Network Rail Performance team.
 Corridor-Contained delay includes primary delay and self contained reactionary delay on the corridor.

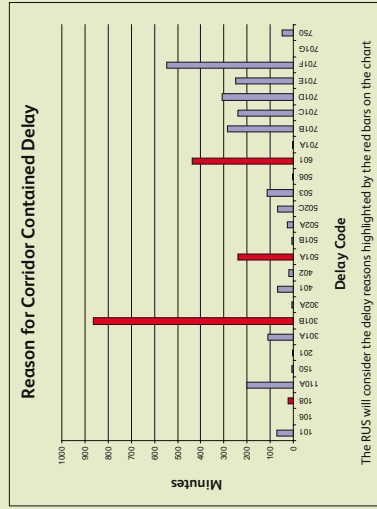
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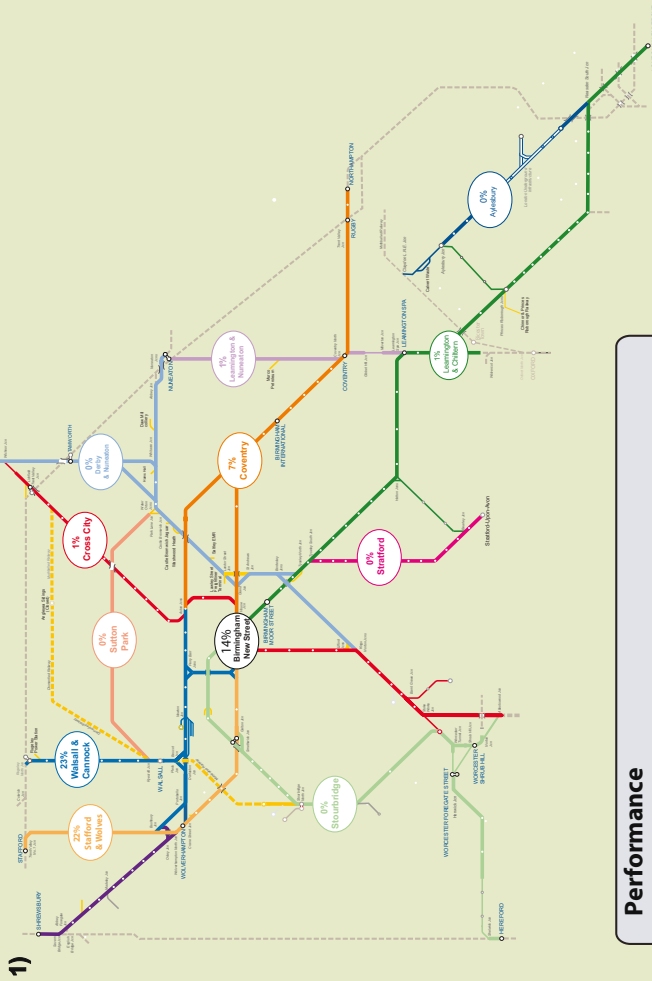


4)

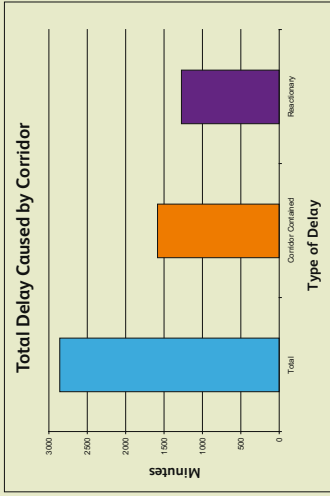


13. Appendix A - Shrewsbury

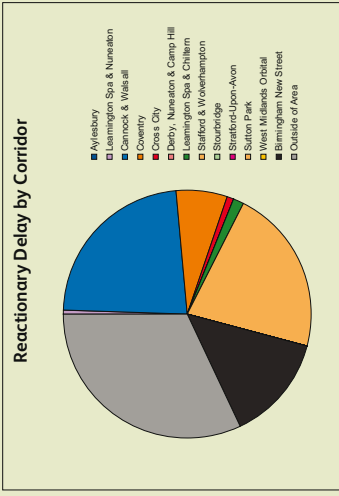
Delay by corridor : Shrewsbury



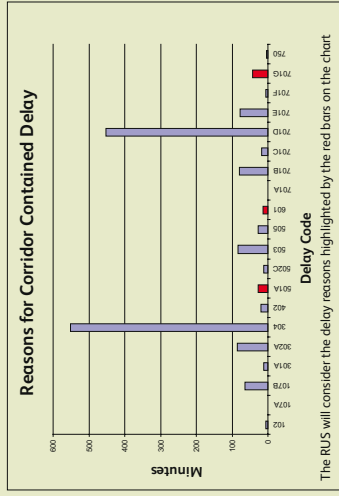
2)



3)



4)



The RUS will consider the delay reasons highlighted by the red bars on the chart

Performance

1. Schematic Map - Overview of delay caused by the Shrewsbury corridor, including % of reactionary delay on other corridors
2. Bar Chart - total minutes delay broken down into corridor contained and reactionary
3. Pie Chart - break down of reactionary delay (by corridor)
4. Bar Chart - reasons for corridor contained delay

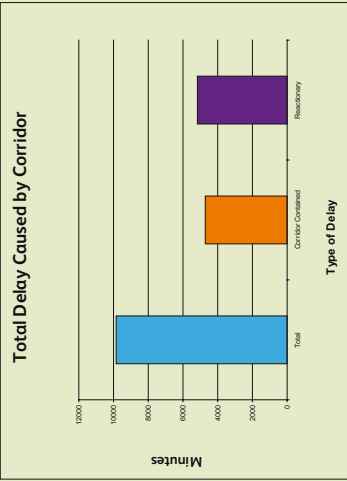
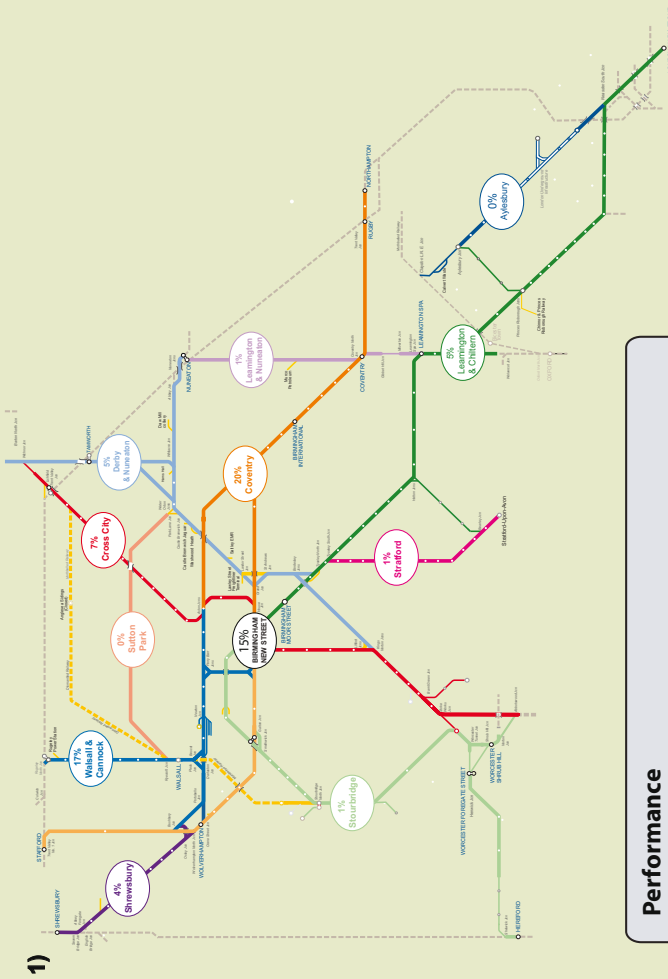
Notes:

Of the total reactionary delay on this corridor, 32% impacted 'Outside of the RUS Area'

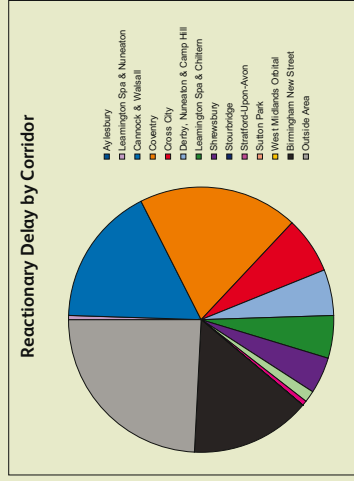
Information based on period 13 2008 data supplied by Network Rail Performance team.
Corridor Contained delay includes primary delay and self contained reactionary delay on the corridor.

