East Midlands

Route Utilisation Strategy

February 2010

Foreword

I am delighted to present Network Rail's Route Utilisation Strategy (RUS) for the East Midlands. This contains recommendations for a key part of the rail network to 2019, and gives an indication of the strategy after that date.

Publication comes at an important time for passengers on this route following the establishment of the Network RUS: Electrification which set out the case for the electrification of the Midland Main Line, along with the ongoing work across the industry on the case for new high speed lines.

It is also set against a background of continued passenger growth, with every indication pointing to even stronger growth in the longer term. Demand forecasts produced for the RUS predict an average growth of 28 percent in passenger numbers between London and the rest of the RUS area over the 10 years to 2019, whilst the market for travel between Birmingham and the RUS area is expected to increase by as much as 40 percent over the same period.

Both the Midland Main Line from London to Sheffield via Leicester, Derby and Nottingham and, at the southern end, the core section of the Thameslink route from St Pancras International to Blackfriars fall within the scope of the strategy, as well as other lines in the East Midlands.

Development of the strategy has followed a now well-established process. Initially, an analysis was carried out into the capacity and capability of the existing network and train services. Future demand was then analysed, taking into account any major changes planned to the network or services over the next 10 years, including major schemes such as the Thameslink Programme, the East Midlands Resignalling Scheme and journey time improvements on the Midland Main Line. A number of "Gaps" were identified through this process and options to address these gaps were then appraised. Those which demonstrated the best value for money are included in the strategy.

Whilst the issues vary across the RUS area, an emerging trend has been identified on a number of key corridors where a combination of rolling stock allocation; the limitations of the existing infrastructure; growth projections for both freight and passenger traffic; and the desire for improved connectivity and reduced journey times are likely to drive significant change over the next 10 years. These include the Midland Main Line, and the corridors between Birmingham, Derby and Chesterfield, and Peterborough, Oakham, Leicester and Nuneaton. Between Lincoln and Nottingham, the flat crossing at Newark represents a major constraint to both the development of the local passenger service and freight growth.

The RUS was initially published as a Draft for Consultation in August 2009. The issues raised have influenced the final strategy in a number of areas and I would like to thank all those who responded. Network Rail has led the production of this RUS, however it has been developed with the full input of the rest of the industry, including passenger and freight train operators, Passenger Focus and others. I thank them all for their contribution.

Iain Coucher
Chief Executive

Executive summary

Introduction

The rail network in the East Midlands serves a diverse set of markets ranging from long distance and commuter travel into London, commuting and leisure travel into the three cities of Derby, Leicester and Nottingham, a mixture of long distance and commuter travel on the interurban services that pass through the region, and more rural, lightly used services in the east. The Midland Main Line (MML) connects much of the East Midlands, one of the fastest growing English regions, along with the northern half of the Thameslink corridor, with London. The network is also of vital importance to freight, particularly as part of the intermodal network, in supplying coal fired power stations and providing aggregates to the major construction projects in the south east, such as the London 2012 Olympic Games.

Scope and background

This East Midlands Route Utilisation Strategy (RUS) recommends an industry strategy for accommodating the growing demands on the railway over the next 10 years and sets out the vision for the route over the longer term. It presents a completely updated analysis of the rail network in the East Midlands, superceding the MML/East Midlands RUS published by the Strategic Railway Authority in March 2004. In accordance with the agreed process, the strategy has been developed in conjunction with rail industry stakeholders and wider stakeholders have been consulted.

This RUS broadly covers the geographical area from London Blackfriars and London St Pancras International via Leicester, Derby and Nottingham to Tapton Jn (Chesterfield). It also includes the other lines in the East Midlands Region that are not covered by other RUSs.

All passenger and freight services that use these routes for part or all of their journeys are considered, including those from London St Pancras International and the West Midlands to the East Midlands and South Yorkshire; between Bedford, Luton, St Albans and central London; between the West Midlands and East Anglia via Leicester and Peterborough; from Liverpool to Norwich via Manchester, Sheffield and Nottingham; and local services within the East Midlands.

The East Midlands RUS considers the interventions required to address the gap between current rail provision and anticipated future demand over a 10-year horizon between 2009 and 2019. The longer-term vision over 30 years is also considered.

Committed schemes

Network Rail's Delivery Plan for Control Period 4 (CP4), from 2009 to 2014, sets out the plan for delivering improvements in the safety, reliability and capacity of the railway system required by the Government's High Level Output Specification and some other high value-for-money projects.

The plan includes measures to increase capacity through train lengthening, remodel Nottingham station to improve performance, enhance the capability of the infrastructure on the MML to deliver faster journey times, and enhance freight capability.

It also includes major projects such as the Thameslink Programme which will deliver 12-car trains on the Bedford – Brighton corridor, with new rolling stock introduced during CP4.

National initiatives such as the Seven Day Railway Programme and the Strategic Freight

Network (SFN) also form part of the CP4 Delivery Plan and those committed schemes applicable to the East Midlands have also been included in the baseline.

Passenger and freight demand

Total passenger demand between the East Midlands and London St Pancras International is expected to grow by 28 percent over the next 10 years. The market for rail travel between the RUS area and Birmingham is expected to grow at a faster rate, with the number of journeys increasing by 40 percent over the same time frame, in line with the recent high growth experienced in this market.

Above average growth in peak passenger demand is set to occur at Leicester, Nottingham and Derby where growth across the three-hour peaks is expected to be in excess of 30 percent over the next 10 years.

Factors driving this increase in demand across the East Midlands include increasing road congestion, changes in commuting patterns favouring rail travel, an increase in the attractiveness of services to business travellers, and growth in regions outside the RUS area generating additional demand on services through the RUS area. Alongside this is the effect of regional economic regeneration strategies, particularly the Milton Keynes South Midlands (MKSM) growth agenda for Bedford, Kettering, Wellingborough and Corby, which will see the continued development of housing, employment and leisure sites in these towns.

Freight growth is anticipated predominantly in the construction and deep sea intermodal market sectors. The Freight RUS forecasts growth of 25 percent, and between 64 and 74 percent respectively, in the 10 years to 2015.

Longer-term forecasts have been developed as part of the SFN process and incorporated into the RUS analysis.

This sizeable increase in demand is set against an already busy network with intensive use on key corridors such as the railway south of Bedford and on cross-country routes from Birmingham to Yorkshire. The combination of Long Distance High Speed (LDHS), interurban and regional trains, and freight services result in high levels of congestion. This has significant implications for the ability of the existing rolling stock and infrastructure to accommodate future passenger numbers and increased freight tonnage in the RUS area.

The demand forecasts in the RUS Draft for Consultation were made before the full extent of the recession became clear. The RUS has since then undertaken extensive analysis to understand its impact on passenger demand. This is detailed in **Chapter 4** and concludes that there is no strong reason to change the forecast from that in the draft.

Gaps

The process to generate gaps and identify options for this RUS was carried out in conjunction with industry stakeholders. In accordance with the established process for RUSs, a series of gaps were identified between the capability of the existing infrastructure and train services and that required to accommodate the forecast demand for passenger and freight services. These generic gaps are shown below:

1 peak crowding and growth into major cities **(peak crowding and growth)**

2 all day crowding and growth on key corridors **(all day crowding and growth)**

3 freight capability of the network in terms of route availability, loading gauge, capacity and diversionary routes **(freight capability)**

4 regional connectivity and journey times between various key locations either within or outside the RUS geographical scope **(regional connectivity)**

5 reactionary delays resulting in significant performance problems at some locations **(performance)**

6 demand for travel at weekends and on some routes in the late evening **(Seven Day Railway)**.

Options

Options were then generated against each gap. These options and the RUS recommendations are summarised below:

Options to address Generic Gap 1: Peak crowding and growth

Peak crowding on Thameslink services at London St Pancras International will be addressed by the introduction of 12-car rolling stock as part of the Thameslink Programme during CP4.

However, further capacity is required on the LDHS peak services at London and the option recommended to address this is progressive lengthening of most trains up to a maximum of 11 cars requiring the provision of an additional 13 vehicles. This option is recommended for implementation as soon as rolling stock becomes available. Analysis has shown that an additional 11 vehicles are required by the end of CP4, with the remainder in Control Period 5 (CP5). The few standing passengers that remain south of Bedford will have the option of utilising the lengthened Thameslink services operating on this corridor or taking less crowded trains on either side of their preferred train.

For Leicester and Nottingham, most of the extra capacity will be provided by the lengthening of some of the London peak services as recommended above. However, further lengthening, requiring an additional eight vehicles is recommended over the short and medium term, such that the overall requirement will be 21 more LDHS vehicles.

In addition, two extra vehicles are recommended for local peak services in the East Midlands. It is recommended that some strengthening takes place as soon as additional rolling stock becomes available.

There is evidence of crowding on high-peak services for short periods of time (less than 20 minutes) between Matlock and Derby. However, a case could not be found for lengthening these services due to the costs associated with operating and leasing the additional vehicles. It is noted that severe crowding will be experienced over short distances on these services by 2019. Therefore, the RUS recommends that opportunities to strengthen the high-peak services between Matlock and Derby, within the existing rolling stock resource base, are examined and introduced as soon as practicable.

Options to address Generic Gap 2: All day crowding and growth

Crowding pressures throughout the day have been identified on interurban services on the following routes:

- Liverpool – Norwich
- Birmingham – Stansted Airport
- Birmingham – Derby – Sheffield.

The RUS recommends the provision of additional capacity on the Liverpool Lime Street – Norwich service, which will reduce crowding along the route and at other urban centres outside the RUS area. The majority of the crowding occurs between Liverpool Lime Street and Nottingham and the additional capacity provided will contribute to crowding relief at Nottingham in the peak. There is generally sufficient capacity on existing services to address future growth between Nottingham and Norwich. Therefore, the proposal is that the service will operate with mostly four-car trains between Liverpool Lime Street and Nottingham with two-cars continuing to Norwich.

In addition, the extension of an early afternoon Liverpool Lime Street – Nottingham service to Norwich and the strengthening of the early morning Norwich to Liverpool Lime Street service will provide further crowding relief at Nottingham and spread the passenger loading across the peak.

This will require the provision of an additional 12 vehicles. This option is recommended for implementation as soon as rolling stock becomes available. East Midlands Trains is currently in discussion with the Department for Transport regarding providing at least some of this extra capacity in CP4.

In the short term, CrossCountry plans to lengthen some of its interurban services operating between Birmingham New Street and Stansted Airport from two-cars to four-cars. It is believed that this can be achieved without additional rolling stock. However, the platforms at a number of stations along the route are too short to accommodate the longer trains. Options to address this are currently being investigated as part of the East Midlands Train Lengthening Project included in the CP4 Delivery Plan. It is likely that a combination of platform lengthening and Selective Door Opening (SDO) will be required, which will involve SDO fitment to further Class 170 vehicles (some of the Class 170s are already SDO fitted).

Further interventions are required to address crowding levels on this corridor up to 2019 and the RUS recommends additional strengthening of services every day through a combination of the extension of some of the existing Birmingham New Street to Leicester services from 2011 and train lengthening, requiring an additional six vehicles, as soon as rolling stock becomes available.

Refurbishment of the rolling stock operating on the long distance interurban services, recently carried out by CrossCountry, will provide some relief to crowding on the Birmingham – Derby – Sheffield corridor. However, further capacity will be required by 2019. The RUS recommends that the final strategy for this corridor is developed as part of the West Midlands and Chilterns RUS. This will ensure that the optimum solution is identified for the long distance interurban network, which may involve alterations to the routeing of services, frequency and calling patterns as well as train lengthening.

Options to address Generic Gap 3: Freight capability

Analysis has demonstrated that the current provision of generally two off-peak daytime freight paths per hour on the MML, at current utilisation levels of 60 percent, is sufficient to accommodate the forecast growth in the short term. A third path per hour has been demonstrated as not being achievable within the constraints of the current infrastructure.

However, it is not possible with the existing infrastructure and daytime passenger service levels to operate heavier freight trains (60mph with more than 2000 tonnes trailing load). If suitable options to address this trailing load restriction can be developed then slightly fewer freight services may be required. The CP4 SFN process is currently examining options to allow this heavier trailing load to operate.

The RUS recommends that two off-peak daytime paths in each direction (the southbound path being 60mph and 2000 tonnes trailing load) are preserved south of Bedford within the Thameslink Programme development timetable. If the necessary enhancements to operate heavier freight trains are funded, then the southbound daytime paths in that timetable would need to be 60mph and 2500 tonnes trailing.

Some enhanced infrastructure is also required on the bi-directional slow line between Sharnbrook Jn and Kettering Jn to allow more than one train per hour to operate in each direction during the night when the fast lines are blocked for engineering works. This would be addressed by the provision of additional

loops between Sharnbrook Jn and Kettering Jn and is being developed as part of the Seven Day Railway Programme.

On other routes, the 2030 growth forecasts produced as part of the SFN process have generated a number of additional interventions. Work to develop an interim forecast to 2019 has commenced but was not available prior to the publication of this RUS. As the results of this work emerge the phasing of any interventions to deliver the 2030 growth will need to be considered.

The RUS has identified that infrastructure enhancements will be required on the following corridors to support the 2030 freight growth forecasts, anticipated passenger train service levels, improved performance and Seven Day Railway principles:

- extension of the goods loops between Clay Mills Jn and Burton-on-Trent to provide four tracks to Wichnor Jn, along with increased junction speeds at Clay Mills Jn. The optimum solution, which would also provide improved journey times for interurban services, may involve the complete remodelling of Burton-on-Trent station area
- improved layout in the Stenson Jn and North Stafford Jn area
- provision of four aspect signalling
- provision of four tracks between Syston Jn and Wigston Jn and signalling improvements to reduce the headways between Ketton and Helpston Jn. This should be incorporated into an integrated scheme for the Leicester area, including Leicester resignalling, to be developed for early CP5
- a flyover at Newark to replace the existing flat crossing
- an additional through line at Nottingham station.

Depending on the 2019 freight forecasts and the requirement for additional passenger services some of these interventions may be required in CP5.

In addition, the interaction between passenger services terminating at Lincoln and freight trains passing through the station area has been identified by the RUS as a constraint to future growth. The RUS recommends that the Great Northern/Great Eastern (GN/GE) Joint Line scheme, which will provide additional capacity between Peterborough and Doncaster (via Spalding) in CP4, considers whether or not combining terminating services at Lincoln (to create more through services and reduce congestion in the station area) would free up sufficient capacity to accommodate growth.

The industry SFN process is examining the feasibility, prioritisation and affordability of gauge enhancement schemes in CP4 and CP5. This work includes a number of routes covered by this RUS.

Options to address Generic Gap 4: Regional connectivity

Options to improve the journey times between the following urban centres have been appraised:

- London and Leicester, Derby, Nottingham and Sheffield
- Birmingham and Stansted Airport
- Nottingham, Derby and Birmingham
- Nottingham and Leeds
- Nottingham and Lincoln
- Nottingham and Stoke-on-Trent/Crewe.

A number of interventions are already being developed for implementation in CP4, such as an enhancement to the capability of the infrastructure on the MML that will reduce journey times between London and Leicester, Derby, Nottingham and Sheffield. On some other corridors, the RUS recommends further development work is carried out on the provision of enhanced infrastructure in CP5 to enable journey times to be improved.

The provision of faster rolling stock on the Birmingham – Derby – Nottingham corridor is recommended for further development by the

West Midlands and Chilterns RUS to incorporate the additional benefits of improved journey times on services that cross Birmingham and reduced crowding into Birmingham.

Another method of improving regional connectivity is to increase the frequency of train services. More frequent trains between London and Sheffield were provided in December 2009 to deliver two services per hour.