14. Appendix A - Stafford & Wolverhampton

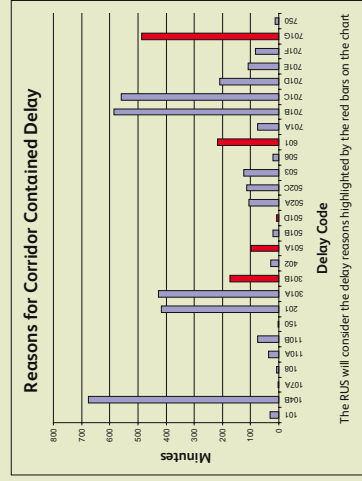
Delay by corridor : Stafford & Wolverhampton



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Performance

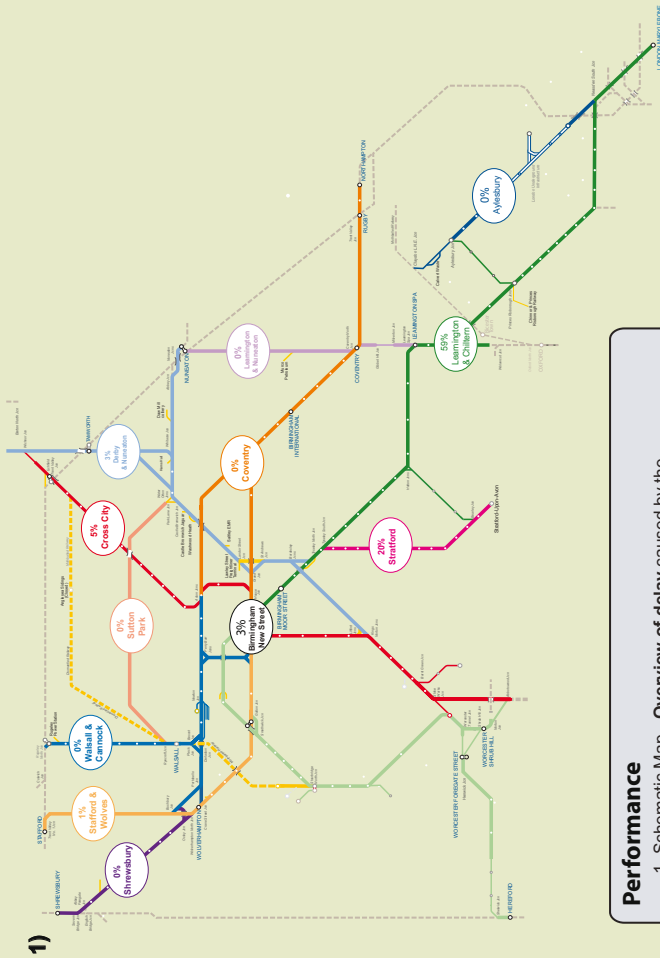
- Schematic Map - Overview of delay caused by the Stafford & Wolverhampton corridor, including % of reactionary delay on other corridors
- Bar Chart - total minutes delay broken down into corridor contained and reactionary
- Pie Chart - break down of reactionary delay (by corridor)
- Bar Chart - reasons for corridor contained delay

Notes:
Of the total reactionary delay on this corridor, 24% impacted 'Outside of the RUS Area'

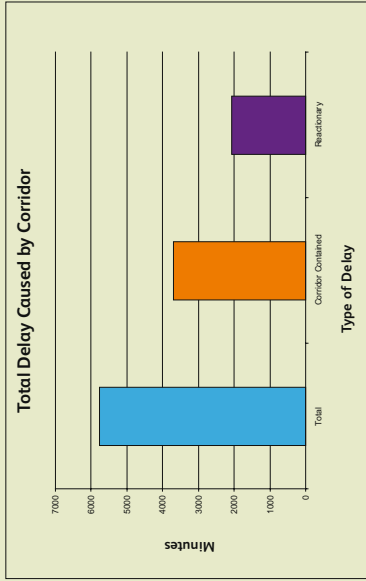
Information based on period 13 2008 data supplied by Network Rail Performance team
Corridor-Contained delay includes primary delay and self contained reactionary delay on the corridor.

15. Appendix A - Stourbridge

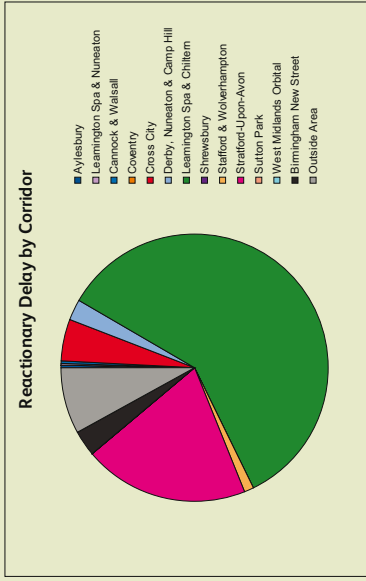
Delay by corridor : Stourbridge (including Worcester to Hereford)



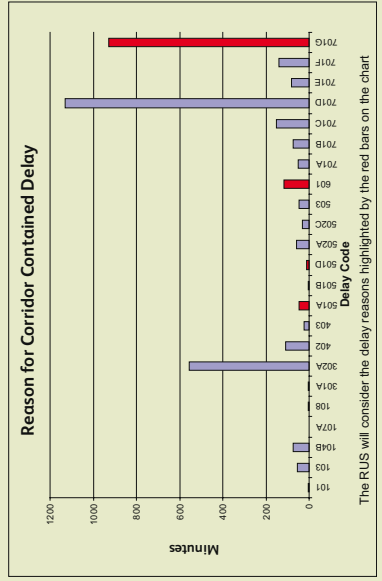
2)



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Performance

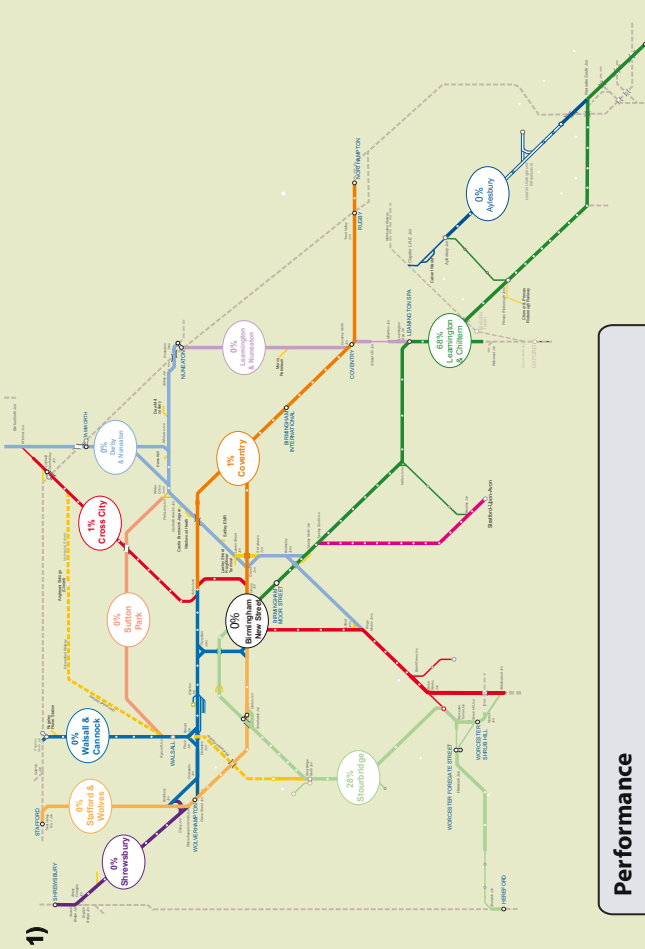
- Schematic Map - Overview of delay caused by the Stourbridge corridor, including % of reactionary delay on other corridors
- Bar Chart - total minutes delay broken down into corridor contained and reactionary
- Pie Chart - break down of reactionary delay (by corridor)
- Bar Chart - reasons for corridor contained delay

Notes:
Of the total reactionary delay on this corridor, 8% impacted 'Outside of the RUS Area'

Information based on period 13 2008 data supplied by Network Rail Performance team.
Corridor Contained delay includes primary delay and self contained reactionary delay on the corridor.

16. Appendix A - Stratford-upon-Avon

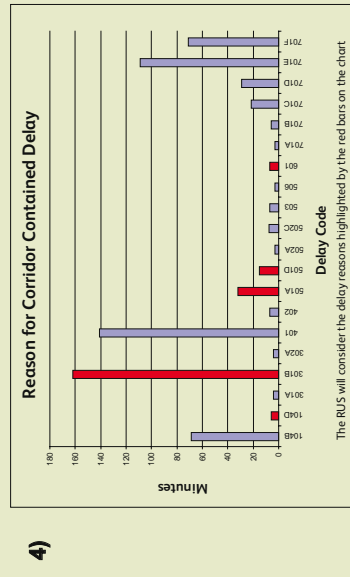
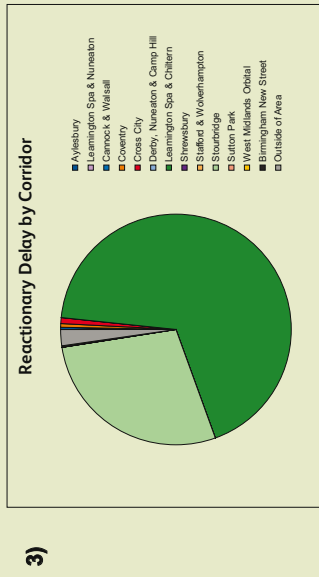
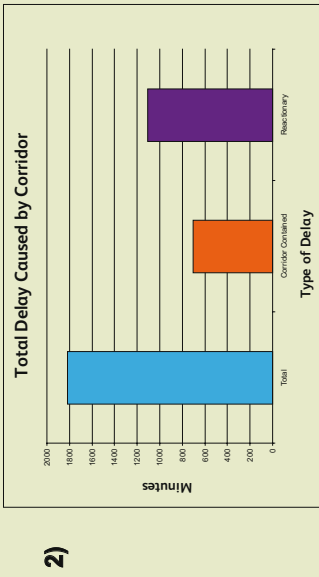
Delay by corridor : Stratford-Upon-Avon



Performance

1. Schematic Map - Overview of delay caused by the Stratford corridor, including % of reactionary delay on other corridors
2. Bar Chart - total minutes delay broken down into corridor contained and reactionary
3. Pie Chart - break down of reactionary delay (by corridor)
4. Bar Chart - reasons for corridor contained delay

Notes:
 Of the total reactionary delay on this corridor, 2% impacted 'Outside of the RUS Area'
 Information based on period 13 2008 data supplied by Network Rail Performance team.
 Corridor Contained delay includes primary delay and self contained reactionary delay on the corridor.



Appendix B – Stations in the RUS area

This appendix provides a list of stations located within the West Midlands and Chilterns RUS area and highlights the integration with other modes of transport. The information presented was collated during the baseline exercise so is subject to change.

Station	Operator	No of car park spaces	Disabled car park spaces	Car park operator	Disabled access to platforms	Transport Interchange					
						Taxi	Bus	Cycle (storage numbers where known)	Metro	Airport	London Underground
Acocks Green	LM	132	Y	Network West Midlands	N	N	Y	9	N	N	N
Adderley Park	LM	-	-	-	N	N	N	2	N	N	N
Albrighton	LM	-	-	-	Partial	N	N	0	N	N	N
Alvechurch	LM	50		Meteor Parking Ltd	Partial	N	N	0	N	N	N
Amersham	LUL	700	Y	Local Authority	Partial	N	Y	56	N	Y	Y
Aston	LM	-	-	-	Partial	N	N	0	N	N	N
Aylesbury	CH	302	Y	Vinci Parking Ltd	Y	Y	Y	40	N	N	N
Aylesbury Vale Parkway	CH	501	Y	Chiltern Railways	Y	Y	Y	40	N	N	N
Banbury	CH	720	Y	Chiltern Railways	Y	Y	Y	60	N	N	N
Barnt Green	LM	60	N	Meteor Parking Ltd	Partial	N	N	8	N	N	N
Bearley	LM	-	-	-	Y	N	N	0	N	N	N
Beaconsfield	CH	696	Y	Chiltern Railways	Y	Y	Y	26	N	N	N
Bedworth	LM	23	-	Local Authority	Y	N	N	0	N	N	N
Berkswell	LM	83	Y	Network West Midlands	Y	N	N	10 *	N	N	N
Bescot Stadium	LM	122	Y	Network West Midlands	N	N	N	2	N	N	N
Bicester North	CH	575	N	Chiltern Railways	Partial	Y	Y	40	N	N	N
Bilbrook	LM	-	-	-	Y	N	N	0	N	N	N
Birmingham International	V	2225	Y	Virgin Trains	Y	Y	Y	35	N	Y	N
Birmingham New Street	NR	40	N	APCOA Parking (UK) Limited	Y	Y		12			N
Birmingham Moor Street	CH	-	-	-	Y	N	Y	28	N	N	N
Birmingham Snow Hill	LM	800	Y	Local Authority	Y	Y	Y	12 *	Y	N	N
Blake Street	LM	155	Y	Network West Midlands	Y	N	N	12	N	N	N
Blakedown	LM	10	N	London Midland	Y	N	N	0	N	N	N
Bloxwich	LM	-	-	-	Y	N	N	0	N	N	N
Bloxwich North	LM	26	Y	Network West Midlands	Y	N	N	0	N	N	N
Bordesley	LM	-	-	-	N	N	N	0	N	N	N
Bournville	LM	-	-	-	Partial	N	Y	2 *	N	N	N

Appendix B – Stations in the RUS area

Station	Operator	No of car park spaces	Disabled car park spaces	Car park operator	Disabled access to platforms	Transport Interchange					
						Taxi	Bus	Cycle (storage numbers where known)	Metro	Airport	London Underground
Bromsgrove	LM	83	Y	Local Authority	Partial	N	N	8	N	N	N
Butlers Lane	LM	-	-	-	N	N	N	2	N	N	N
Cannock	LM	86	Y	Local Authority	Partial	Y	Y	6	N	N	N
Chalfont and Latimer	LUL	361	Y	NCP Ltd	Y	Y	Y	7	N	Y	Y
Chester Road	LM	150	Y	Network West Midlands	Y	N	N	7	N	N	N
Chorleywood	LUL	238	Y	NCP Ltd	Y	Y	Y	0	N	Y	Y
Claverdon	LM	-	-	-	Y	N	N	0	N	N	N
Codsall	LM	-	-	-	Partial	N	N	0	N	N	N
Colehill Parkway	LM	240	Y	Meteor Parking Ltd	Y	N	Y	20	N	N	N
Colwall	LM	20	N	-	Y	N	N	0	N	N	N
Coseley	LM	243	Y	Network West Midlands	Y	N	Y	7	N	N	N
Cosford	LM	-	-	-	N	N	N	0	N	N	N
Coventry	V	798	Y	Virgin Trains	Y	Y	Y	34	N	N	N
Cradley Heath	F	243	Y	Network West Midlands	Y	N	Y	8 *	N	N	N
Danzey	LM	50	Y	London Midland	Partial	N	N	0	N	N	N
Denham	CH	162	Y	Chiltern Railways	Y	Y	Y	5	N	N	N
Denham Golf Club	CH	-	-	-	Y	N	N	2	N	N	N
Dorridge	LM	NWM - 93	Y	Network West Midlands	Y	N	N	23	N	N	N
		Chiltern - 121	Y	Chiltern Railways							
Droitwich Spa	LM	105	N	APCOA Parking (UK) Limited	Partial	N	N	9	N	N	N
Duddeston	LM	-	-	-	Y	N	Y	0	N	N	N
Dudley Port	LM	36	Y	Network West Midlands	N	N	N	2 *	N	N	N
Earlwood	LM	12	N	Network West Midlands	Y	N	N	0	N	N	N
Erdington	LM	-	-	-	Y	N	N	2	N	N	N
Five Ways	LM	-	-	-	Y	N	N	0	N	N	N
Four Oaks	LM	275	Y	Network West Midlands	Y	N	N	20	N	N	N
Gerrards Cross	CH	462	Y	Chiltern Railways	Partial	Y	Y	30	N	N	N
Great Missenden	CH	407	Y	Vinci Parking Ltd	Y	Y	Y	20	N	N	N
Gravelly Hill	LM	-	-	-	Y	N	N	1	N	N	N
Great Malvern	LM	122	Y	Meteor Parking Ltd	Y	Y	N	14	N	N	N
Haddenham and Thame Parkway	CH	488	Y	Chiltern Railways	Y	Y	Y	45	N	N	N
Hall Green	LM	105	Y	Network West Midlands	Y	N	N	3 *	N	N	N
Hampton in Arden	LM	68	Y	Network West Midlands	Partial	N	Y	8	N	N	N
Hamstead	LM	-	-	-	Partial	N	N	0	N	N	N
Harrow on the Hill	LUL	89	N	NCP Ltd	N	N	Y	Y	N	Y	Y
Hartlebury	LM	20	N	Meteor Parking Ltd	Y	N	N	0	N	N	N
Hatton	CH	18	Y	Chiltern Railways	Partial	N	N	12	N	N	N