Recommendations to improve the frequency of services on other corridors are shown below:

- Luton, Bedford, North Northamptonshire (MKSM area) and the north by inserting an additional call each hour in the London St Pancras International to Sheffield semi-fast service at Kettering. This will also improve connectivity from stations south of Leicester to East Midlands Parkway, Derby and South Yorkshire and vice versa. The case would be further improved by linespeed improvements on the MML included in the CP4 Delivery Plan
- Peterborough and Lincoln by providing an improved service using existing resources once the upgrade of the GN/GE Joint Line has been completed.
- Nottingham and Lincoln, which requires a significant infrastructure scheme at Newark (see performance section below)
- Birmingham and Stansted Airport by the provision of later/earlier trains on this corridor to better align with airport departures/arrivals
- connectivity between Derby and West Yorkshire, which has been examined in the Yorkshire and Humber RUS (Option YS2)
- Nottingham and Stoke-on-Trent by extending the existing hourly Crewe – Derby service to Nottingham, subject to the availability of suitable train paths

Options to address Generic Gap 5: Performance

Options to address the locations with the worst congestion-related performance delay have been identified for the following locations:

- Bedford – London
- Kettering area
- Wigston Jn – Helpston Jn
- Loughborough
- Mountsorrel
- Newark
- Derby
- Nottingham
- Trent East Jn
- Chesterfield
- Nottingham – Worksop
- Sleaford – Skegness.

In some cases, schemes already being taken forward during CP4 will address these gaps (eg. south of Bedford, as part of the Thameslink Programme, and Nottingham station area, as part of East Midlands Signalling Renewals). In other cases, such as at Loughborough and Mountsorrel, no economic case can be made for infrastructure intervention based on performance improvement alone.

Of the remainder, the RUS recommends that the provision of a flyover at Newark is further developed in CP4 to refine the infrastructure costs and potential benefits. It is recognised that the development of the East Coast Main Line Intercity Express Programme service requirements beyond those proposed for LDHS services from May 2011, combined with freight growth beyond 18 freight trains per day on the east – west corridor, may drive the requirement for the flyover in CP5.

Various alternative layouts have been reviewed to improve performance in the Derby area.

Based on performance benefits alone, all options offer poor value for money. However, the inclusion of journey time benefits considerably improves the business case for a remodelled layout. Therefore, the RUS recommends that the layout at Derby is remodelled to improve the segregation of services and improve entrance/exit speeds and that this scheme is developed in CP4 for implementation in conjunction with track and signalling renewals around Control Period 6 (CP6).

Where opportunities can be taken to derive early benefits from track renewals planned to occur in advance of the major works or small scale stand-alone enhancements, they must be shown to be compatible with the remodelled layout.

Options to address Generic Gap 6: Seven Day Railway

As part of Network Rail's Seven Day Railway Programme a number of initiatives are being considered to increase access to the network for all of our customers. A small number of key routes have been identified for special attention as part of the Seven Day Railway Programme. Within the East Midlands RUS area, these include:

- Birmingham New Street – York
- Birmingham New Street – Nottingham
- London St Pancras International – Nottingham
- London St Pancras International – Sheffield
- West Midlands – South Yorkshire.

Schemes to support improved network availability on these routes are at various stages of development and include:

- additional infrastructure to improve capacity
- initiatives to improve the productivity and efficiency of maintenance and renewal activities
- improvements to diversionary routes.

These schemes must demonstrate that they will contribute to an improvement in the availability of the infrastructure for passenger services, and as a minimum hold constant the availability for freight services. Furthermore, the schemes must not have an adverse material effect on the capacity, performance and journey times for freight or passenger services.

30-year vision

The recommendations set out above are based on the detailed analysis of the gaps and options necessary to accommodate growth up to 2019. Beyond this, the RUS adopts the projections included in the Government's 2007 White Paper which suggests a doubling of both passenger and freight traffic nationally over a 30-year period. Against this scenario, a number of conclusions can be drawn:

- additional capacity is required on the London LDHS services which could be provided by the introduction of new higher capacity rolling stock, such as that for the Intercity Express Programme
- in the longer term, further growth would require 12-car operation on all Thameslink services on the Midland route. This would involve platform extensions at a number of stations on the MML and south of London, some of which would require major infrastructure works
- progressive lengthening of East Midlands local services, with associated platform extensions, would be required
- other major interventions which would affect the capacity of some routes in the RUS area include:
  - those schemes discussed in the Freight Capability gap above that are not required in CP5
  - the extension of electrification beyond Bedford to Corby, Derby, Sheffield and Nottingham on the MML. The Government is still examining the costs and benefits of electrifying the MML

– further loading gauge enhancement to create a comprehensive network of core freight arteries in the northern half of the country capable of carrying deep sea containers (intermodal traffic) on standard deck height wagons and swap bodies

– the construction of one or more new lines.

Of these, a combination of electrification and gauge clearance of the MML, as recommended in the established Network RUS: Electrification strategy, would provide the opportunity to utilise the route more fully to accommodate growth in intermodal traffic, which will be the largest growth market for rail freight between London and the north. The increased demand created by these initiatives would drive the requirement for further interventions on the MML including:

- full four-tracking of the section between Sharnbrook and Kettering
- doubling of the single line from Kettering to Corby (unless undertaken for Seven Day Railway purposes)
- loops between Syston Jn and Manton Jn
- doubling of the junction at Manton.

It would also provide the ideal opportunity for remodelling the station layout at Derby to deliver improved performance, capacity and journey times and to carry out any major infrastructure interventions to provide new alignments where the existing curvature reduces the speed of trains (for example at Market Harborough and Wellingborough). This would allow journey times to be further reduced on the MML.

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1. Background

1.1 Introduction to Route Utilisation Strategies

1.1.1

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

1.1.2

The route utilisation objective is defined as:

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

Extract from ORR Guidelines on Route Utilisation Strategies, April 2009

1.1.3

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

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

Extract from ORR Guidelines on Route Utilisation Strategies, April 2009

1.1.4

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

1.1.5

The process is designed to be inclusive. Joint work is encouraged between industry parties, who share ownership of each RUS through its Industry Stakeholder Management Group (SMG). In order to ensure passengers' interests are represented, the SMG also includes Passenger Focus and London Travelwatch (where relevant).

[1] The definition of "network" in Condition 1 of Network Rail's network licence "includes where the licence holder has any estate or interest in, or right over a station or light maintenance depot, such station or light maintenance depot."

1.1.6
There has also been extensive consultation outside the rail industry by means of a series of Wider Stakeholder Group events.

1.1.7
The ORR guidelines require options to be appraised. This is initially undertaken using the Department for Transport (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.

1.1.8
RUSs occupy a particular place in the planning activity for the rail industry. They utilise available input from processes such as the DfT's Regional Planning Assessments and, for the period to 2014, the 2007 High Level Output Specification. 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.

1.1.9
Network Rail will take account of the recommendations from RUSs when carrying out its activities. In particular they will be used to help to inform the allocation of capacity on the network through application of the normal Network Code processes.

1.1.10
The ORR will take account of established RUSs, and those in preparation when exercising its functions.

1.2 Document structure

1.2.1
Chapter 2 describes the geographic scope of the RUS, the time horizon and the planning context within which it is being developed.

1.2.2
Chapter 3 summarises the current capabilities and usage of the strategic routes within the RUS area, drawing on input from key industry stakeholders, and highlighting particular issues.

1.2.3
Chapter 4 discusses anticipated changes in supply and demand and the schemes planned to enhance or improve the routes and services covered by the strategy. This helps to identify the benefits from these improvements, as well as the potential for synergy between committed or expected schemes and those developed by the RUS.

1.2.4
Chapter 5 identifies the "gaps" being considered by the RUS. These gaps are defined in terms of specific elements of supply and demand for the railway system. "Options" for bridging these gaps are listed, discussed and given an initial appraisal of their likely costs and benefits.

1.2.5
Chapter 6 covers the consultation process, including its purpose and a summary of the responses received and how these have been taken into account.

1.2.6
Chapter 7 draws together the conclusions into a strategy comprising recommendations for better use of resources and investment proposals for meeting growth to 2019. Recommendations are grouped by "gap" into those required in the short and medium term.

The document then looks ahead to the challenges posed to the RUS area in the longer 30-year term.

1.2.7
Chapter 8 describes the next steps in the process, including the consideration of this RUS by the ORR. Supporting data is contained within the appendices.

2. Dimensions

2.1 Geographic scope

The East Midlands Route Utilisation Strategy (RUS) covers the network defined by Network Rail's Strategic Route I. This is depicted in geographical and schematic format in Figures 2.1 and 2.2 respectively. It includes the route from London Blackfriars through to Tapton Jn via London St Pancras International, as well as the entire route east and north of Nuneaton and Barton North Jn (just north of Central Rivers Depot) not assessed by the West Midlands and Chilterns, Yorkshire and Humber or Greater Anglia RUSs. The East Midlands RUS also includes lines on Strategic Route G from Peterborough (exclusive) to Lincoln (exclusive).

2.2 Services considered

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

2.3 Linkage to other studies and workstreams

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

The East Midlands RUS interacts with:

- the East Coast Main Line RUS area at Peterborough and Grantham
- the West Coast Main Line RUS area at Nuneaton and Stoke-on-Trent (under development)
- the Yorkshire and Humber RUS area at Chesterfield and Lincoln
- the Greater Anglia RUS area in relation to long distance services from the Midlands and the North West to Stansted Airport and Norwich
- the South London RUS area at Blackfriars
- the West Midlands and Chilterns RUS area at Nuneaton and Wichnor Jn (under development)
- the Freight RUS, throughout the RUS area
- the Network RUS, principally in relation to long distance flows, electrification, depots/ rolling stock (under development) and stations (under development).

The following RUSs have flows into the East Midlands RUS area:

- the Kent RUS
- the South West Main Line RUS
- the Cross London RUS
- the Scotland RUS
- the Lancashire and Cumbria RUS
- the Wales RUS
- the Merseyside RUS
- the Sussex RUS

– the Great Western RUS (under development)

– the London and South East Generation 2 RUS (under development)

– the Northern Generation 2 RUS (under development)

– the Scotland Generation 2 RUS (under development).

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

- East Midlands RPA (published in May 2007)
- East of England RPA (published in February 2006)

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

- East Midlands and East of England Regional Economic Strategy
- East Midlands Draft Regional Plan
- East of England Spatial Strategy
- London Plan
- Transport for London GN/Thameslink Rail Corridor Plan
- Government White Paper including High Level Output Specification
- Midland Main Line RUS (published by the Strategic Rail Authority in 2003).

The draft North Northamptonshire Rail Strategy has also provided valuable context for the RUS. Strategies addressing regeneration, inter-regional economic activity, sustainability and tourism issues have been referred to during the planning process.

2.4 Assumptions

During analysis, it has been necessary to make assumptions about planned changes to services. Further details are provided in **Chapter 4**.

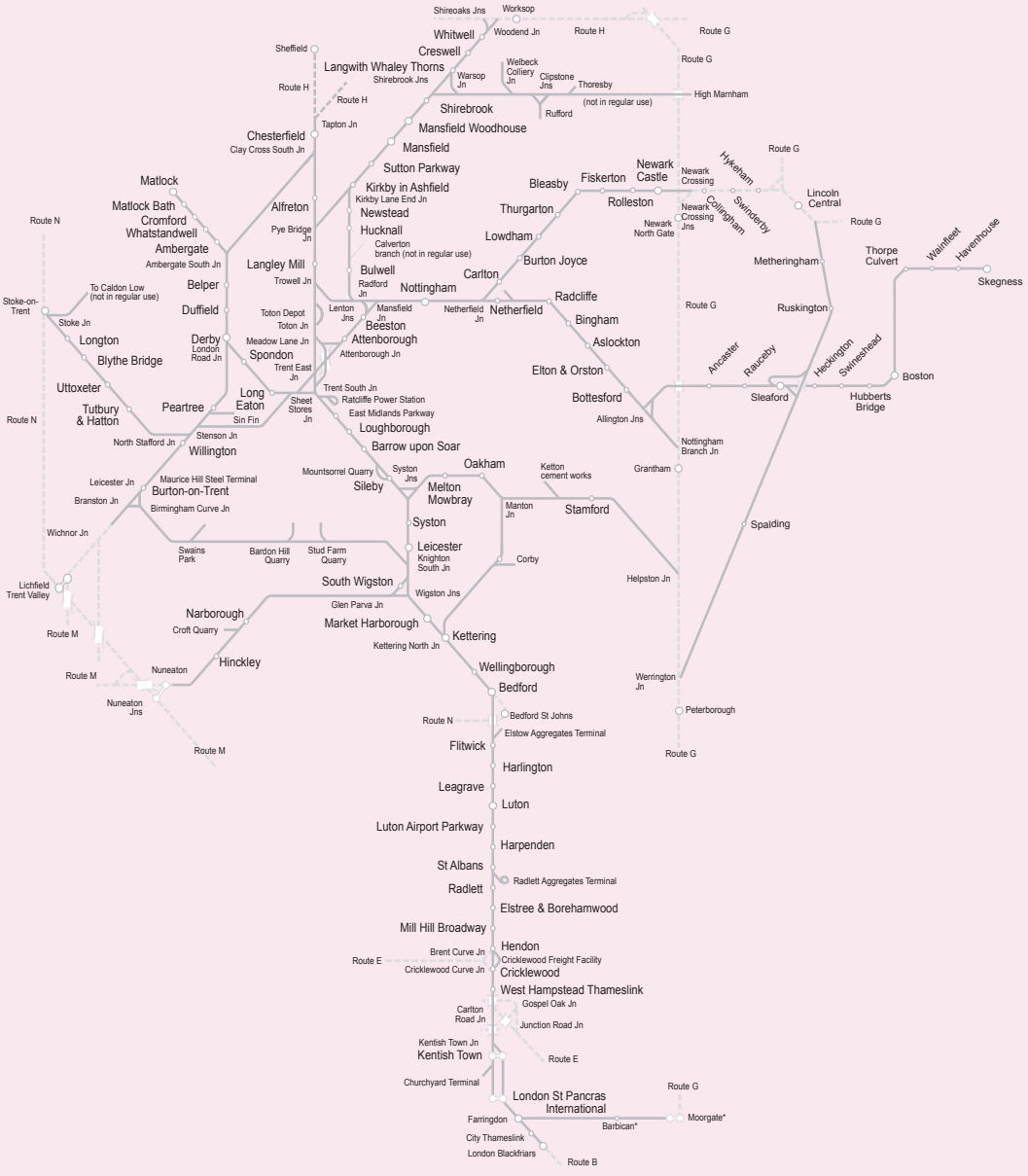
- the Thameslink programme expectation of increasing the level of services across London up to 16 trains per hour (tph) in each direction in the peaks on the Midland route by the middle of the decade is classed as committed. This includes operation of 12-car length trains on the Bedford – Brighton route in the peaks from December 2011.

2.5 Time horizon

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

Figure 2.1 – Geographic scope (shown in blue)

Figure 2.2 – Schematic map



Key

Within the RUS scope

Closest connecting routes outside RUS scope

* Barbican and Moorgate stations are closed to Thameslink services

3. Current capacity, demand and delivery

3.1 Train operators

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

3.1.1 CrossCountry

CrossCountry operates Long Distance High Speed (LDHS) services linking Scotland, the North East and Yorkshire, with the East and West Midlands, the South West and the South Coast. It also operates inter regional services between Birmingham New Street and Stansted Airport and between Cardiff Central and Nottingham via Birmingham New Street. The franchise commenced in November 2007 and runs until April 2016. The final 14 months of the franchise are subject to performance targets being met.

3.1.2 East Midlands Trains

East Midlands Trains (EMT) operates regular LDHS services from Sheffield, Derby, Nottingham and Corby to London St Pancras International. It provides a service from Liverpool Lime Street, Manchester and Sheffield to the East Midlands and East Anglia. It also operates a number of local services in the East Midlands area. The franchise commenced in November 2007 and runs until April 2015. The final 14 months of the franchise are subject to performance targets being met.

3.1.3 First Capital Connect

First Capital Connect (FCC) operates cross-London services via London St Pancras International, between Bedford and Brighton and between Luton, St Albans, Wimbledon and Sutton. The franchise commenced in April 2006 and runs until March 2015. FCC also jointly operates services between the RUS area and Kent, run by FCC north of Blackfriars and Southeastern south of Blackfriars.