Station	Operator	No of car park spaces	Disabled car park spaces	Car park operator	Disabled access to platforms	Transport Interchange					
						Taxi	Bus	Cycle (storage numbers where known)	Metro	Airport	London Underground
Hednesford	LM	58	Y	Local Authority	Partial	N	Y	0	N	N	N
Henley in Arden	LM	20	N	London Midland	Partial	N	N	0	N	N	N
Hereford	ATW	175	Y	NCP Ltd	Partial	Y	Y	12	N	N	N
Heyford	FGW	28	N	APCOA Parking (UK) Limited	Partial	N	N	20	N	N	N
High Wycombe	CH	340	Y	Chiltern Railways	Y	Y	Y	38	N	N	N
Jewellery Quarter	LM	-	-	-	Y	N	N	5	N	N	N
Kidderminster	LM	224	Y	Meteor Parking Ltd	Partial	Y	Y	48	N	N	N
Kings Norton	LM	105	Y	Network West Midlands	Y	N	N	12 *	N	N	N
Kings Sutton	CH	23	Y	Vinci Parking Ltd	Partial	N	N	10	N	N	N
Landywood	LM	26	N	-	Y	N	N	0	N	N	N
Langley Green	LM	30	Y	Network West Midlands	Y	N	N	7	N	N	N
Lapworth	CH	20	Y	Chiltern Railways	Partial	N	N	10	N	N	N
Lea Hall	LM	28	Y	Network West Midlands	Y	N	N	7 *	N	N	N
Leamington Spa	CH	177	Y	Vinci Parking Ltd	Y	Y	Y	57	N	N	N
Ledbury	LM	50	Y	-	Partial	N	N	0	N	N	N
Lichfield City	LM	92	Y	Meteor Parking Ltd	Y	Y	Y	16	N	N	N
Lichfield Trent Valley	LM	95	Y	Meteor Parking Ltd	Partial	N	N	5	N	N	N
Little Kimble	CH	4	Y	Chiltern Railways	Y	N	Y	1	N	N	N
London Marylebone	CH	-	-	-	Y	Y	Y	54	N	N	Y
Longbridge	LM	-	-	-	Y	N	Y	0	N	N	N
Long Buckby	LM	90	Y	-	N	N	Y	Y	N	N	N
Lye	LM	16	Y	Network West Midlands	Y	N	Y	2	N	N	N
Marston Green	LM	96	Y	Meteor Parking Ltd	Y	N	N	8 *	N	N	N
Monks Risborough	CH	-	-	-	Y	N	Y	0	N	N	N
Moor Park (Tube)	LUL	-	-	-	Partial	N	Y	0	N	N	Y
Northampton	LM	813	Y	Meteor Parking Ltd	Y	Y	Y	40	N	N	N
Northolt Park	CH	-	-	-	Y	N	Y	6	N	N	N
Northfield	LM	205	Y	Network West Midlands	Partial	N	N	8 *	N	N	N
Nuneaton	LM	175	Y	Meteor Parking Ltd	Y	Y	Y	15	N	N	N
Oakengates	LM	-	-	-	Y	N	N	0	N	N	N
Old Hill	LM	51	Y	Network West Midlands	N	N	N	6	N	N	N
Olton	LM	98	Y	Network West Midlands	Y	N	Y	6 *	N	N	N
Penkridge	LM	15	N	Network West Midlands	Y	N	N	0	N	N	N
Perry Barr	LM	-	-	-	Partial	N	N	0	N	N	N
Princes Risborough	CH	280	Y	Vinci Parking Ltd	Partial	Y	Y	36	N	N	N
Redditch	LM	156	Y	Meteor Parking Ltd	Y	Y	Y	8	N	N	N
Rickmansworth	LUL	294	Y	Waitrose	Partial	Y	Y	Y	N	Y	Y
Rowley Regis	LM	380	Y	Network West Midlands	Y	N	Y	14	N	N	N
Rugby	V	739	Y	Virgin Trains	Y	Y	Y	30	N	N	N
Rugeley Town	LM	110	N	Local Authority	Partial	Y	Y	0	N	N	N
Rugeley Trent Valley	LM	24	N	Meteor Parking Ltd	Partial	N	N	0	N	N	N

Appendix B – Stations in the RUS area

Station	Operator	No of car park spaces	Disabled car park spaces	Car park operator	Disabled access to platforms	Transport Interchange					
						Taxi	Bus	Cycle (storage numbers where known)	Metro	Airport	London Underground
Sandwell and Dudley	LM	369	Y	Network West Midlands	Y	Y	N	4 *	N	N	N
Saunderton	CH	35	Y	Chiltern Railways	Partial	N	Y	2	N	N	N
Seer Green	CH	117	Y	Vinci Parking Ltd	Y	N	Y	24	N	N	N
Selly Oak	LM	376	Y	Network West Midlands	Y	N	N	16	N	N	N
Shenstone	LM	20	N	London Midland	Partial	N	N	0	N	N	N
Shifnal	LM	80	N	London Midland	Partial	N	N	0	N	N	N
Shirley	LM	80	Y	Network West Midlands	Partial	N	Y	19	N	N	N
Shrewsbury	ATW	156	Y	NCP Ltd	Y	Y	Y	56 + 34	N	N	N
Smethwick Galton Bridge	LM	77	Y	Network West Midlands	Y	N	N	3 *	N	N	N
Smethwick Rolfe Street	LM	-	-	-	N	N	N	Y	N	N	N
Solihull	LM	290	Y	Network West Midlands	Y	N	N	16	N	N	N
South Ruislip	CH	37	Y	NCP Ltd	N	Y	Y	2	N	N	Y
Spring Road	LM	-	-	-	Partial	Y	Y	Y *	N	N	N
Stafford	V	350	Y	Virgin Trains	Y	Y	N	20	N	N	N
Stechford	LM	-	-	-	N	N	Y	2	N	N	N
Stoke Mandeville	CH	270	Y	Vinci Parking Ltd	Y	Y	Y	35	N	N	N
Stourbridge Jn	LM	797	Y	Network West Midlands	Y	N	N	17 *	N	N	N
Stourbridge Town	LM	353	Y	Local Authority	Y	Y	Y	5	N	N	N
Stratford-Upon-Avon	LM	320 #	Y	Meteor Parking Ltd	Partial	Y	N	10	N	N	N
Sudbury Hill Harrow	CH	-	-	-	N	N	Y	2	N	N	Y
Sudbury Harrow Road	CH	-	-	-	N	N	Y	0	N	N	N
Sutton Coldfield	LM	320	Y	Network West Midlands	Y	N	N	10 *	N	N	N
Tackley	FGW	-	-	-	Partial	N	N	16	N	N	N
Tame Bridge Parkway	LM	237	Y	Network West Midlands	Y	N	Y	11 *	N	N	N
Tamworth	LM	290	Y	Meteor Parking Ltd	Y	Y	N	10	N	N	N
Telford Central	LM	182	Y	Meteor Parking Ltd	Y	Y	Y	Y	N	N	N
The Hawthorns	LM	184	Y	Network West Midlands	Y	N	N	13	N	N	N
The Lakes	LM	-	-	-	Y	N	N	0	N	N	N
Tile Hill	LM	129	Y	Network West Midlands	Y	N	Y	18	N	N	N
Tipton	LM	55	Y	Network West Midlands	Y		N	2	N	N	N
Tyseley	LM	-	-	-	Partial	Y	N	0	N	N	N
University	LM	-	-	-	Y	N	N	0 *	N	N	N
Walsall	LM	-	-	-	Partial	N	Y	6 *	N	N	N
Warwick	CH	50	Y	Vinci Parking Ltd	Partial	Y	Y	6	N	N	N
Warwick Parkway	LM	589	Y	Chiltern Railways	Y	Y	Y	12	N	N	N
Water Orton	LM	40	Y	Local Authority	N	N	N	0	N	N	N
Wellington	LM	109	Y	London Midland	Y	Y	Y	0	N	N	N
Wendover	CH	183	Y	Vinci Parking Ltd	Y	Y	Y	15	N	N	N
West Ruislip	CH	136	Y	Chiltern Railways	Partial	N	Y	4	N	N	Y
Whitlocks End	LM	111	Y	Network West Midlands	Y	N	N	2 *	N	N	N
Widney Manor	LM	273	Y	Network West Midlands	Y	N	N	24 *	N	N	N

Station	Operator	No of car park spaces	Disabled car park spaces	Car park operator	Disabled access to platforms	Transport Interchange					
						Taxi	Bus	Cycle (storage numbers where known)	Metro	Airport	London Underground
Wilmcote	LM	-	-	-	Partial	N	N	Y	N	N	N
Wilnecote	LM	-	-	-	Partial	N	Y	0	N	N	N
Witton	LM	-	-	-	Partial	N	N	0	N	N	N
Wolverhampton	V	477	Y	Virgin Trains	Y	Y	Y	32	Y	N	N
Wood End	LM	-	-	-	N	N	N	0	N	N	N
Wooten Wawen	LM	-	-	-	Y	N	N	0	N	N	N
Worcester Foregate Street	LM	-	-	-	Y	Y	Y	15	N	N	N
Worcester Shrub Hill	LM	121	Y	Meteor Parking Ltd	Partial	Y	Y	26	N	N	N
Wylde Green	LM	51	Y	Network West Midlands	Y	N	N	0*	N	N	N
Wythall	LM	-	-	-	Y	N	N	0*	N	N	N
Yardley Wood	LM	100	Y	Network West Midlands	Y	N	N	17	N	N	N

* Part of the Centro cycle storage improvement programme 09/10 and 11/12

Will reduce to 140 after the cattle market development

Appendix C - West Midlands and Chilterns RUS issues

The following table lists the issues that were identified during the RUS baseline process. The table indicates which corridor the issue relates to and whether it has been classified as a gap (G), option (O), constraint (C), or aspiration (A) following a Stakeholder Management Group review. Where the issue has been identified as a gap, the relevant gap number is listed to enable it to be referenced in **Chapter 6**.

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Inadequate car-parking capacity.	Across RUS corridors	G	GEN-4
Improve gauge to W9/10 across West Midlands with a long term aim of W12.	Across RUS corridors	A	-
Improve Route Availability across the West Midlands.	Across RUS corridors	A	-
Electrification of other freight routes following the Sutton Park Line.	Across RUS corridors	O	-
Limited freight capacity for intermodal traffic destined for Yorkshire and North east markets.	Across RUS corridors	G	See section 6.9
Crowding close to London identified in the Thames Valley Regional Planning Assessment (RPA) from Aylesbury to Marylebone, south of Harrow. Housing growth also planned.	Aylesbury	G	OC-3
Poor service mix on the Metropolitan lines due to the mix of London Underground Limited (LUL) services with heavy rail services that impacts on service provision and performance.	Aylesbury	G	OC-3
Limited North-South Links in Buckinghamshire, particularly connectivity of Aylesbury.	Aylesbury	G	RC-1
Low linespeeds at various locations (especially the Aylesbury corridor on the Metropolitan lines) means relatively slow journey times.	Aylesbury	G	JT-1
Inadequate capacity into Birmingham to accommodate HLOS peak demand by the end of CP4.	Birmingham New Street	G	OC-1
Limited operational capacity on approach to and within Birmingham New Street station.	Birmingham New Street	G	OC-4
Potential passenger flow and interchange issues following the completion of Birmingham New Street Gateway project.	Birmingham New Street	G	RI-1
Lack of passenger rail service provision for Burntwood.	Cannock and Walsall	A	-
Manual signalling and low linespeed on Cannock line.	Cannock and Walsall	C	-

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Route north of Walsall not electrified creating inefficient rolling stock deployment and restricting diversionary route and service deployment capability.	Cannock and Walsall	C	-
Restrictive operational constraint at Walsall station.	Cannock and Walsall	C	-
Loading gauge issues on Cannock Line to enable a fit for purpose diversionary route as an alternative to Bushbury - Stafford.	Cannock and Walsall	C	-
Inadequate capacity to accommodate HLOS peak demand from Cannock and Walsall into Birmingham by the end of CP4.	Cannock and Walsall	G	OC-1
Inadequate passenger service provision to meet peak demand on the Cannock line.	Cannock and Walsall	G	OC-5
Peak capacity issues for passenger services: central Birmingham.	Cannock and Walsall	G	OC-5
Limited access to the rail network from the Brownhills area to cater for housing growth and regeneration.	Cannock and Walsall	G	RC-2
Limited access to the rail network from the Aldridge area to meet demand stimulated from housing growth and regeneration.	Cannock and Walsall	G	RC-2
Freight routeing issues on the Cannock and Walsall line in the light of future freight and passenger growth.	Cannock and Walsall	G	See section 6.11
Limited gauge capability on the Cannock and Walsall line.	Cannock and Walsall	G	See section 6.11
Limited intermodal terminal capacity issues – in the north of the West Midlands to accommodate growth.	Cannock and Walsall	G	See section 6.11
Inadequate station facilities at Cannock Line stations (all six stations Bloxwich-Rugeley Town) limiting rail accessibility.	Cannock and Walsall	G	SF-1
Lack of direct rail connectivity between Walsall and the north.	Cannock and Walsall	G	RC-3
Limited connectivity: Wolverhampton – Walsall.	Cannock and Walsall	G	RC-4
Improved rail service provision from Walsall to London.	Cannock and Walsall	A	-
Lack of direct service Banbury – Leamington Spa – West Yorkshire suppressing rail demand.	Coventry	G	RC-5
Lack of passenger rail service provision for Daventry.	Coventry	A	-
Improved services required to meet growth from Warwick University development.	Coventry	A	-
Overnight services required to meet airport peak departure times in early morning and mid to late evening at Birmingham airport*.	Coventry	A	-
2009 timetable based around a 20 minute pattern that creates poor compatibility with other routes with 30 minute frequencies - limits opportunities for cross- Birmingham service creating through links to the airport and prevents regular interval 2 trains.	Coventry	C	-
Inadequate peak capacity on local services between Coventry and Birmingham.	Coventry	G	OC-6

Appendix C - West Midlands and Chilterns RUS issues

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Inadequate peak capacity on long distance high speed services between Coventry and Birmingham.	Coventry	G	OC-6
Peak capacity issues for passenger services: central Birmingham.	Coventry	G	OC-6
Peak overcrowding in the RUS area on long distance high speed services between Oxford and Birmingham and beyond.	Coventry	G	OC-6
Overcrowding: Bournemouth – Thames Valley – Banbury – Leamington Spa – Coventry – Birmingham International – Birmingham New Street – Manchester services.	Coventry	G	OC-6
Lack of direct service Coventry – Derbyshire, South and West Yorkshire and North East – suppressing rail demand.	Coventry	G	RC-5
Limited capacity: Rugby – Coventry – Stechford to cater for intermodal and passenger demand growth forecasts.	Coventry	G	See section 6.11
Freight routeing issues within the West Midlands.	Coventry	G	See section 6.11
Lack of direct services Birmingham International - South West.	Coventry	A	-
Increase capacity required: Potential increase in passenger and freight traffic on Stoke Works Branch due to housing/population growth.	Cross City and Lickey	A	-
Lack of passenger rail service provision north of Lichfield including Alrewas (Arboretum) and Curborough.	Cross City and Lickey	A	-
Rail service improvements to support regeneration in south Birmingham and support the Central Technology Belt.	Cross City and Lickey	A	-
Single track on Redditch branch restricts frequency to half-hourly.	Cross City and Lickey	C	-
Lickey Incline creates severe operating constraint for freight traffic.	Cross City and Lickey	C	-
Single line between Bromsgrove and Droitwich.	Cross City and Lickey	C	-
Inadequate capacity between Bromsgrove and Birmingham New Street to accommodate demand.	Cross City and Lickey	G	OC-7
Inadequate capacity between Redditch to Birmingham to accommodate demand.	Cross City and Lickey	G	OC-8
High capacity utilisation between Kings Norton and Birmingham New Street in peak hours leads to performance problems.	Cross City and Lickey	G	OC-9
Peak capacity issues for passenger services: central Birmingham.	Cross City and Lickey	G	OC-9
Inadequate capacity to meet demand on long distance high speed services between Bristol Temple Meads and Birmingham New Street and beyond.	Cross City and Lickey	G	OC-10
Freight routeing issues on the Cross City and the Lickey Incline.	Cross City and Lickey	G	See section 6.11
Limited gauge capability on Cross City and Lickey Incline.	Cross City and Lickey	G	See section 6.11
Inadequate car parking to meet current demand in the Longbridge area, which will increase following proposed redevelopment.	Generic Issues	G	GEN-4