3.1.4 Northern Rail

Northern Rail commenced operation of a new service between Leeds and Nottingham in December 2008. The current Northern Rail franchise started in December 2004 and runs until August 2013. The final two years of the franchise are subject to performance targets being met.

3.1.5 DB Schenker

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

3.1.6 Freightliner

Freightliner operates throughout Great Britain and has two divisions: Freightliner Limited and Freightliner Heavy Haul. Freightliner Limited is the largest rail haulier of containerised traffic, predominantly from the deep sea market. Freightliner Heavy Haul is a significant conveyor of bulk goods (predominantly coal, construction materials and petroleum) and operates infrastructure services.

3.1.7 First GB Railfreight

First GB Railfreight (First GBRf) is an operator of container trains and infrastructure services. It also runs a number of bulk market services, including coal, gypsum and Royal Mail trains. It is estimated to have acquired a 12 percent share of the UK market for rail haulage of power station coal, since commencing operations in April 2007.

3.1.8 Fastline Freight

Fastline Freight is a branch of Jarvis plc. It has recently started conveying coal to Ratcliffe and Ironbridge power stations.

3.1.9 Colas Rail

Colas Rail bought out the UK rail operations of AMEC in 2007 and operates timber traffic from Carlisle and Scotland to Chirk. In November 2008, train operations started from Immingham to Heartlands Park, Birmingham, conveying steel coil.

3.2 Passenger market profile

3.2.1 Population and the rail passenger market

The East Midlands Regional Planning Assessment (RPA) gives a population figure of 4.3 million, though naturally this excludes the population in the greater London area that falls within the geographic scope of this RUS. The county populations range from 760,000 in Nottinghamshire to 623,000 in Leicestershire. The unitary authorities of Leicester, Nottingham and Derby have populations ranging from 233,000 to 285,000, whilst Rutland has a population of just 36,000. The Eastern RPA quotes a population figure of 3.3 million for the 16 London Boroughs (the City of London, Westminster, Havering, Redbridge, Barking, Newham, Hackney, Tower Hamlets, Barnet, Enfield, Haringey, Waltham Forest, Camden, Islington, Brent and Harrow), a proportion of which will be within the East Midlands RUS area.

Nearly 50 million rail trips were made in 2007/08 either to, from, through, or within the RUS area. There are three key rail passenger markets in the RUS area which are served by the following operational groups:

- LDHS services provide passengers with fast connections between cities such as Leicester, Nottingham, Derby and London within the RUS area
- London and South East suburban services provide frequent connections from stations such as Bedford, Luton and St Albans to London and the South East
- regional, interurban and local services provide connections between regional cities within or outside the RUS area. Local services provide access to employment, education and leisure opportunities. The main regional centres in the RUS area are Leicester, Nottingham and Derby.

Figure 3.1 shows the breakdown of trips to, from, through and within the RUS area in 2007/08. 12 million journeys have both their origin and destination inside the East Midlands RUS area (excluding London). 5 million journeys go through the RUS area (excluding London) but have neither their origin nor destination inside the RUS area (eg. trips between Birmingham and Leeds). The remaining 33 million journeys are either to or from a station outside the East Midlands RUS area (excluding London). Of these, two thirds are trips to or from London stations within the RUS area (London St Pancras International, Blackfriars, Farringdon, Barbican, City Thameslink and Moorgate) and one third are to or from the rest of the country.

Figure 3.2 shows the breakdown of passenger demand between the RUS area and other regions of the country. About 75 percent of these trips are to or from the rest of London and the South East, the West Midlands or the Yorkshire and Humber regions.

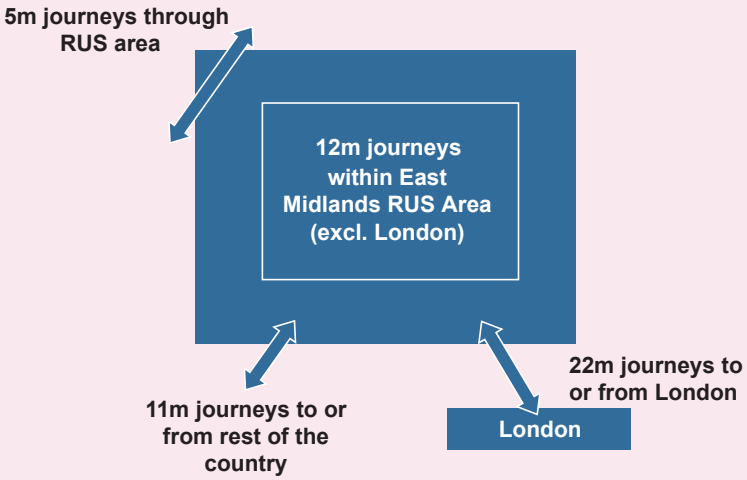
Figure 3.3 shows the quantity of footfall within the RUS area. Demand is consistently high at key stations along the Midland Main Line (MML). Some stations such as Newark or Grantham are also served by the East Coast Main Line (ECML) which is outside the scope of this RUS. The six busiest stations within the RUS area are shown in Table 3.1.

Those stations with the lowest footfall in the RUS area, shown in Figure 3.3 with fewer than 10,000 passengers per annum, are predominantly stations on rural routes, particularly on the Nottingham – Newark – Lincoln and Nottingham – Grantham – Skegness corridors.

The service level varies at each station, according to demand and the ability to serve the station economically, but in all cases the elimination of stops would achieve minimal benefits in terms of journey time, resource utilisation or train performance. Furthermore, the low footfall stations on the Grantham – Skegness corridor are on a designated community rail line. The strategy for these stations is therefore subject to review with the Poacher Line Community Rail Partnership.

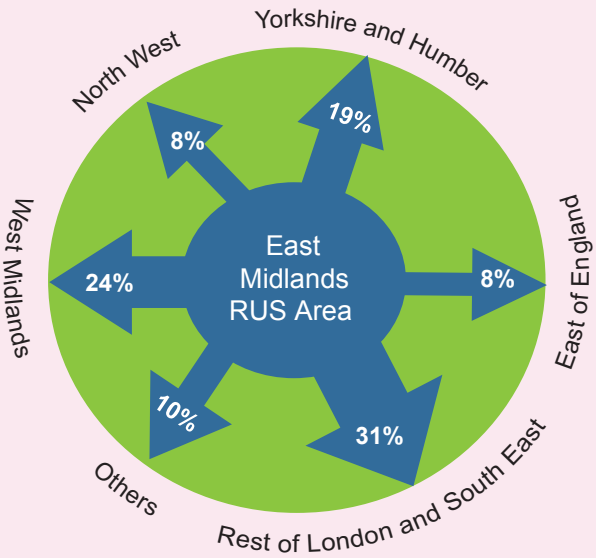
Figure 3.4 shows the level of growth in total journeys experienced in the East Midlands RUS area between 1996/97 and 2007/08. Demand within the RUS area has almost doubled and journeys to or from outside the RUS area have grown on average at five percent per annum.

Figure 3.1 – Passenger demand to, from, through and within the RUS area 2007/08



Source: RIFF V1.3 and MOIRA OR25 (Midlands) database
Note: London comprises London St Pancras International, Blackfriars, Farringdon, Barbican, City Thameslink and Moorgate.

Figure 3.2 – External demand (rest of the country to/from the RUS area) 2007/08



Source: MOIRA OR25 (Midlands)
Note: Rest of London and South East includes all London stations except London St Pancras International, Blackfriars, Farringdon, Barbican, City Thameslink and Moorgate.

Figure 3.3 – Station footfall within the RUS area 2006/07

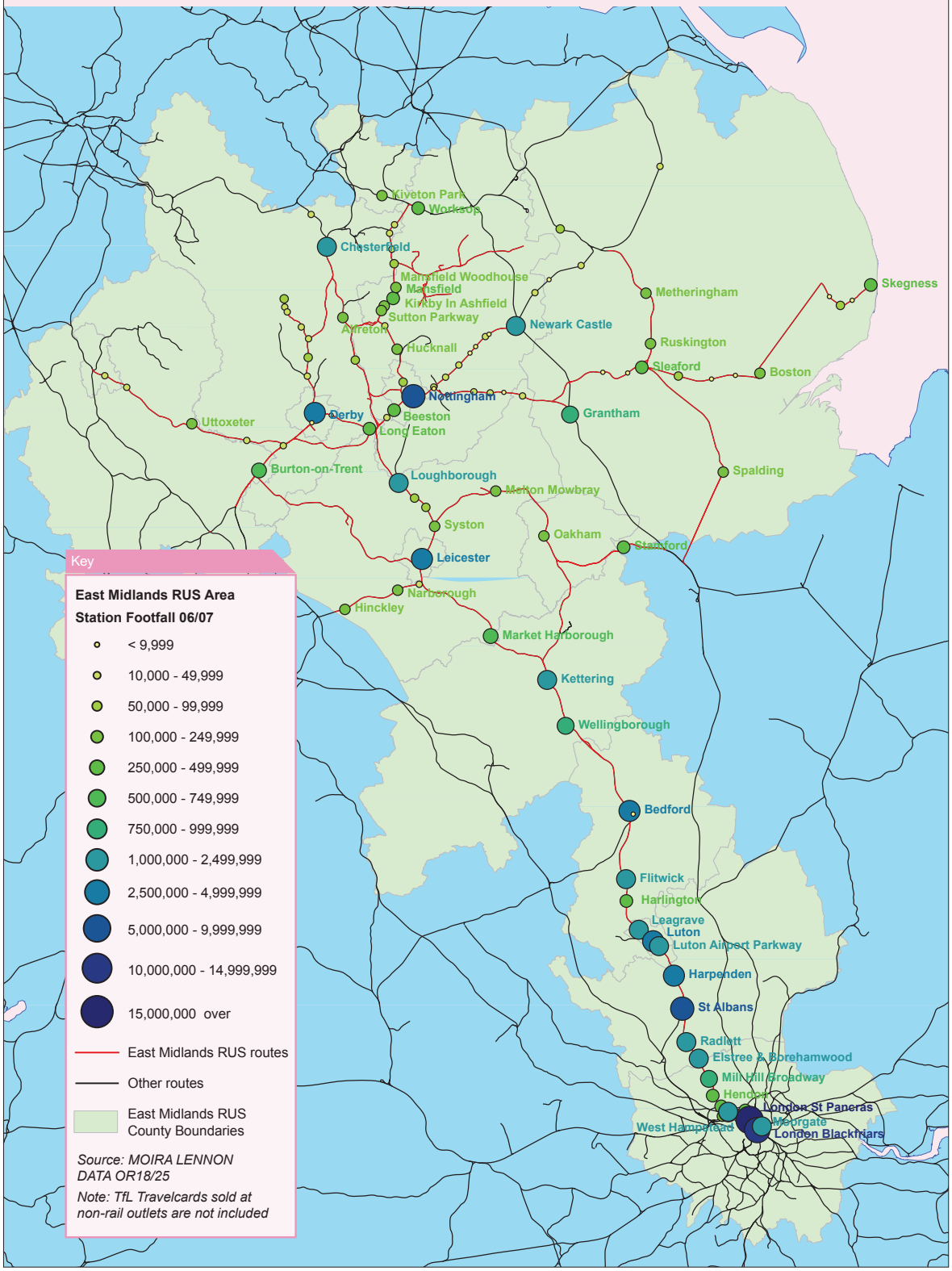


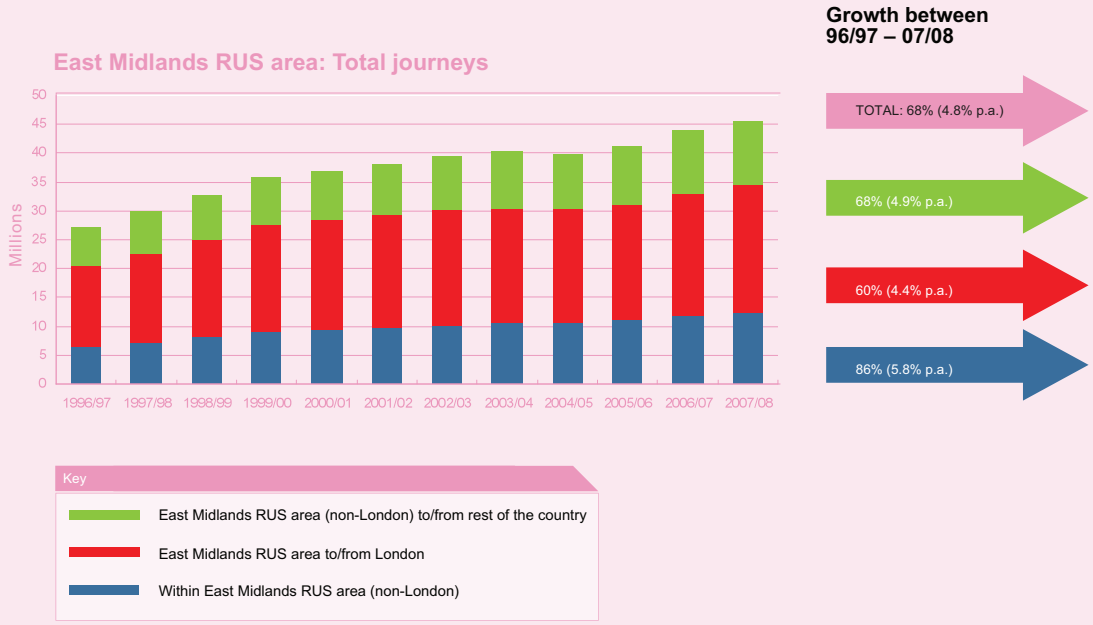
Table 3.1 – Most used stations in the RUS area 2007/08

	Footfall (million)
London St Pancras International*	24.4
St Albans	6.3
Nottingham	5.9
Leicester	5.0
Luton	3.5
Bedford Midland	3.2

Source: RIFF v1.3 and MOIRA OR19 and 0R25 07/08 database

**Note: This figure represents all passengers regardless of origin or destination excluding passengers using TfL Travelcards sold through non-rail outlets.*

Figure 3.4 – Historic growth in rail journeys in the RUS area



Source: LENNON data RIFF V1.3 and MOIRA OR25 (Midlands) database
Notes: (1) Excludes those using TfL Travelcards sold through non-rail outlets (2) London comprises London St Pancras International, Moorgate, Farringdon, Barbican, City Thameslink and London Blackfriars.

3.2.2 Long Distance High Speed passenger services

The following LDHS services are covered by this RUS:

- LDHS services between London St Pancras International and towns and cities in the East Midlands and Yorkshire and Humber regions via the MML
- LDHS interurban services, between Edinburgh and Plymouth via Leeds, Sheffield, Derby, Birmingham and Bristol, and between Newcastle and Reading via Sheffield, Derby, Birmingham and Oxford.

Long Distance High Speed to or from London

There are regular hourly LDHS services between London and Sheffield providing access to both Luton and East Midlands airports via parkway stations on the MML. A few of these services run on to Leeds.

The majority of passengers using LDHS services on the MML are travelling to or from London for business, leisure or commuting purposes. London St Pancras International provides a good interchange facility for passengers to continue their journeys by rail. There are convenient rail connections to a number of cities and towns south of London, or a short walk to King's Cross allows for further connections with ECML services. There are good connections to the London Underground, taxis and bus services.

LDHS services also provide fast connections to and from Kettering, Wellingborough and Bedford. The majority of passengers travelling from these stations are commuters travelling into London, although there is some commuting into Leicester and Nottingham.

Other locations (not on the MML) which drive demand for LDHS services to or from London include:

- other London airports by interchanging to rail services and/or London Underground. In addition, Stansted Airport can also be reached by interchanging at Leicester into the CrossCountry services
- Europe, for which Eurostar services depart from London St Pancras International to Paris, Brussels and Lille.

Two new stations have recently been opened and are now served by LDHS services. These are East Midlands Parkway and Corby, both of which opened in 2009. Demand from these stations is likely to build up over the next few years, particularly for commuting from Corby to London. East Midlands Parkway provides passengers with better connections to East Midlands Airport, and park and ride facilities which will allow car drivers an opportunity to avoid the M1 to access Nottingham, Leicester, Derby or London.