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Inadequate journey time between Kings Norton and Birmingham New Street exacerbated by pathing time in fast services.	Cross City and Lickey	C	-
Inappropriate journey time Birmingham to the South West (Birmingham New Street – Bristol Temple Meads).	Cross City and Lickey	G	JT-2
Limited station capacity at University station to accommodate future growth stimulated by Selly Oak/Queen Elizabeth Hospital redevelopment strategy.	Cross City and Lickey	G	SC-1
Lack of passenger rail service provision on the Camp Hill line to accommodate demand for rail services in Kings Heath, Moseley and Hazelwell areas.	Derby and Nuneaton	A	-
Improve Washwood Heath freight capacity for intermodal, steel and coal traffic to obviate the need to use the circuitous route via Castle Bromwich curve, Sutton Park and Bescot.	Derby and Nuneaton	A	-
Insufficient local service provision on Water Orton corridor.	Derby and Nuneaton	A	-
Deliver improved public transport to Castle Bromwich, Fort Retail Park and Castle Vale.	Derby and Nuneaton	A	-
Overnight services required to meet airport peak departure times in early morning and mid to late evening at Stansted Airport.	Derby and Nuneaton	A	-
Inadequate journey time between Birmingham New Street and Leicester/ Stansted Airport.	Derby and Nuneaton	G	JT-3
Inadequate journey time between Birmingham New Street and Nottingham.	Derby and Nuneaton	G	JT-4
Existing infrastructure constrains the method of working for both inter modal and bulk traffic at Kingsbury Oil Terminal/Birch Coppice inter-modal terminal.	Derby and Nuneaton	C	-
Dedicated Tamworth local service.	Derby and Nuneaton	O	-
Inadequate capacity to accommodate HLOS peak demand from Derby and Nuneaton into Birmingham by the end of CP4.	Derby and Nuneaton	G	OC-1
Peak capacity issues for passenger services: central Birmingham.	Derby and Nuneaton	G	OC-11
Limited peak capacity to accommodate demand on long distance high speed services between Sheffield and Birmingham and beyond.	Derby and Nuneaton	G	OC-11
Insufficient capacity on peak services between Cardiff and the West Midlands and Nottingham leads to crowding issues.	Derby and Nuneaton	G	OC-11
Inadequate capacity to accommodate demand on the Birmingham to Derby route.	Derby and Nuneaton	G	OC-11
Inadequate capacity between West Midlands – West Yorkshire leads to crowding.	Derby and Nuneaton	G	OC-12
Inadequate capacity to accommodate demand between Birmingham New Street and Leicester.	Derby and Nuneaton	G	OC-13
Inadequate daytime service frequency West Midlands – Peterborough/ Cambridge/Stansted Airport.	Derby and Nuneaton	G	OC-13
Inadequate capacity to accommodate local demand between Hinckley/ Nuneaton and Birmingham.	Derby and Nuneaton	G	OC-13a

Appendix C - West Midlands and Chilterns RUS issues

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Lack of direct services between Birmingham International and the north east to accommodate demand.	Derby and Nuneaton	G	RC-5
Freight routeing and capacity issues on the Derby, Nuneaton and Camp Hill lines.	Derby and Nuneaton	G	See section 6.11
Kingsbury performance issues –access and regulation issues in connection with Kingsbury and Birch Coppice freight terminals.	Derby and Nuneaton	G	See section 6.11
Limited gauge capability on the Derby, Nuneaton and Camp Hill lines to support additional planned services between Avonmouth and the West Midlands.	Derby and Nuneaton	G	See section 6.11
Limited runround opportunities for freight services between Nuneaton and Daw Mill.	Derby and Nuneaton	G	See section 6.11
Limited intermodal terminal capacity in light of freight growth in the east and south east of the West Midlands.	Derby and Nuneaton	G	See section 6.11
Inadequate capacity to accommodate Sunday demand levels for long distance high speed services between Sheffield and Birmingham and beyond.	Derby and Nuneaton	G	GEN-2
Limited interchange opportunities on the Derby and Nuneaton corridor.	Derby and Nuneaton	G	RI-2
Inadequate provision of early morning and late evening services within the RUS area.	Generic Issues	G	GEN-1
Inadequate provision of Sunday services within the RUS area.	Generic Issues	G	GEN-2
Limited rail connectivity to Birmingham Airport.	Generic Issues	G	GEN-3
Overcrowding on Leamington Spa – Coventry services in the morning and evening peak, and throughout the day.	Leamington Spa and Nuneaton	G	OC-15
Diversionary route and further capacity required on Solihull line.	Leamington Spa and Chiltern	A	-
Improve rail facilities arriving at Warwick to support sustainable tourism and reduce road congestion.	Leamington Spa and Chiltern	A	-
Low service frequency London Marylebone to West Ruislip.	Leamington Spa and Chiltern	A	-
Low service frequency London Marylebone to High Wycombe.	Leamington Spa and Chiltern	A	-
New direct service between Aylesbury and High Wycombe to develop regional hub and encourage inter-regional travel.	Leamington Spa and Chiltern	A	-
Lack of passenger rail service provision for Halemere/Tylers Green.	Worcester and Hereford	A	-
Unattractive service pattern at stations within the Greater London area.	Leamington Spa and Chiltern	G	RC-6
Inadequate capacity to accommodate HLOS peak demand into London Marylebone by the end of CP4.	Leamington Spa and Chiltern	G	OC-2
Reduce road congestion and support growth into Birmingham city centre from Dorridge and Shirley.	Leamington Spa and Chiltern	A	-

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Improve links between West Midlands and the South East region.	Leamington Spa and Chiltern	A	-
Unsuitability of infrastructure between West Ruislip and High Wycombe for single line bi-directional working.	Leamington Spa and Chiltern	C	-
Timetable constraint due to two track main line serving multiple minor stations.	Leamington Spa and Chiltern	C	-
Limited track capacity at Birmingham Snow Hill and Birmingham Moor Street reduces operational flexibility on Solihull line.	Leamington Spa and Chiltern	C	-
Single track constraint prevents service improvements - Hatton West Jn - Bearley Jn.	Leamington Spa and Chiltern	C	-
Inadequate capacity to accommodate peak demand into Birmingham by the end of Control Period 4 (CP4).	Leamington Spa and Chiltern	G	OC-1
Inadequate capacity to accommodate peak demand into London Marylebone by the end of CP4.	Leamington Spa and Chiltern	G	OC-2
Peak overcrowding on Leamington and Chiltern corridor.	Leamington Spa and Chiltern	G	OC-14
Peak capacity issues for passenger services: central Birmingham.	Leamington Spa and Chiltern	G	OC-14
Inadequate peak capacity on Chiltern services.	Leamington Spa and Chiltern	G	OC-14
Inadequate all day capacity Chiltern corridor: London – Birmingham.	Leamington Spa and Chiltern	G	OC-14
Lack of capacity between London Marylebone and Banbury leads to performance problems and rigidity in timetable structure.	Leamington Spa and Chiltern	G	OC-14
Inadequate capacity on long distance high speed routes between Oxford and Birmingham and beyond.	Leamington Spa and Chiltern	G	OC-14
Poor service provision at some smaller stations within the Chiltern area.	Leamington Spa and Chiltern	G	RC-6
Limited rail connectivity to London Heathrow Airport from the Chiltern lines to meet London air passenger demand growth forecasts.	Leamington Spa and Chiltern	G	RC-7
Limited freight capacity on the Leamington Spa and Chiltern corridor.	Leamington Spa and Chiltern	G	See section 6.11
Gauge capability on the Leamington Spa and Chiltern corridor.	Leamington Spa and Chiltern	G	See section 6.11
Evening services on Solihull route are poorly spaced.	Leamington Spa and Chiltern	G	GEN-1
Limited service frequency to meet Sunday demand for long distance services between Oxford and Birmingham and beyond.	Leamington Spa and Chiltern	G	GEN-2
Limited seven day timetable between Oxford and Banbury to encompass passenger growth.	Leamington Spa and Chiltern	G	GEN-2