The main competition for LDHS services is from car and coach travel. The M1 motorway lies parallel to the MML and key roads connect it with the three main cities in the East Midlands.

Long Distance High Speed interurban

While travel on this network between the East Midlands and Birmingham is significant for business, leisure and commuting, no single flow dominates in the same way that London radial routes are dominated by one destination.

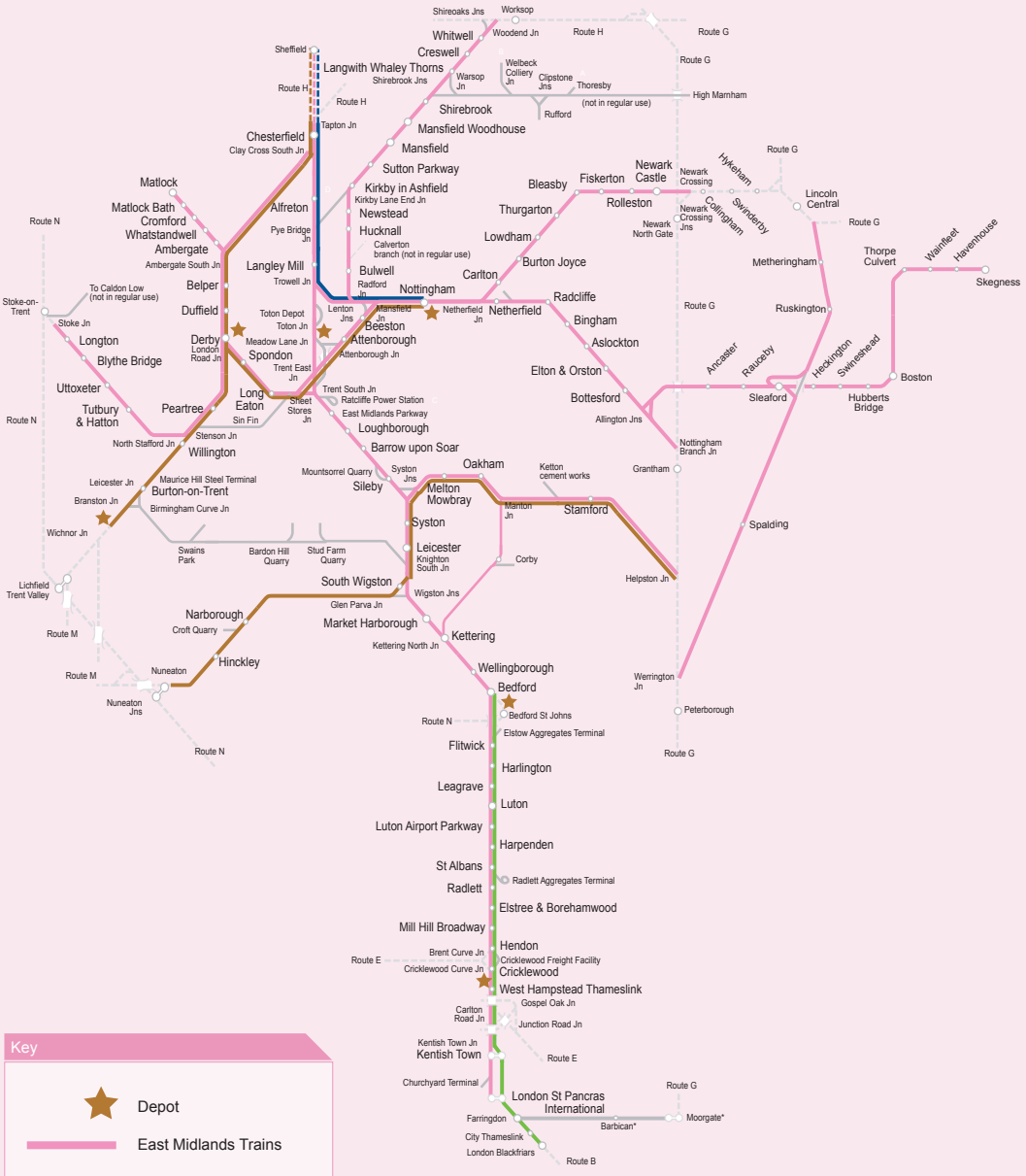
Accordingly, interurban LDHS services experience complex patterns of overlapping demands for travel and often a high level of turnover of seat occupation, particularly at interchange stations.

Competition with the motorway network is intense. The motorway network parallels much of the core rail network and it offers a much more attractive and viable alternative for customers making cross country journeys. Journey time and direct services are therefore critical issues for rail on these corridors.

Sunday is the second busiest day of the week on interurban LDHS services. It is believed that there is suppressed demand for travel on Sundays and for outward travel on the other days of the week that would return on Sundays.

Figure 3.5 shows the routes covered by all Train Operating Companies (TOCs) operating in the RUS area.

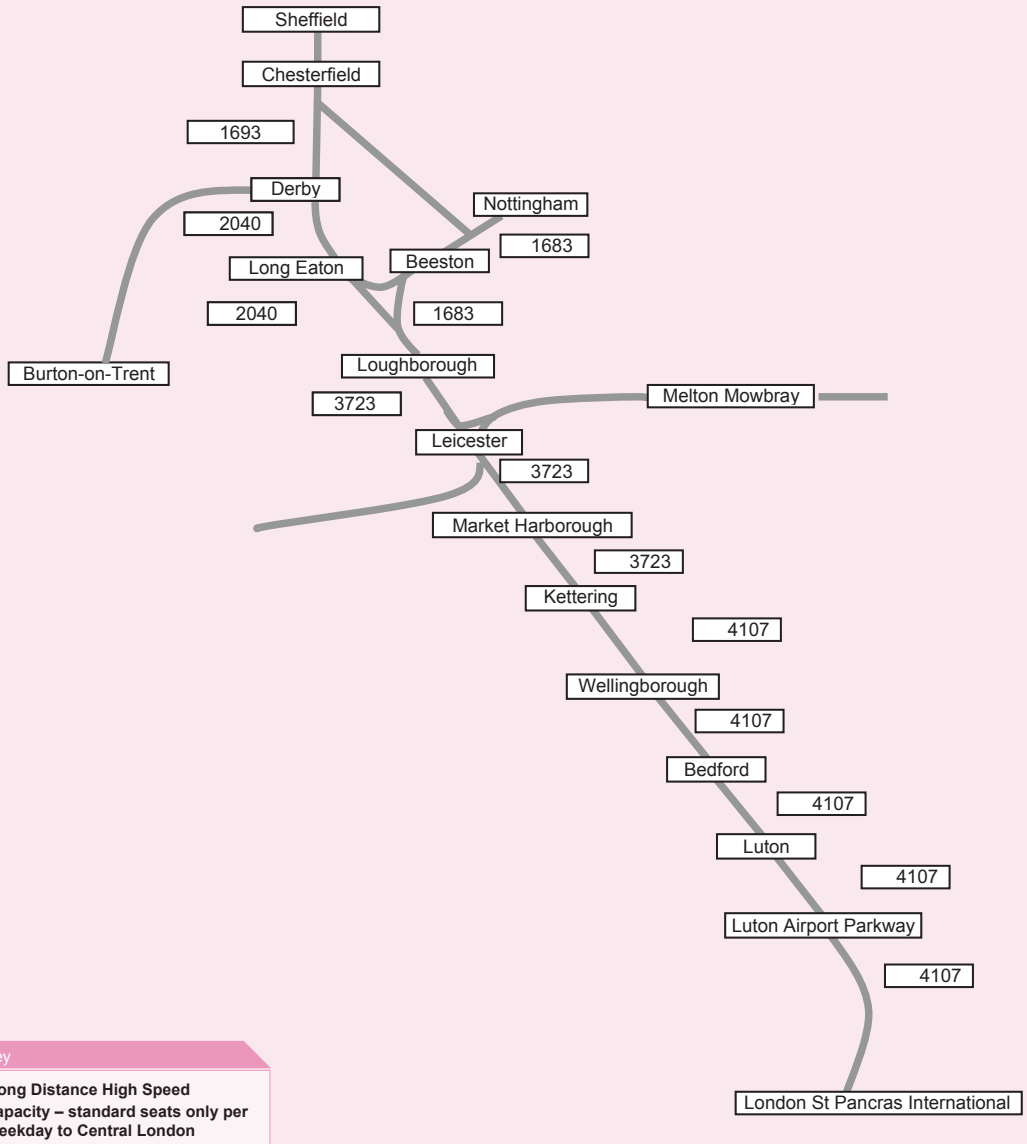
Figure 3.5 – TOCs within the RUS area



3.2.3 Long Distance High Speed capacity

EMT operates the LDHS services between London St Pancras International and the East Midlands by using a combination of diesel Class 43 High Speed Trains (HSTs) with eight passenger coaches, or Meridian/Pioneer Class 222 rolling stock with a configuration of four, five, seven, eight, nine or ten passenger coaches. CrossCountry has recently added Class 43 HSTs with eight passenger coaches to their fleet of Class 220/221 Voyager and Super Voyagers and Turbostar Class 170s. Figure 3.6 shows total standard LDHS capacity in the RUS area provided by EMT in the morning three-hour peak.

Figure 3.6 – Total daily standard seating capacity for LDHS services in the morning three-hour peak, December 2008



Key

Long Distance High Speed capacity – standard seats only per weekday to Central London
December 2008

Source: Network Rail estimate

Table 3.2 – Historic growth (LDHS London flows)

Passenger journeys to/from London St Pancras International 1996/97 and 2007/08

Station	1996/97	2007/08	% Change per annum
Bedford	314,000	1,104,000	12%
Market Harborough	107,500	330,500	11%
Wellingborough	279,000	608,000	7%
Luton	309,000	632,500	7%
Kettering	320,000	604,000	6%
Nottingham	563,000	1,016,500	6%
Derby	325,500	585,000	5%
Loughborough	166,000	289,000	5%
Leicester	626,000	978,000	4%
Luton Airport Parkway (open 1999)	N/A	520,000	N/A

Source: MOIRA OR25 (Midlands)

Long Distance High Speed to or from London – passenger numbers

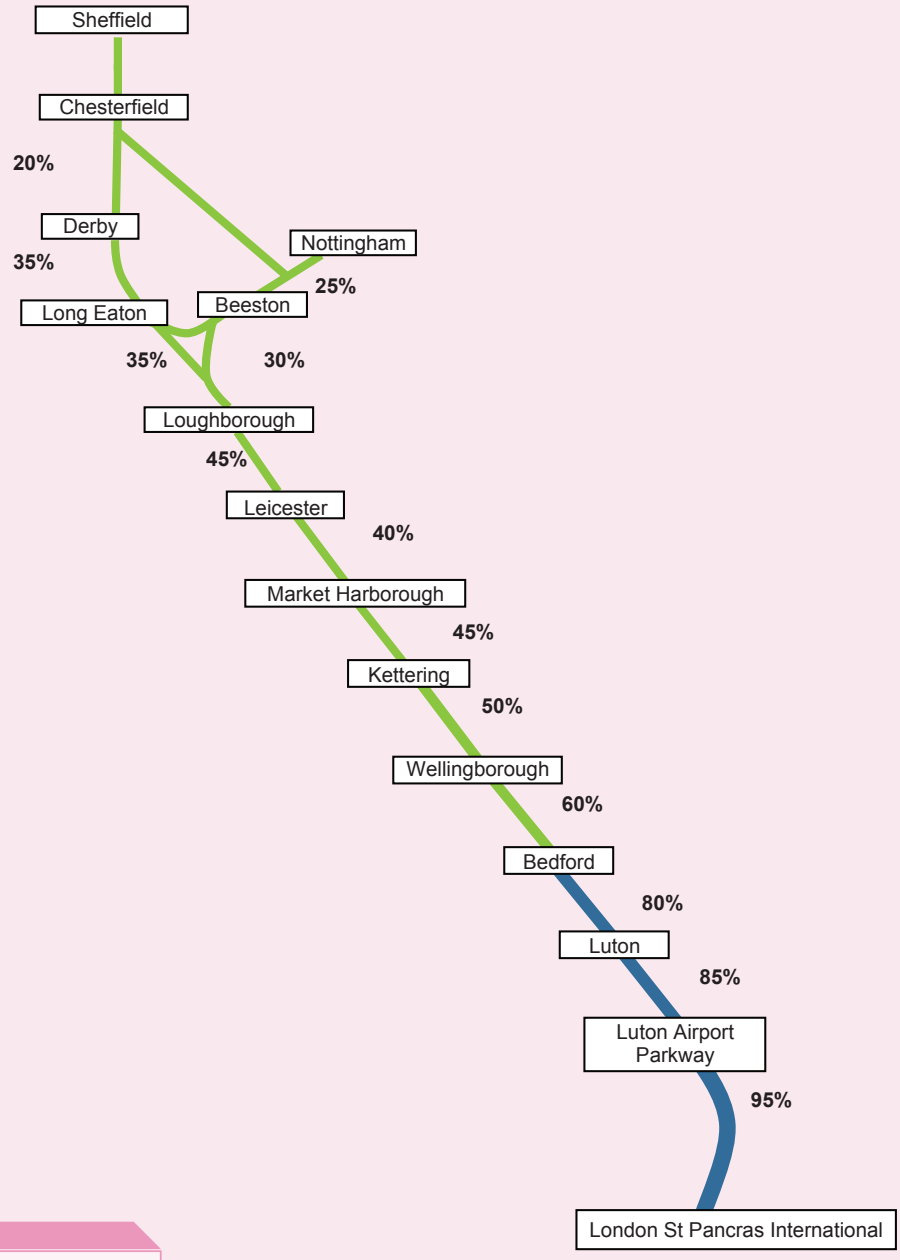
Table 3.2 shows the growth in passenger travel between London St Pancras International and other stations along the MML within the RUS area. There has been a large increase in rail travel to London from stations south of Leicester, in particular those within North Northamptonshire. One of the reasons for this growth is the increased trend in long distance commuting driven partly by the rapid increase in London living costs.

Long Distance High Speed to or from London – current crowding

Figure 3.7 shows the average peak loadings towards London on LDHS services between 07:00 and 09:59 for each key route segment. The figures represent an average weekday standard seated load factor (Monday to Thursday only) comparing passenger loadings to standard seats. The seated load factors get significantly higher on the approach to London St Pancras International.

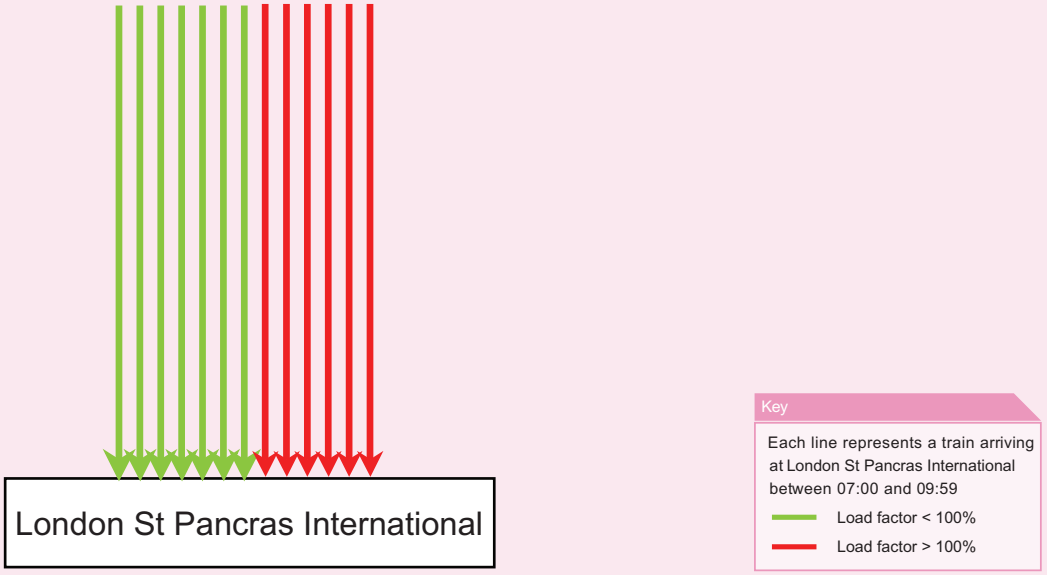
Figure 3.8 indicates the level of crowding on all LDHS services upon arrival at London St Pancras International in the morning three-hour peak. It shows that almost half of all services have some passengers standing.