Appendix C - West Midlands and Chilterns RUS issues

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Limited connectivity to Birmingham Airport from the Leamington and Chiltern corridor.	Leamington Spa and Chiltern	G	GEN-3
Unattractive journey time: London Marylebone – Birmingham Moor Street on Chiltern route.	Leamington Spa and Chiltern	G	JT-5
Inappropriate journey time Oxford – Birmingham New Street.	Leamington Spa and Chiltern	G	JT-6
Limited interchange opportunities between Birmingham central stations.	Leamington Spa and Chiltern	G	RI-3
Station crowding issues: Birmingham Moor Street southbound platform.	Leamington Spa and Chiltern	G	SC-2
Station crowding issues: Birmingham Snow Hill (Platforms 1 and 3) congested.	Leamington Spa and Chiltern	G	SC-2
Provision of Chiltern platforms at West Hampstead to provide an integrated interchange between Thameslink, London Overground, the Jubilee line.	Leamington Spa and Chiltern	A	-
Future station congestion at London Marylebone resulting from increased demand on Chiltern services (particularly interchange with London Underground and heavy crowding on the Bakerloo line).	Leamington Spa and Chiltern	G	SC-3
The single line between Milverton Jn and Kenilworth South Jn limits capacity between Leamington Spa and Coventry services in the morning and evening peak, and throughout the day.	Leamington Spa and Nuneaton	C	-
Limited access to the rail network from Kenilworth which has a population of c.25000.	Leamington Spa and Nuneaton	G	RC-8
Limited rail provision between Coventry and Nuneaton to meet demand for rail services to Ricoh Arena and Bermuda Park stimulated by leisure, housing and business developments.	Leamington Spa and Nuneaton	G	RC-9
Limited freight capacity on Leamington Spa and Nuneaton line.	Leamington Spa and Nuneaton	G	See section 6.11
Limited gauge capability on the Leamington Spa and Nuneaton line.	Leamington Spa and Nuneaton	G	See section 6.11
Large population not served by rail – Hazelmere/Tylers Green.	Leamington Spa and Chiltern	A	-
Lack of passenger rail service provision for Madeley.	Shrewsbury	A	-
Limited operational flexibility at Shrewsbury station.	Shrewsbury	C	-
Inadequate capacity to meet HLOS peak demand from Shrewsbury into Birmingham by end of CP4.	Shrewsbury	G	OC-1
Inadequate capacity for passenger services: central Birmingham.	Shrewsbury	G	OC-16
Limited freight gauge capability between Wolverhampton and Shrewsbury.	Shrewsbury	G	See section 6.11
Inadequate journey time between Wolverhampton and Shrewsbury.	Shrewsbury	G	JT-7
Inadequate/irregular timetable interval between rail services from Telford and Birmingham New Street.	Shrewsbury	G	RC-10

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Limited access to the rail network from the Brinsford area.	Stafford and Wolverhampton	A	-
Improvements at Wolverhampton station to support regeneration.	Stafford and Wolverhampton	A	-
Increase services to accommodate growth resulting from Wolverhampton Transport Interchange.	Stafford and Wolverhampton	A	-
Capacity: Wolverhampton North Jn, exacerbated by low linespeed.	Stafford and Wolverhampton	C	-
Limited operational flexibility at Wolverhampton station.	Stafford and Wolverhampton	C	-
Inadequate capacity to meet HLOS peak demand from Stafford and Wolverhampton into Birmingham by the end of CP4.	Stafford and Wolverhampton	G	OC-1
Peak capacity issues for passenger services: central Birmingham.	Stafford and Wolverhampton	G	OC-17
Peak overcrowding in the RUS area on long distance high speed services between Manchester and Birmingham and beyond.	Stafford and Wolverhampton	G	OC-17
Limited track capacity: Wolverhampton – Birmingham.	Stafford and Wolverhampton	G	OC-17
Performance issues: Wolverhampton – Birmingham.	Stafford and Wolverhampton	G	OC-17
Overcrowding issues: Bournemouth – Thames Valley – Banbury – Leamington Spa – Coventry – Birmingham International – Birmingham New Street – Manchester Piccadilly services.	Stafford and Wolverhampton	G	OC-18
Inadequate all day capacity on long distance high speed services between Birmingham New Street and Manchester Piccadilly and beyond.	Stafford and Wolverhampton	G	OC-18
Crowding during peak hours on services between Stafford and Birmingham.	Stafford and Wolverhampton	G	OC-19
Limited engineering access Stafford – Bushbury.	Stafford and Wolverhampton	G	See section 6.11
Limited gauge capability on the Stafford – Wolverhampton corridor.	Stafford and Wolverhampton	G	See section 6.11
Intermodal terminal capacity issues – North West Midlands.	Stafford and Wolverhampton	G	See section 6.11
Limited service frequency to meet Sunday demand for long distance high speed services between Manchester and Birmingham and beyond.	Stafford and Wolverhampton	G	GEN-2
Inadequate journey time between Birmingham and Manchester.	Stafford and Wolverhampton	G	JT-8
New interchange between Dudley Port heavy rail and Midland Metro.	Stafford and Wolverhampton	A	-
Lack of passenger rail service provision for Stourport-on-Severn.	Stourbridge	A	-

Appendix C - West Midlands and Chilterns RUS issues

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Rail service improvements to support regeneration in south Birmingham and support the Central Technology Belt.	Stourbridge	A	-
Restricted signalling capacity of route south of Stourbridge.	Stourbridge	C	-
Midland Metro provision between Five Ways and Brierley Hill.	Stourbridge	A	-
Inadequate capacity to accommodate HLOS peak demand from Stourbridge into Birmingham by end of CP4.	Stourbridge	G	OC-1
Inadequate peak capacity for passenger services between Stourbridge and Birmingham. Overcrowding observed on Stourbridge line and seating constraints for peak passengers from Rowley Regis inwards.	Stourbridge	G	OC-20
Freight routeing issues on the Stourbridge line.	Stourbridge	G	See section 6.11
Limited gauge capability on the Stourbridge line.	Stourbridge	G	See section 6.11
Inappropriate journey time between Birmingham, Stourbridge, Kidderminster and Worcester.	Stourbridge	G	JT-9
Large population not served by rail – Stourport-on-Severn.	Stourbridge	A	-
Missing link: Stratford-Long Marston-Oxford/Cheltenham.	Stratford-upon-Avon	A	-
Improve station facilities and services at Stratford-upon-Avon to support sustainable tourism and reduce road congestion.	Stratford-upon-Avon	A	-
Increase service provision to cater for potential housing developments south of Stratford-upon-Avon.	Stratford-upon-Avon	A	-
Reduce road congestion and support growth into Birmingham city centre from Dorridge and Shirley.	Stratford-upon-Avon	A	-
Poor track layout at Stratford: Performance and capacity constraints .	Stratford-upon-Avon	C	-
Inadequate peak capacity between Stratford-upon-Avon and Birmingham.	Stratford-upon-Avon	G	OC-21
Capacity issues for passenger services into central Birmingham..	Stratford-upon-Avon	G	OC-21
Lack of passenger rail service provision for Streetly.	Sutton Park line	A	-
Limited capacity on the single track sections of the Sutton Park line constrains intermodal services to Southampton.	Sutton Park line	C	-
Gauge and headway constraints on the Sutton Park line limit freight routeing opportunities.	Sutton Park line	C	It should be noted that this constraint is being addressed as part of planned resignalling and renewals schemes in the Walsall and Cannock and Water Orton areas.
Improve rail facilities at Hereford to support sustainable tourism and reduce road congestion.	Worcester and Hereford	A	-
Turnback facilities at Hereford are constrained by lack of a facing crossover north of the station.	Worcester and Hereford	C	-
Inadequate capacity to meet growth in demand for rail services between Birmingham New Street and Worcester/Hereford.	Worcester and Hereford	G	OC-22

<i>Issue</i>	<i>Corridor</i>	<i>Classification</i>	<i>Issue incorporated into consolidated gap number</i>
Limited rail access to Worcester town centre due to some First Great Western services terminating at Worcester Shrub Hill not Worcester Foregate Street, which is closer to the city centre.	Worcester and Hereford	G	This gap has been addressed by a recent timetable change
Limited rail service provision between Worcester and areas south of Worcester.	Worcester and Hereford	G	RC-11
Inappropriate journey time between Worcester and Hereford.	Worcester and Hereford	G	JT-10
Infrastructure constraints between Hereford and Worcester limit journey time and can impact on performance.	Worcester and Hereford	C	-

Appendix D - Stakeholder aspirations for the West Midlands and Chilterns RUS area.

These are currently unfunded aspirations.