Figure 3.7 – Average load factors along the Midland Main Line, for LDHS services arriving into London St Pancras International in the morning three-hour peak



Source: East Midlands Trains and MOIRA OR25 (Midlands)
NB. The figure shows average passenger loads for intermediary flows, eg. on average, LDHS services are at 60% of their seated capacity between Wellingborough and Bedford. The figure excludes East Midlands Parkway and Corby stations due to data unavailability as services have only recently started operating.

Figure 3.8 – Current level of crowding on trains arriving at London St Pancras International in the morning three-hour peak on the LDHS services



Source: East Midlands Trains, December 2008

Long Distance High Speed interurban crowding

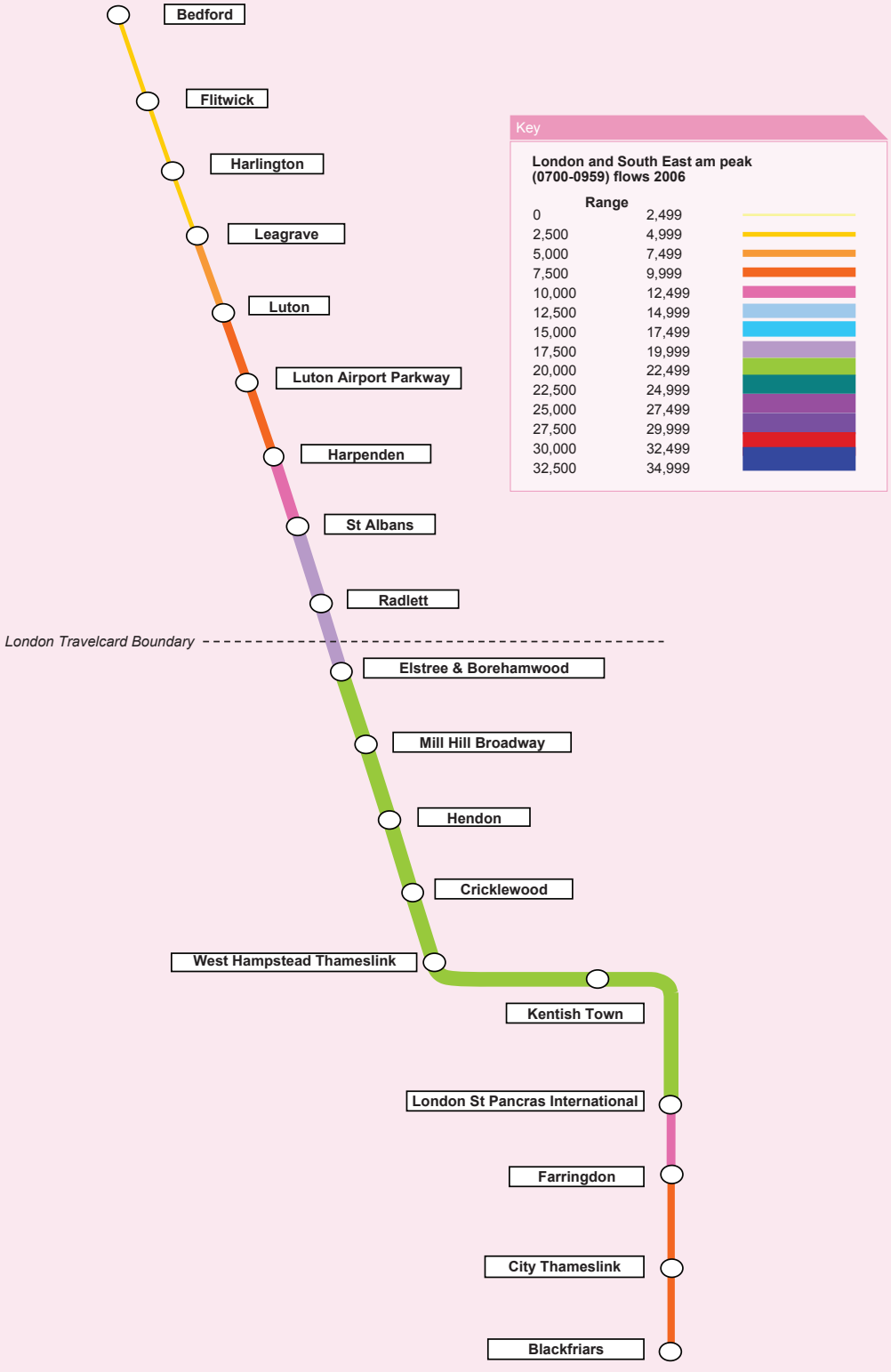
The LDHS interurban services between Plymouth and Edinburgh, and Reading and Newcastle, are currently provided by CrossCountry and pass through various cities, including Bristol, Birmingham, Derby, Sheffield, Leeds, York and Newcastle, and Oxford, Birmingham, Derby, Sheffield, Doncaster and York respectively. Train capacity analysis (based on passenger count data at major stations from May 2009, along with MOIRA build profiles), ascertained that currently there is generally sufficient capacity on the Reading – Newcastle services. However, some services experience crowding near urban centres over short periods during the peaks. Trains on the Plymouth – Edinburgh corridor are fairly busy with most reaching load factors over 75 percent through the length of their journey, and a handful exceeding seated capacity on some parts of their journey.

3.2.4 London and South East commuter services

London and South East commuter services operating on the MML from Bedford, Luton and St Albans are provided by FCC, although a number of EMT LDHS services call at Bedford, Luton and Luton Airport Parkway. FCC services continue through the Thameslink core of Farringdon, City Thameslink, and Blackfriars to stations in South London, Kent and on the Brighton Main Line. The largest commuting/ suburban stations in the RUS area are:

- Bedford
- Luton
- St Albans.

Figure 3.9 – The build up of demand on FCC services during the morning peak as services approach the Thameslink core



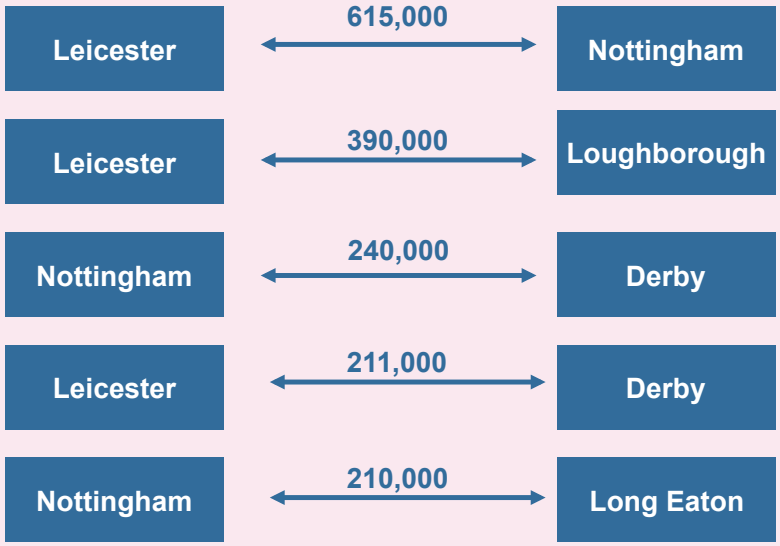
Source: Data from Railplan model outputs for Thameslink services for 2006

3.2.5 Regional, interurban and local services

Interurban and regional services connect urban centres in and outside the RUS area. For example, the service between Liverpool Lime Street and Norwich connects urban centres in the north west, the Yorkshire and Humber region (specifically Sheffield), the East Midlands and East Anglia.

Local travel made entirely within the RUS area is generally for the purpose of commuting, leisure or education. Figure 3.10 shows the top five non-London flows within the RUS area in

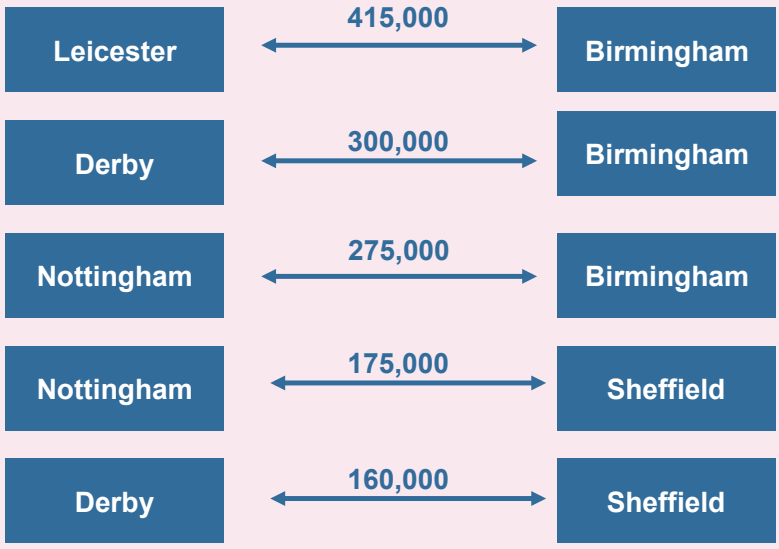
Figure 3.10 – Top five non-London flows within the RUS area, 2007/08



Source: MOIRA OR25 (Midlands)

NB. This excludes journeys south of Bedford on LDHS services

Figure 3.11 – Top five non-London flows to/from outside the RUS area, 2007/08



Source: MOIRA OR25 (Midlands)

2007/08. The size of the flows reflect the importance of Leicester and Nottingham in the RUS area.

Figure 3.11 shows the top five non-London flows to/from outside the RUS area in 2007/08. The top flows indicate considerable demand for rail travel between urban centres within the East Midlands region and Birmingham and Sheffield outside the region.

Leicester

Leicester is both a major attractor and generator of rail demand in the RUS area, with London and Birmingham being key destinations for travel outside the East Midlands region. Figure 3.12 shows the level of crowding experienced by passengers when departing Leicester in the three-hour evening peak. Urban centres in the East Midlands region were found to have crowding more spread out in the morning peak, whereas crowding in the evening peak was more concentrated between the hours of 16:00 and 18:59. Train capacity analysis is therefore based on the evening peaks as this is where crowding is expected to be more significant. The analysis demonstrates that there is currently sufficient capacity on most trains.

Nottingham

Nottingham is another key urban centre in the East Midlands region, attracting many local passengers travelling for the purpose of commuting, leisure, business or educational activities. There is also a large amount of travel between Nottingham and other places outside the East Midlands region, such as London, Birmingham and Sheffield. Figure 3.13 shows

Figure 3.12 – Current level of crowding on trains departing Leicester in the three-hour evening peak (average for Dec 2008)

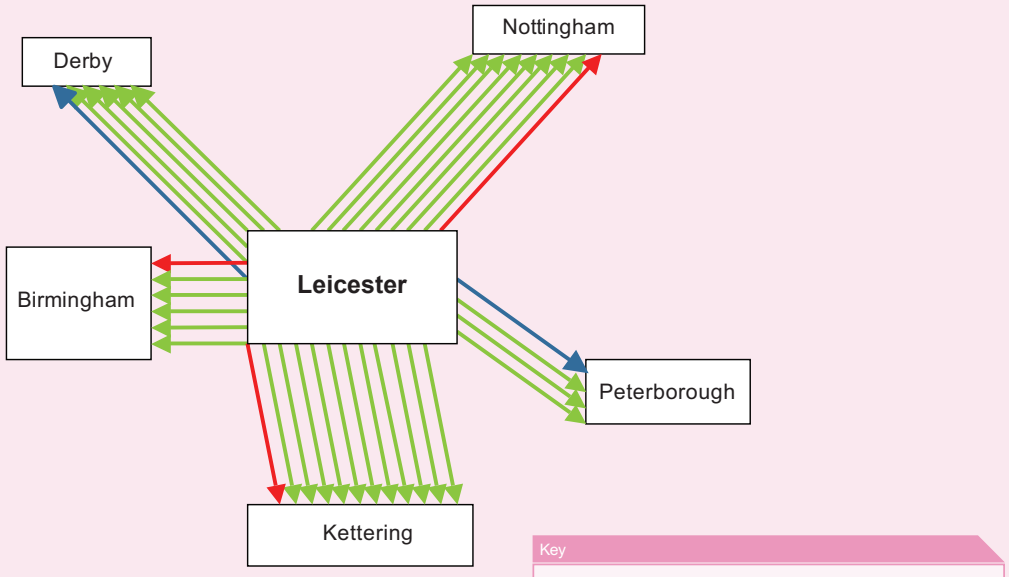
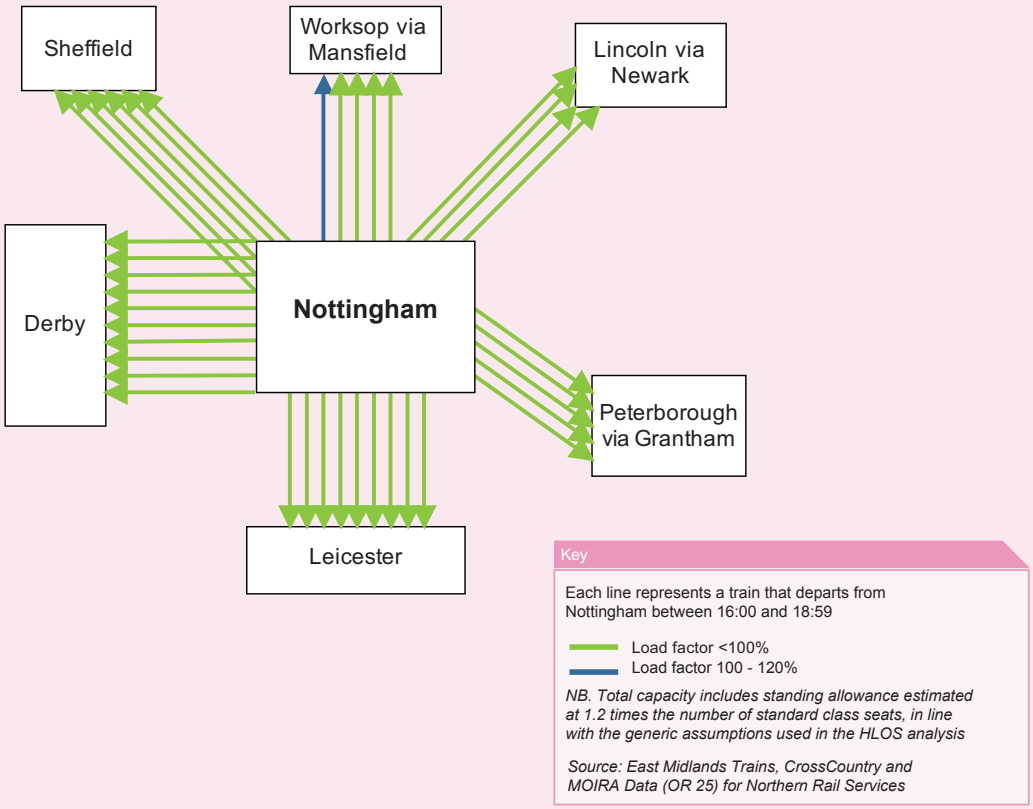


Figure 3.13 – Current level of crowding on trains departing Nottingham in the three-hour evening peak (average for December 2008)



the level of crowding experienced by passengers when departing Nottingham in the evening three-hour peak. Similarly to Leicester, crowding in the evening three-hour peak is more concentrated and is therefore used for train capacity analysis.

The analysis demonstrates that apart from one train with some passengers standing, there is currently sufficient capacity at Nottingham during the peak period.

Interurban services

There are three major interurban services through the RUS area which are used by passengers for both long distance inter-regional travel between key urban centres, and for short distance commuting during the peaks:

- Liverpool – Norwich via Nottingham. This service is currently provided by EMT, and passes through various major cities, including Manchester, Sheffield, Nottingham and Peterborough. Figure 3.14 shows the level of standing on the route throughout the day in each direction in December 2008. There is currently sufficient capacity east of Nottingham but many of the services west of Nottingham show evidence of overcrowding, with some even having passenger numbers above total train capacity (more than 20 percent above seated capacity). This is especially true during peak times at major cities.

Figure 3.14 – Current level of crowding on trains arriving at stations along the Liverpool Lime Street – Norwich route in each direction throughout the day

Station Key

LIV: Liverpool Lime Street
SPT: Stockport
CHD: Chesterfield
NOT: Nottingham
PBO: Peterborough
NRW: Norwich
MCO: Manchester Oxford Road
SHF: Sheffield
ALF: Alfreton
GRA: Grantham
ELY: Ely

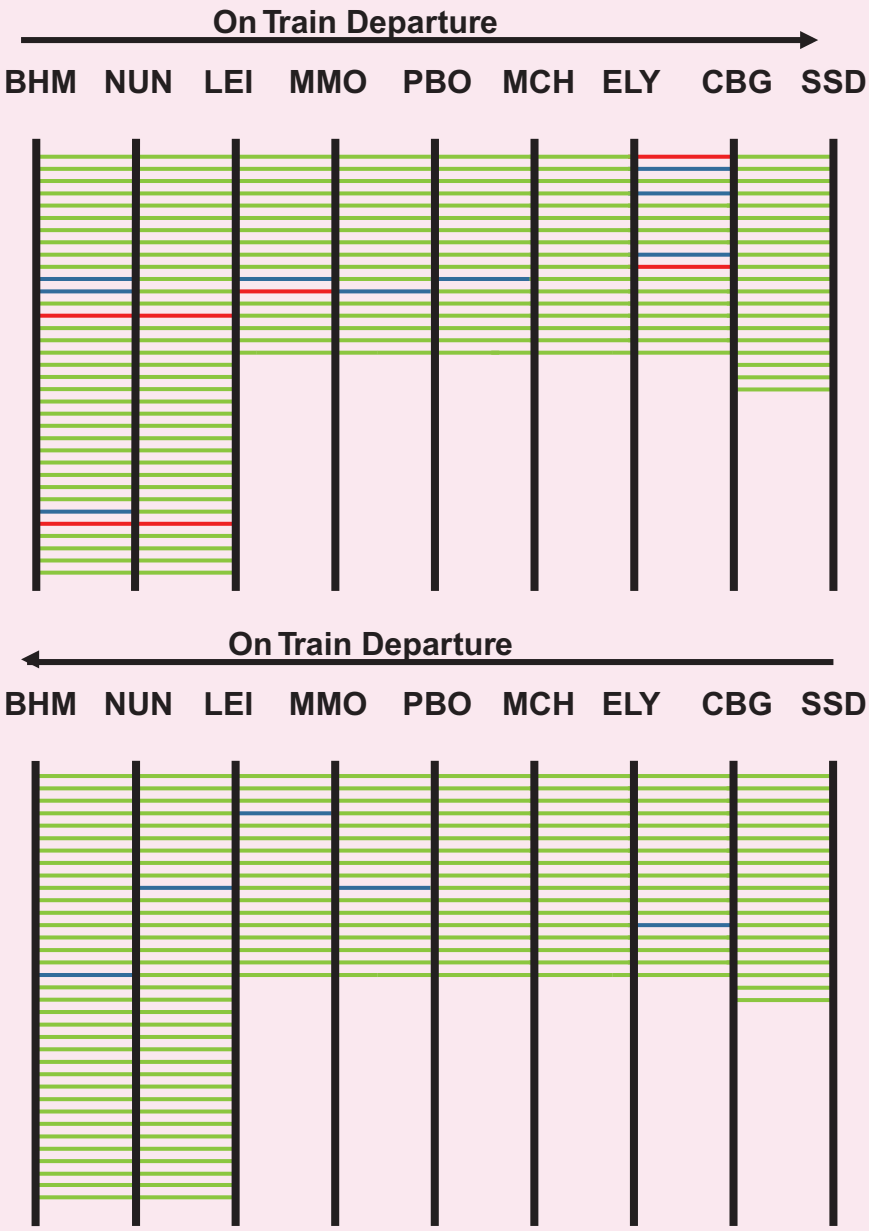
Key

- Load factor <100%
- Load factor 100 - 120%
- Load factor >120%

NB. Total capacity includes standing allowance estimated at 1.2 times the number of standard class seats, in line with the generic assumptions used in the HLOS analysis

Source: East Midlands Trains passenger counts Monday - Thursday 2008 and MOIRA Data (OR 25)

Figure 3.15 – Current level of crowding on trains departing from stations along the Birmingham – Stansted Airport route in each direction throughout the day



Station Key

BHM: Birmingham New Street	NUN: Nuneaton
LEI: Leicester	MMO: Melton Mowbray
PBO: Peterborough	MCH: March
ELY: Ely	CBG: Cambridge
SSD: Stansted Airport	

Key

- Load factor <100%
- Load factor 100 - 120%
- Load factor >120%

NB. Total capacity includes standing allowance estimated at 1.2 times the number of standard class seats, in line with the generic assumptions used in the HLOS analysis.

Source: CrossCountry passenger count data March 2009 and MOIRA Data (OR 25)

- Birmingham – Stansted Airport via Leicester. This service is currently provided by CrossCountry and passes through various major cities, including Leicester, Peterborough and Cambridge. Figure 3.15 shows the level of standing on the route throughout the day in each direction in March 2009. There is currently sufficient capacity along the route overall, but there are many services with standing passengers at some point along the route. There is also evidence of some services already reaching load factors above total capacity, which usually coincides with a peak at a major city such as at Birmingham, Leicester or Cambridge

- Nottingham – Derby – Birmingham – Cardiff. This service is currently provided by CrossCountry and links both major cities and significant towns, including Derby, Burton-on-Trent, Tamworth, Birmingham, Cheltenham, Gloucester and Newport. Most crowding occurs in the peaks and is associated with travel to and from Birmingham. The West Midlands and Chilterns RUS will therefore be addressing crowding issues on this service.

3.3 Freight market profile

3.3.1 Overview

Within the UK, rail's freight market share has grown year on year, from 10 percent to 12 percent of total freight tonne kilometres (weight of freight multiplied by distance carried) in the 10 years following rail privatisation.

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

3.3.2 Freight markets

The main freight markets within the RUS area are described below.

Electricity Supply Industry (ESI) coal

Coal remains the dominant fuel used for generating electricity in the UK. With the recent rises in gas and oil prices, and the time required to build nuclear power stations, it looks set to remain competitive for much of the RUS period. ESI coal flows constitute a significant proportion of the freight carried in the RUS area. The power station at Ratcliffe-on-Soar normally receives up to 13 trains per day from Daw Mill Colliery, Ayrshire and ports on the east and west coasts of the country. Services also pass over the area en route from the East Coast ports to Rugeley Power Station and from Daw Mill Colliery to the Aire Valley. These flows are shown in Figure 3.16.

Other coal markets

Coal from South Wales to Immingham for blending passes through the area. Coal for industrial use is delivered to Ketton Cement works.

Intermodal

The total volume of container traffic in the UK is growing, and rail is increasing its modal share of this market. Deep sea containers are carried through the RUS area from Southampton, Felixstowe and Tilbury to terminals in Yorkshire, the West Midlands and the North East. Within the RUS area, there is a terminal at Burton-on-Trent that receives traffic from Southampton and Felixstowe on a daily basis.

The types of containers that can be carried depend on the loading gauge of the overall end-to-end route (see section 3.4.10). Most of the RUS area is cleared to W8, allowing 8' 6" high containers to be carried on standard deck height wagons. Larger 9' 6" high deep sea containers are increasingly favoured by shipping companies, with the percentage arriving in the UK growing significantly in recent years. Due to a restricted loading gauge of less than W10 in the RUS area, these larger containers can only be carried on special wagons, which can limit the weight of the

Figure 3.16 – Freight flows: coal traffic

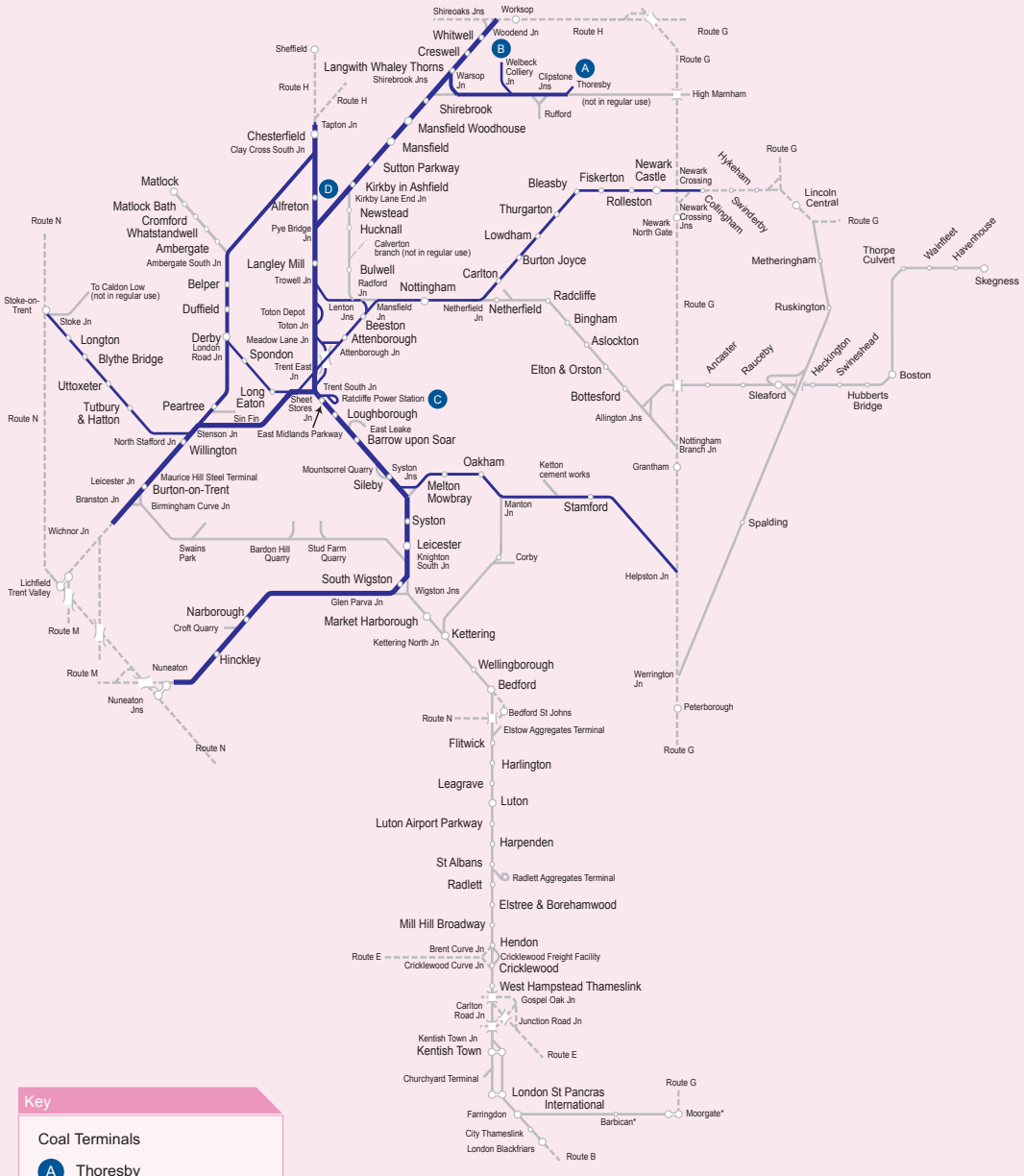
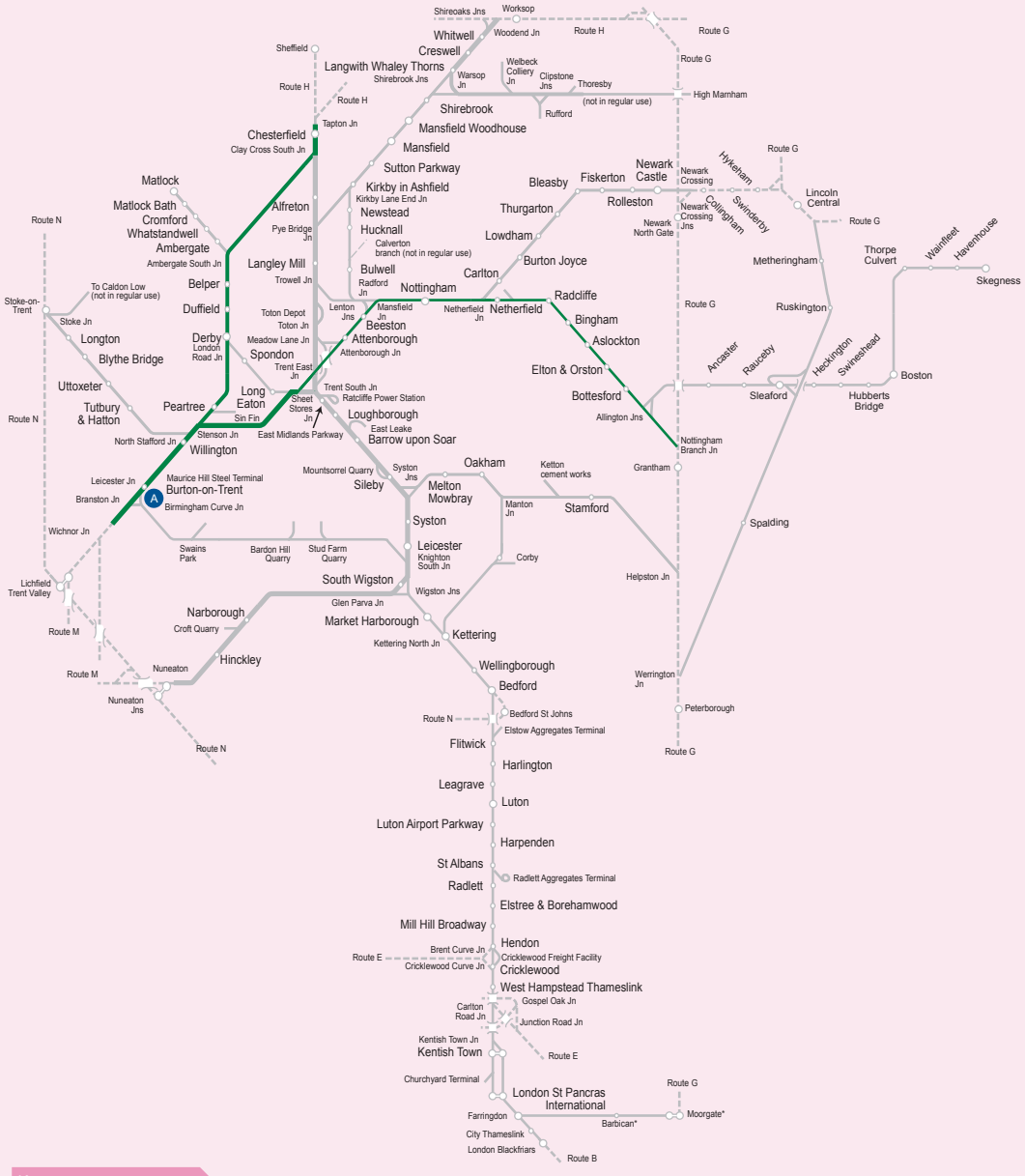


Figure 3.17 – Freight flows: intermodal traffic



Key

Intermodal Terminal

A Burton-on-Trent

*Barbican and Moorgate stations are closed to Thameslink services

containers. The wagons themselves either have small wheels and consequently high maintenance costs, or are much longer than the containers themselves, thereby using the train's length inefficiently, which in turn does not make best use of track capacity, locomotives and drivers.

As a result, some of the RUS area is being considered for W10/W12 gauge, to allow these containers to pass through from the southern ports to terminals in the East Midlands, Yorkshire and the North East. In addition, capacity for other north – south freight services is being considered as part of the Strategic Freight Network (SFN) workstream. The intermodal routes are shown in Figure 3.17.