Aspiration	Description	Benefits	Proposer
Alrewas rail service	Aspiration to provide a rail connection and services to the National Memorial Arboretum at Alrewas.	<ul style="list-style-type: none"> – improve rail access for visitors – reduce road congestion. 	Third Party
Birmingham International station development	The West Midlands Regional Rail Prioritisation Plan highlights the upgrade of the passenger station environment based on its regional significance, contribution to economic growth and affordability.	<ul style="list-style-type: none"> – improve station environment – improve passenger flow – improve interchange with other transport modes. 	West Midlands Focus Group (including local authorities, rail industry representatives and Centro)
Camp Hill Chords	Aspiration to introduce new stations and services on the route via the Camp Hill line into Birmingham Moor Street. The proposed routeing would require a chord line to divert services into Birmingham Moor Street. New stations are proposed at Hazelwell, Kings Heath and Moseley. A feasibility study has been completed, which recognises the wider transport benefits of the scheme.	<ul style="list-style-type: none"> – improve rail connectivity – reduce road congestion – release capacity at Birmingham New Street. 	Centro and Birmingham City Council
Shrewsbury Parkway	Aspiration to introduce new parkway station at Shrewsbury. The proposed location would provide an additional bus based park and ride location for Shrewsbury.	<ul style="list-style-type: none"> – Increase rail station car park capacity in Shrewsbury – reduce road congestion – support longer distance commuter market – improve public transport interchange with bus mode. 	Shropshire County Council
Stratford Parkway station	Project to develop a new park and ride station at Bishopton.	<ul style="list-style-type: none"> – increase the train service frequency between Stratford-upon-Avon and Birmingham – increase rail station car parking capacity in Stratford-upon-Avon – reduce road congestion – support growth in demand generated by local housing developments – support longer distance commuter market – improve public transport interchange with bus mode. 	Warwickshire County Council
Solihull to Stratford-upon-Avon service	Feasibility work is being developed to consider the option to extend some services which operate between Birmingham Snow Hill and Dorridge, through to Stratford-upon-Avon.	<ul style="list-style-type: none"> – increase the direct rail service provision between Solihull and Stratford-upon-Avon. 	Centro
Stratford-upon-Avon – Honeybourne	Assessment of the case to re-open the former rail route between Stratford-upon-Avon and Honeybourne.	<ul style="list-style-type: none"> – release capacity on existing routes – facilitate new services between Worcester and Stratford-upon-Avon, and Honeybourne to Evesham, Pershore, Worcester, Malvern, Hereford and South Wales – potential to serve housing development at Long Marston – potential diversionary route – potential alternative to the existing routes between the Midlands and the Thames Valley, and between Birmingham, Oxford, Reading, London Paddington and South Coast – potential new stations along the route. 	Third Party

Aspiration	Description	Benefits	Proposer
Tamworth local service with new station proposals	Assessment of options to provide a new half-hourly local service between Tamworth and Birmingham Moor Street with new stations at Kingsbury, Castle Bromwich and the Fort (shopping complex). The proposed routeing would require a chord line to divert services into Birmingham Moor Street.	<ul style="list-style-type: none"> – improve rail connectivity – support growth at Tamworth – reduce road congestion – release capacity at Birmingham New Street. 	Centro
West Hampstead rail interchange	Assessment of the option of a new integrated interchange at West Hampstead between Chilterns, Thameslink, London Overground, and London Underground services. This aspiration includes platforms on the Chilterns route.	<ul style="list-style-type: none"> – improve connectivity to the wider London rail network from the Chilterns route – reduce potential future congestion at London Marylebone station. 	London TravelWatch
Wolverhampton to Walsall local service	Assessment of options to provide a local service on the route between Wolverhampton and Walsall, via Portobello Junction.	<ul style="list-style-type: none"> – improve connectivity between the two locations – contribute to Walsall's economic regeneration – reduce road congestion. 	Centro
Worcestershire Parkway	Aspiration to investigate options to develop a parkway station at Norton in Worcestershire as part of an integrated transport strategy. This aspiration is defined in the South Worcestershire Joint Core Strategy to 2026.	<ul style="list-style-type: none"> – Increase rail station car parking capacity in Worcestershire – reduce road congestion – support growth in demand generated by local housing developments – support longer distance commuter market. 	Malvern Hills District Council, Worcester City Council and Wychavon District Council

Glossary

Term	Meaning
ACORP	Association of Community Rail Partnerships.
Approach Control	A method of controlling train speed when approaching junctions.
ATOC	Association of Train Operating Companies.
BCR	Benefit Cost Ratio.
Capacity (of rolling stock)	Capacity is deemed to be the number of standard class seats and standing spaces available on a train.
Capacity (of infrastructure)	The capacity of a given piece of railway infrastructure is an assessment of the maximum number or mix of trains which could operate over it. This is quantified through a Capacity Utilisation Index.
Capacity (of stations)	The pedestrian capacity of a station is an assessment of the maximum number of passengers it can acceptably handle, given the station layout at the site concerned.
CaSL	Cancellations and Significant Lateness.
Centro	West Midlands Integrated Transport Authority.
Community Rail Partnership	Organisation whose members may include local authorities, community groups, rail user groups, train operating companies and sometimes Network Rail. They are funded by the partners who will then typically seek additional funding to support their activities which aim to involve the local community more closely in the development of a local or rural railway line.
Connectivity	The ability to travel between two stations or conurbations within an acceptable journey time or frequency options compared to other modes of transport.
Control Period 4 (CP4)	The five-year period between 2009 and 2014.
Control Period 5 (CP5)	The five-year period between 2014 and 2019.
Control Period 6 (CP6)	The five-year period between 2019 and 2024.
CUI	Capacity Utilisation Index – Indicative measure of how much capacity is being utilised on a section of railway based on the current timetable.
DfT	Department for Transport.
DMU	Diesel Multiple Unit.
EEA	Efficient Engineering Access.
EMU	Electric Multiple Unit.
FGD	Flue gas desulphurisation
FOC	Freight Operating Company.
Gap	Where the network does not meet the specification or demand required of it, now or in the future.
GRIP	Governance to Railway Investment Projects – Network Rail's process for project management of schemes through development and implementation.
Headway	The minimum time interval possible between trains on a particular section of track.

Term	Meaning
HLOS	The DfT's High Level Output Specification, which specifies the outputs which Network Rail and the rail industry need to deliver within a Control Period.
Intermodal trains	Freight trains which convey traffic that could also be conveyed by road or sea (eg. containerised traffic).
Integrated Transport Authority	Authority responsible for an integrated transport strategy (formerly the Passenger Transport Executive).
JPIP	Joint Industry Performance Improvement Plan.
LDHS	Long Distance High Speed.
LEP	Local Enterprise Partnership.
LENNON	An industry database recording ticket sales.
Load factor compared to seats	The amount of seats occupied on a train service expressed as a percentage of seats.
Load factor compared to train capacity	Train capacity includes both standard class seats and standing allowance. Standing allowance is usually estimated at 0.45 square metre per passenger, in accordance to Department for Transport High Level Output Specification for Control Period 4. For a typical commuter rolling stock, its standing allowance is 40 % of standard class seats although this can vary significantly by rolling stock type. The standing allowance of typical interurban and long distance rolling stock is around 20 %.
Loading gauge	Loading gauge is the profile for a particular route within which all vehicles or loads must remain to ensure that sufficient clearance is available at all structures.
LDG	Local Delivery Group.
LUL	London Underground Limited.
MOIRA	Industry standard demand forecasting model.
NEC	National Exhibition Centre.
NPV	Net present value.
NRDF	Network Rail Discretionary Fund.
NSIP	National Stations Improvement Programme.
Optimism bias	A proportional uplift to scheme cost estimates to allow for historical systematic optimism on the part of UK scheme promoters.
Option	The options as identified in this document are aimed at addressing the identified gaps.
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.
Perturbation	Describes disruption to the planned train service pattern.
Possession	Where part of the infrastructure is closed to services to carry out maintenance, renewals or enhancement works.
PPM	Public Performance Measure.
PSR	Permanent Speed Restriction.
Red Zone working	Red Zone working is the terminology that is used to describe the working environment when undertaking work activity on the railway while the rail network is open and operative.
RES	Regional Economic Strategy.
RFG	Rail Freight Group.

Glossary

Term	Meaning
RIFF	Rail Industry Forecasting Framework.
Route Availability (RA)	The system which determines which types of locomotive and rolling stock can travel over any particular route. The main criteria for establishing RA usually concerns the strength of underline bridges in relation to axle loads and speed, although certain routes have abnormal clearance problems (eg. very tight tunnels). A locomotive of RA8 is not permitted on a route of RA6 for example.
RPA	Regional Planning Assessment.
RSS	Regional Spatial Strategy.
Rules of the Route	Rules regulating the location, number, timing and duration of the possession of parts of the network that Network Rail requires to carry out maintenance, renewals and repairs.
RUS	Route Utilisation Strategy.
S&C	Switches and crossings.
SDO	Selective Door Operation – a means of ensuring that only certain doors open when a train is stopped at a station, leaving closed any doors which overhang short platforms. Not all rolling stock is fitted with this facility; those types which are so fitted vary in the permutations of doors which can be kept closed in this way.
Services in excess of capacity	When passenger loads exceed train capacity or when there are passengers standing for more than 20 minutes.
Seven day railway	Network Rail initiative implementing techniques which will minimise the impact on passengers and freight of engineering work for maintenance, renewal and enhancements.
SFN	Strategic Freight Network.
SFO	Station Facility Owner.
SMG	Stakeholder Management Group.
TEE table	Transport Economic Efficiency table.
TfL	Transport for London.
TOC	Train Operating Company.
TPH	Trains Per Hour.
Train path	A slot in a timetable for running an individual train.
WCML	West Coast Main Line.
WSG	Wider Stakeholder Group.

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