Construction and aggregates services

Aggregates services form a major proportion of rail freight flows across the RUS area. There are four major quarries in the area, at Croft, Bardon Hill, Stud Farm and Mountsorrel. These serve the London and South East construction markets, making use of a number of terminals on the MML and in the London area. They also serve a number of terminals in other parts of the country. There are also flows from Peak Forest, Tunstead and Hope Cement Works that pass over the area to serve various terminals, including West Thurrock, Theale, Ely, Norwich, Bletchley and Peterborough. The cement works at Ketton also serves the London market, with a regular train to a terminal near London St Pancras International that returns via the MML. Traffic levels have increased at the south end of the MML with the demand for materials for the 2012 Olympics, and future projects (such as Crossrail) will continue to support this business. The flows are shown in Figure 3.18. There are a number of flows to supply limestone for the Flue Gas Desulphurisation process (which reduces carbon emissions) at power stations.

Metals and petroleum traffic

Metals freight is predominately traffic associated with the steel works at Rotherham, Scunthorpe and in the North East, passing through the area to the Midlands and South Wales. The metals terminal at Corby also receives daily services from South Wales. The amount of scrap traffic moving across the route has increased recently, and this is expected to continue to grow over the coming years, with services running from the North East and the East Midlands to South Wales.

Over half of all the petroleum flows in the country pass through the RUS area, with the corridor from Lincoln to Burton-on-Trent normally carrying at least four loaded services per day from Immingham to Kingsbury and Westerleigh terminals. The flows are shown in Figure 3.19.

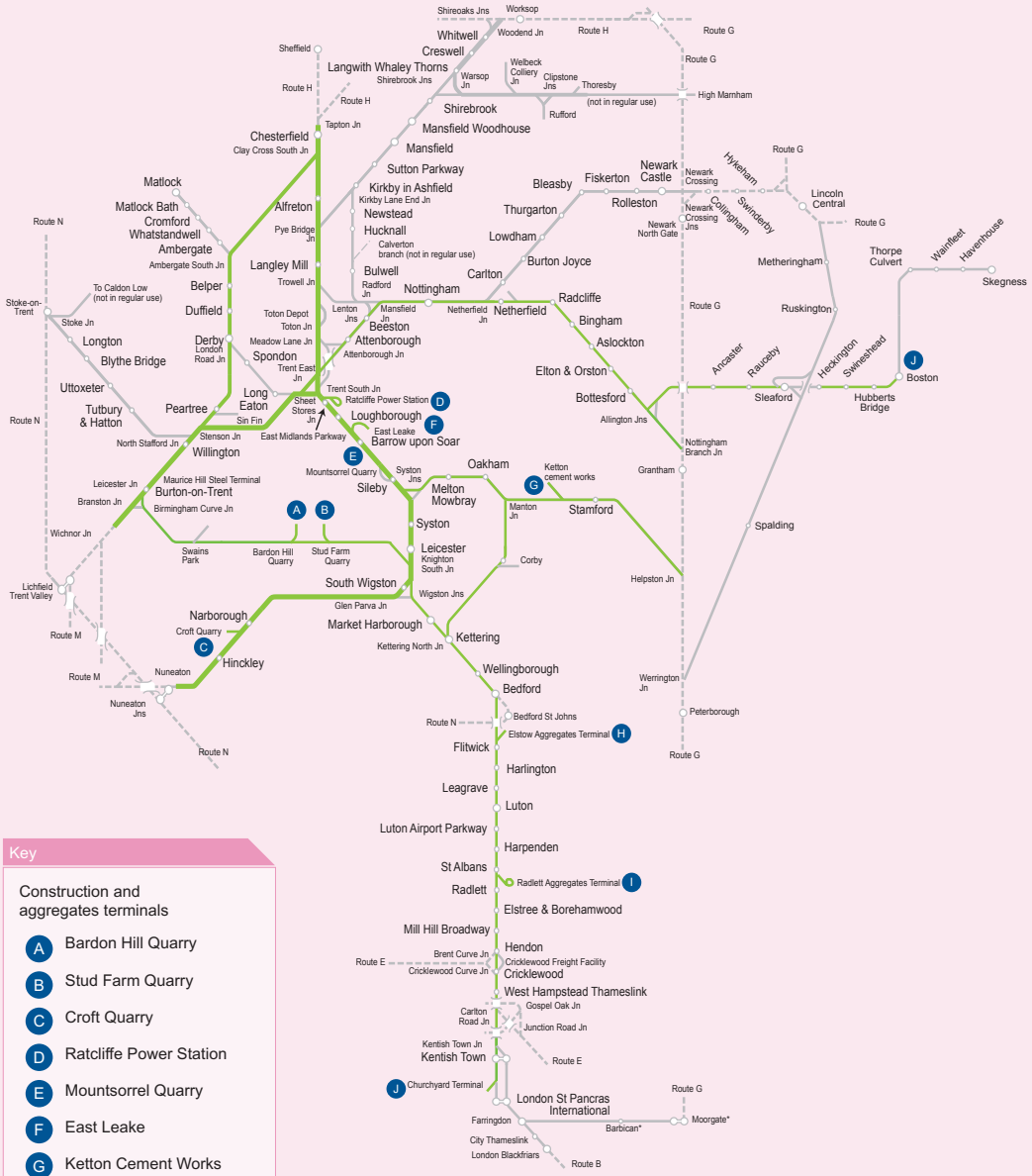
Other traffic

Network Rail's own engineering trains also run along the routes in the RUS area, to support infrastructure maintenance, renewal and enhancement activities. These require trains from the quarries on the route to restock ballast storage facilities in other areas. The Balfour Beatty site at Beeston also provides trains to support this function. First GBRf has an operation at Wellingborough which provides trains to support engineering work on the London Underground.

Automotive traffic is conveyed from Europe to Corby and from Portbury to Mossend. Traffic levels on these flows fluctuate with the demand for new vehicles.

There are also a number of train movements associated with the Railway Technical Centre at Derby.

Figure 3.18 – Freight flows: construction and aggregates traffic



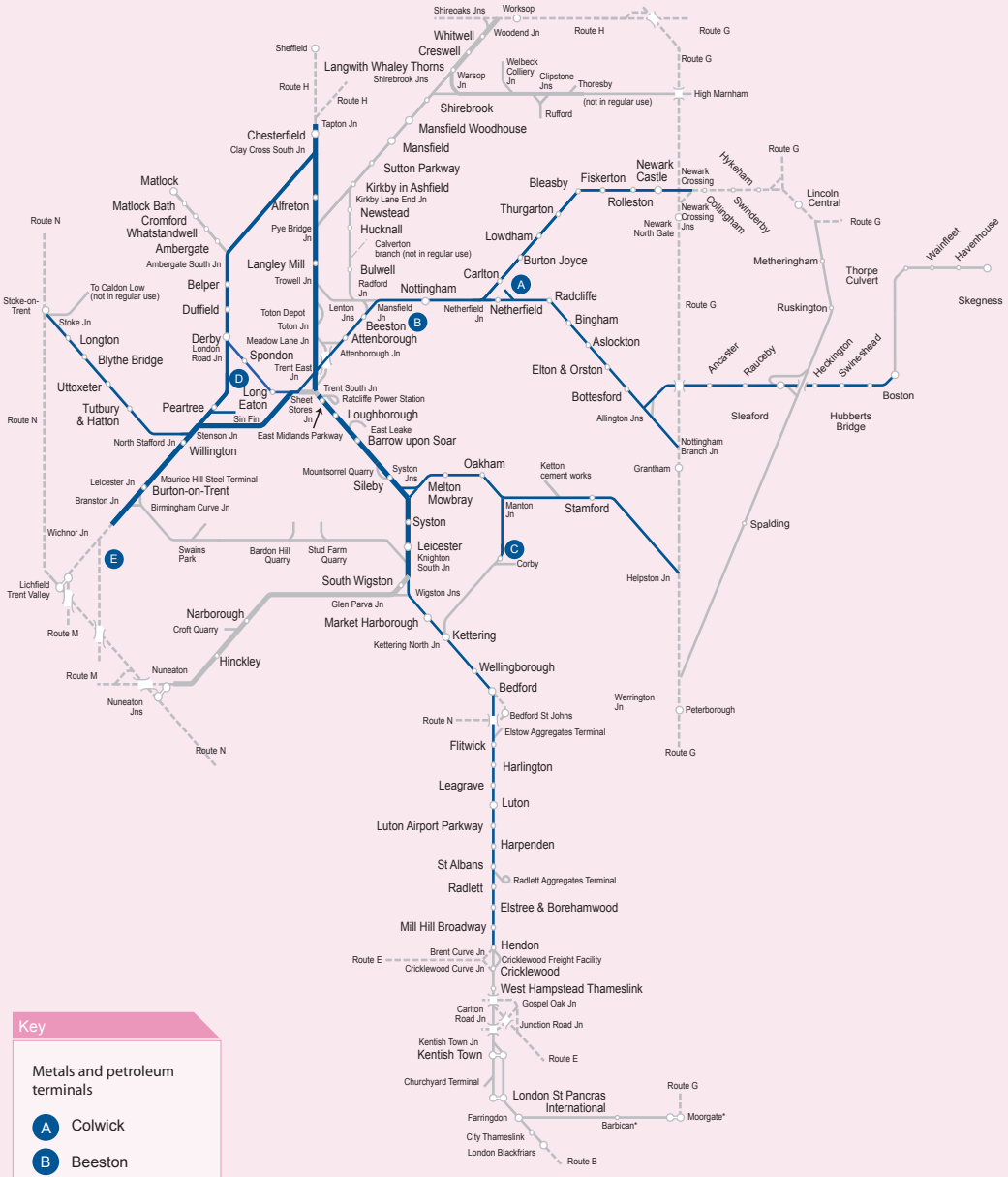
Key

Construction and aggregates terminals

- A Bardon Hill Quarry
- B Stud Farm Quarry
- C Croft Quarry
- D Ratcliffe Power Station
- E Mountsorrel Quarry
- F East Leake
- G Ketton Cement Works
- H Elstow
- I Radlett
- J Churchyard Terminal
- K Boston

*Barbican and Moorgate stations are closed to Thameslink services

Figure 3.19 – Freight flows: metals and petroleum traffic



Key

Metals and petroleum terminals

- A Colwick
- B Beeston
- C Corby
- D Sinfin
- E Kingsbury

*Barbican and Moorgate stations are closed to Thameslink services

3.3.3 Current freight demand in the East Midlands RUS area

Figures 3.16 to 3.19 show the active freight terminals in the RUS area.

Figure 3.20 shows current freight usage on key route sections in the RUS area. The data reflects demand at the start of 2008 and indicates trains per day in one direction. It can be seen that the heaviest freight flow is along the South Erewash line, between Chesterfield South Jn and Trent East Jn. Significant levels of freight traffic also run between Wichnor Jn and Chesterfield South Jn, and between Syston Jns and the Trent/Sheet Stores/Stenson Jns area. However, there is a high level of use over many of the lines covered by the RUS.

Freight services require more reserved paths in the working timetable than are actually used, in order to permit operational flexibility. For most freight market sectors, if there is little or no demand for a freight service, it is cancelled (unlike passenger services). The Freight RUS contains a national analysis of path utilisation, and an explanation of the key factors in each market sector.

Baseline analysis carried out on freight capacity across the RUS area has identified that there are generally two off-peak daytime train paths per hour in each direction on the MML, with one operating via Corby and one via Market Harborough. Southbound, the paths will accommodate up to 2000 tonnes trailing, and northbound up to 600 tonnes trailing (for returning empty trains), which are also suitable for Class 4 trains with 1600 tonnes trailing.

The Freight Operating Companies (FOCs) are engaged in a number of initiatives to improve path take-up and the efficiency of operations. All operators are seeking to maximise the use of each path on the network by running trains which are longer, heavier and in some cases potentially bigger (both in width and height).

3.4 East Midlands rail network

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

- planning headways
- linespeeds
- junction speeds
- electrification
- loop lengths
- platform lengths
- rolling stock depots and stabling
- loading gauge
- route availability.

3.4.1 Planning headways

The planning headway is a measure of how closely (in time) one train can be timetabled to follow another. Within the RUS area, headways on the double track sections vary from two minutes on the Thameslink core to 13 minutes on the slow lines north of Bedford. Even greater headways apply on some single line sections. Within the RUS area, the most notable single lines are between Kettering and Corby, Skegness and Sleaford (where there are three separate single line sections), Bulwell and Kirkby in Ashfield, and Sleaford North Jn and Sleaford. Single lines significantly restrict the number of services that can run, and are generally a performance risk.

There are a number of lines where the headways vary along the route (such as from Helpston Jn to Frisby, Stoke Jn to North Stafford Jn, and Nottingham to Lincoln) because of a mix of track circuit and absolute block signalling systems. In some cases, this suits the service pattern and rolling stock types. However, in others, it can limit capacity, by reducing the ability to change the timetable, recover from perturbation, or utilise the line as a diversionary route. Figure 3.21 shows the planning headways across the RUS area.

Figure 3.20 – Current freight trains per day on sections of the network

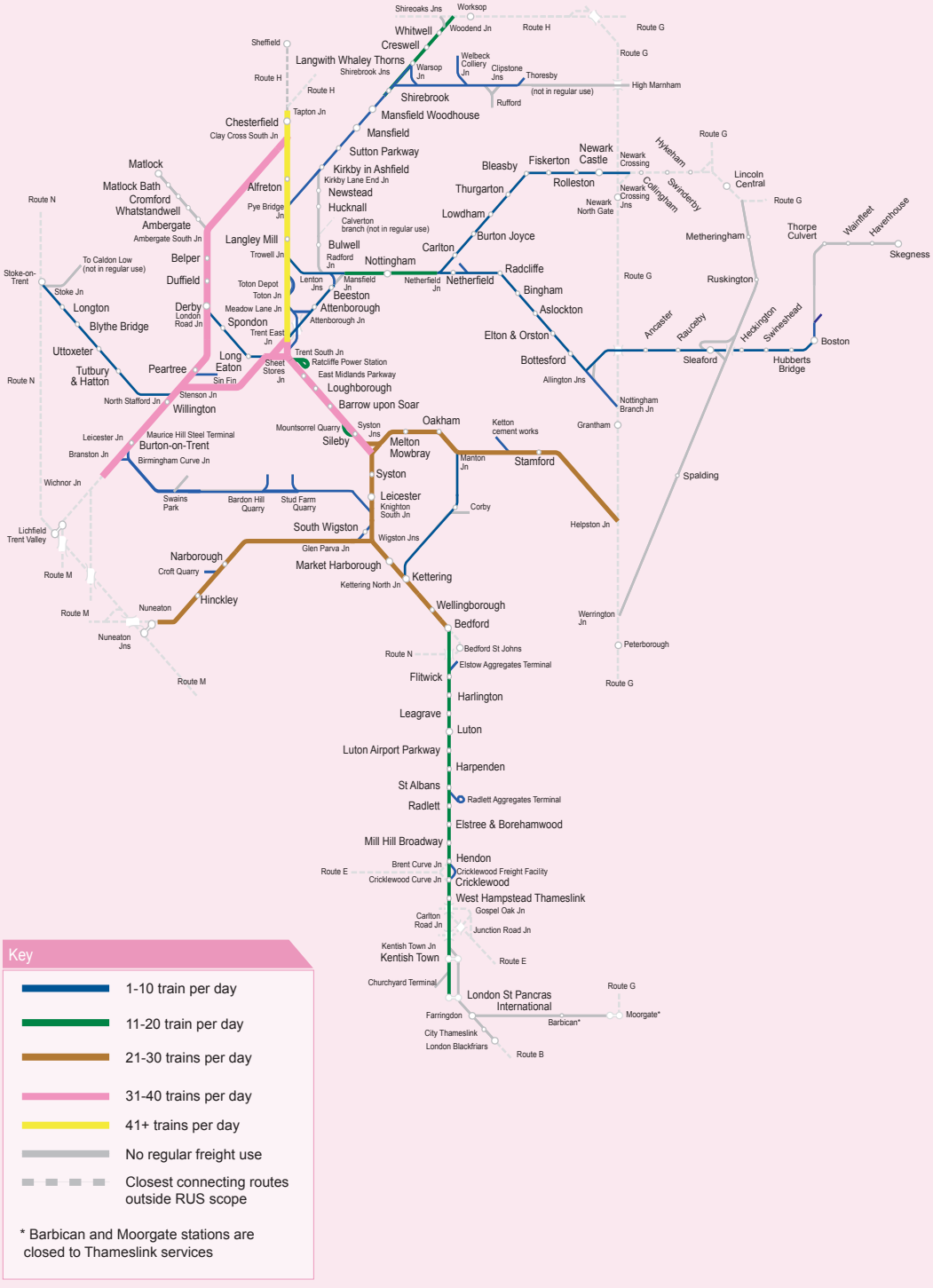
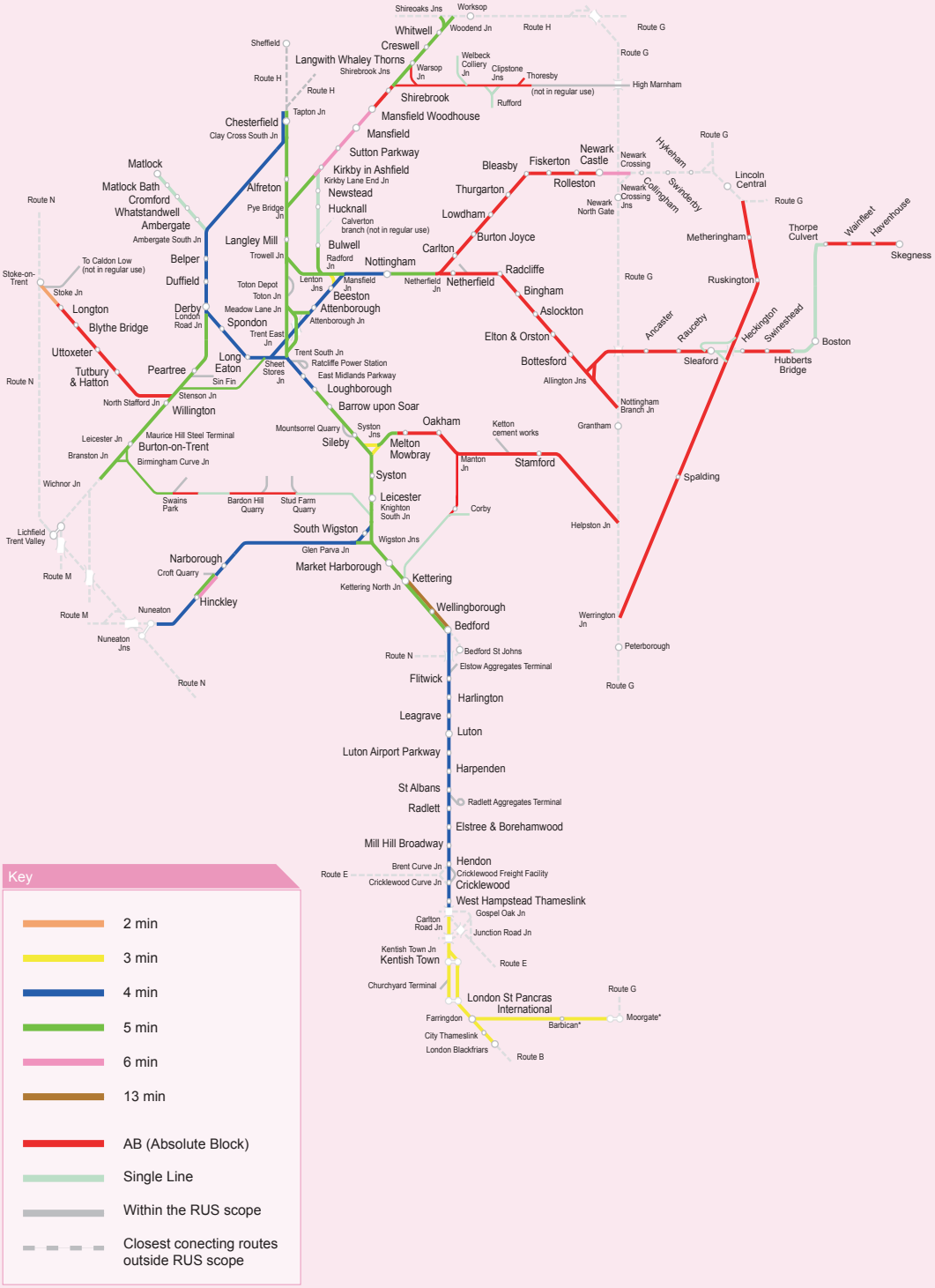


Figure 3.21 – Planning headways



3.4.2 Linespeeds

The prevailing linespeed on the main line route sections is generally between 80mph and 125mph, and a good proportion of the passenger rolling stock is capable of 100mph to 125mph. However, the linespeed on many of the branch lines, particularly in Lincolnshire, is lower than 75mph. Meanwhile, there are a number of routes along which the linespeed varies. This can be inefficient in terms of capacity and journey time, depending on the rolling stock types and stopping patterns.

3.4.3 Junction turnouts

Many of the junction turnout speeds are between 15mph and 40mph. Deceleration from linespeed and subsequent acceleration after crossing a junction costs time and therefore capacity and journey times are affected. For freight trains in particular, the time taken to decelerate and return to full speed has a significant impact on both line capacity and fuel consumption. In some cases the requirement for approach control signalling increases journey times and decreases capacity further. Capacity is also constrained by single lead junctions (where parallel movements between trains on and off the diverging route are not possible), which also cause performance problems. Examples of single lead junctions in the RUS area are Radlett, Harpenden, Leagrave, Flitwick, Carlton Rd, West Hampstead, Manton, Nottingham Branch (Grantham), Syston East, and Syston South.

3.4.4 Electrification

There is no electrification within the RUS area beyond the section between London Blackfriars, London St Pancras International and Bedford.

3.4.5 Loop lengths

There are not many loops in this area, with the majority not long enough to accommodate 775m long freight trains, except for the loops at Melton Mowbray. Where there are substantial lengths of mixed-use double track, either without loops or with only loops of limited length, the inability for a service to overtake another is both a constraint on capacity and adversely affects performance. This is most acute on the route through Burton-on-Trent to Derby, where both LDHS and interurban services share the route with slower-moving freight services.

3.4.6 Platform lengths

Apart from at major stations such as Nottingham, Derby and Leicester and those south of Bedford, the platforms across the RUS area are largely four-car lengths. In some cases, the platform lengths vary along a line of route, which means either the train length is constrained by the shortest platform, or stopping patterns have to vary according to train length. Often the shortest platforms are on the periphery of the RUS area. For example, some smaller stations on the Allington Jn to Skegness line cannot fully accommodate all types of modern two-car or three-car trains.

3.4.7 Car parking

Around half of the stations within the RUS area provide car parking, with just 10 of those having more than 500 spaces. Overall, the provision of car parking spaces relative to the population is low compared with some other parts of the country. At the busier locations, station car parks generally fill up early and hence constrain off-peak demand.

Passenger Focus carried out a survey of car parks across the RUS area in November 2009 to identify stations where parking was already at or near capacity. The survey also verified the accuracy of the baseline data and included an assessment of passenger satisfaction with car parking in the RUS area.

Those station car parks which are currently full or nearly full by 09:00 during the week are identified in the tables below:

Cars (percentage of spaces occupied by 09:00 weekdays)		
100%+	**90-99%**	**80-89%**
Mill Hill	Elstree & Borehamwood	Bedford
Oakham	Flitwick	Harlington
Stamford	Harpenden	Leicester
Bottesford		Loughborough
Beeston		Uttoxeter
Longton		Chesterfield
Duffield		Newark Castle
Cromford		Bingham

Cycles (percentage of spaces occupied by 09:00 weekdays)	
90-100%	**70-89%**
Bedford	Elstree & Borehamwood
Nottingham	Flitwick
Derby	Harpenden
	St Albans
	Kettering
	Leicester
	Chesterfield

Blue Badge Holders (percentage of spaces occupied by 09:00 weekdays)	
90-100%	**80-89%**
Wellingborough	Belper
Newark Castle	Leicester
	Harpenden

The results of the survey demonstrate that it is mainly smaller stations that are currently at or exceeding capacity. A number of schemes are underway to improve the availability of parking spaces across the RUS area. They include major improvements delivered by Network Rail and the incumbent train operator, as part of their franchise commitments, such as the recently completed works to extend the car park at Chesterfield by an additional 130 spaces and the planned extension at Loughborough to create a further 327 spaces. Major third party funded schemes include the recently completed multi-storey car park at St Albans which has significantly alleviated car parking capacity constraints at this location. Other schemes included in wider development proposals are being progressed at:

- Derby, as part of the Derby Cityscape project
- Nottingham, to provide 980 spaces as part of the multi-funded Nottingham Hub project
- Lincoln as part of a third party scheme to provide a transport interchange
- Wellingborough as part of a larger third party scheme
- Luton as part of a wider programme to regenerate the station area by Luton Borough Council
- Flitwick, as part of the masterplan for the town centre
- Beeston and Harlington as part of commercial schemes under development.

Network Rail, in conjunction with train operators, will continue to review and assess opportunities for improving capacity at stations for cars, motorbikes/bicycle storage and blue badge holders at those locations already exhibiting high levels of occupancy (shown in the tables above) where there are no schemes under development, particularly:

- Mill Hill
- Oakham
- Stamford
- Bottesford
- Longton
- Duffield
- Cromford
- Newark Castle.

Schemes already under development at Beeston, Bedford, Nottingham, Derby, and Wellingborough should be examined to ensure that they address the capacity issues highlighted by the Passenger Focus survey.

Once capacity at these locations has been addressed, those stations surveyed with greater than 80 percent occupancy represent the next priority for scheme development.

3.4.8 Integration with other modes of public transport

There are many locations where the railway interfaces with other modes of public transport. There are interchanges with London Underground at Kentish Town, West Hampstead Thameslink, London St Pancras International and Farringdon which are especially important, as these provide easy access to multiple destinations in and around the London area, and can reduce overcrowding during the peak. There are bus links to international airports at Luton Airport Parkway and East Midlands Parkway, and a connection to the local tram system at Nottingham. The East Midlands RPA of May 2007 highlighted the need for improvements in access to the railway, in particular through the integration of bus and rail services (especially in Lincolnshire). However, the report noted the many difficulties in achieving such integration. Interchanges are currently being developed at the following stations: Derby, Nottingham, Loughborough, Luton, Flitwick and West Hampstead Thameslink.

Network Rail and the train operators continue to work with local authorities to develop these facilities across the RUS area.

3.4.9 Station facilities

Current station facilities across the network have been reviewed in a number of industry studies and actions proposed for future station improvements. In November 2009, Network Rail launched their new initiative 'Action Stations'; a 10-point plan to deliver better stations and facilities for passengers aimed at getting the public talking about the future of stations. The plan represents a guide setting out that stations should:

1. be safe, secure and easy to use
2. provide the information needed for passengers to plan their journeys
3. allow quick and easy transfer to other forms of transport
4. attract people to use the rail network
5. have a positive impact on the environment
6. be places people want to work, shop and travel
7. showcase British design and safeguard our heritage
8. provide a hub for other modes of transport
9. act as a catalyst for the development of major cities
10. anticipate the changing and dynamic needs of passengers.

Several schemes are already in development with train operating companies and third parties through the National Station Improvement Programme (NSIP) or Access for All, to improve the facilities available at stations across the RUS area. In addition to those schemes listed in the paragraphs above, development work is also underway to examine:

- the provision of a new station entrance to platform 1 at Luton Airport Parkway
- re-development of Bedford station
- the provision of a new entrance and booking hall at Leicester station as part of the development of the Business Gateway
- improvements to the forecourt area at Burton-on-Trent
- refurbishment of facilities at Derby, Loughborough, Skegness, Burton-on-Trent, Leicester and Kettering through NSIP
- the provision of step free access to platforms 2 and 3 at Loughborough through the Access for All programme
- EMT's franchise commitments programme which includes improvements to the station environment. So far, this has involved the installation of automatic gates at Derby and Nottingham, ticket vending machines at a number of stations within the RUS area, customer information systems on the Derby – Crewe line and Closed Circuit Television (CCTV) at Long Eaton station.

£3.25 billion has been secured by Network Rail over the next five years for investment in the operation, maintenance and improvement of stations. Where possible, Network Rail will combine forces with the train operating companies, local councils, regional development agencies, passenger groups and other third parties to encourage and maximise this investment at stations. To deliver the stations that people want, and to make sure that future investment choices are those that people want and value the most, the Action Stations campaign has been established to engage the public and hear their views. This will collate public thoughts on the 10-point plan, including the priority areas and how these can best be delivered. The findings will be compiled and analysed ahead of the publication of the Action Stations report in April 2010. This document will then contribute towards the Network: Stations RUS which will take a national overview of the capacity and facilities required to address passenger growth over the next 10 years.

The Station Champions report 'Better Rail Stations' (November 2009) was published by the Department for Transport (DfT) with the objective of advising on ways to improve stations. The focus of the review was on getting the basic facilities right as well as the broader role of stations in the future. This was completed through a review of the existing station facilities and their station categorisation. Station priorities should be focused on improving access, information, facilities and environment and the report recommends the extension of the National Stations Improvement Programme (NSIP) and the Access for All funding beyond 2014 to provide funding for stations to achieve the minimum standard.

Within the RUS area, Luton station has been identified as a priority station for improvement. A major scheme to regenerate the station, provide additional car parking and a new public realm at the front of the station has been developed in conjunction with Luton Borough Council (and is referred to earlier in this section). Funding mechanisms to take this scheme forward are currently being determined.

3.4.10 Rolling stock depots and stabling

EMT has rolling stock depots at Etches Park (in Derby) and Eastcroft (in Nottingham), FCC has a depot at Bedford, and CrossCountry has a depot at Central Rivers (near Burton-on-Trent). Additionally, overnight stabling of stock is permitted at various stations throughout the RUS area, including Leicester, Nottingham, Derby, Bedford and London St Pancras International. At Cricklewood, EMT stable rolling stock during the day and FCC stable rolling stock both during the day and overnight. The provision of a Light Maintenance Depot (LMD) at Cricklewood is being developed as part of the Thameslink Programme of works. There are other important depots outside the RUS area which are used by services operating within it, for example the EMT depot at Neville Hill (near Leeds), and Tyseley (near Birmingham) where CrossCountry's Turbostar fleet is maintained.

A strategic solution to the future provision of adequate depot and stabling facilities is a network-wide issue, and will therefore be considered as part of the Network RUS. However, the major capability and capacity limitations of the existing facilities within this RUS area are:

- Neville Hill is a considerable distance from the main operational routes of the trains that are maintained there, and is difficult to access
- Eastcroft is close to maximum capacity, which presents many difficulties in arranging train movements (though the expansion of Etches Park should relieve this problem).

3.4.11 Loading gauge

In the RUS area, loading gauges range from W6 to W8, but are predominantly W7 or W8. The absence of W10 gauge (which would allow 9' 6" high containers to be conveyed on standard-height wagons) is a serious limitation on rail's attractiveness in the intermodal market. The mixture of loading gauges means that diversionary routes can often be long and circuitous, or trains have to be cancelled when the main route is unavailable. See Figure 3.22 for the various loading gauge profiles and Figure 3.23 for the loading gauges on the route.

3.4.12 Route Availability

The Route Availability (RA) of a specific route is determined by the carrying capability of both its structures and its track. The RUS area is predominantly RA8, with the line between Helpston Jn and Stamford being RA9, and the line between Boston and Skegness being RA7. However, traffic up to RA10 can operate over specified sections of the RUS area, subject to certain speed restrictions. Each train has special permission to run, and cannot be diverted from the specified path without additional authorisation. This reduces operational flexibility during perturbation.

Figure 3.22 – Loading gauge profile

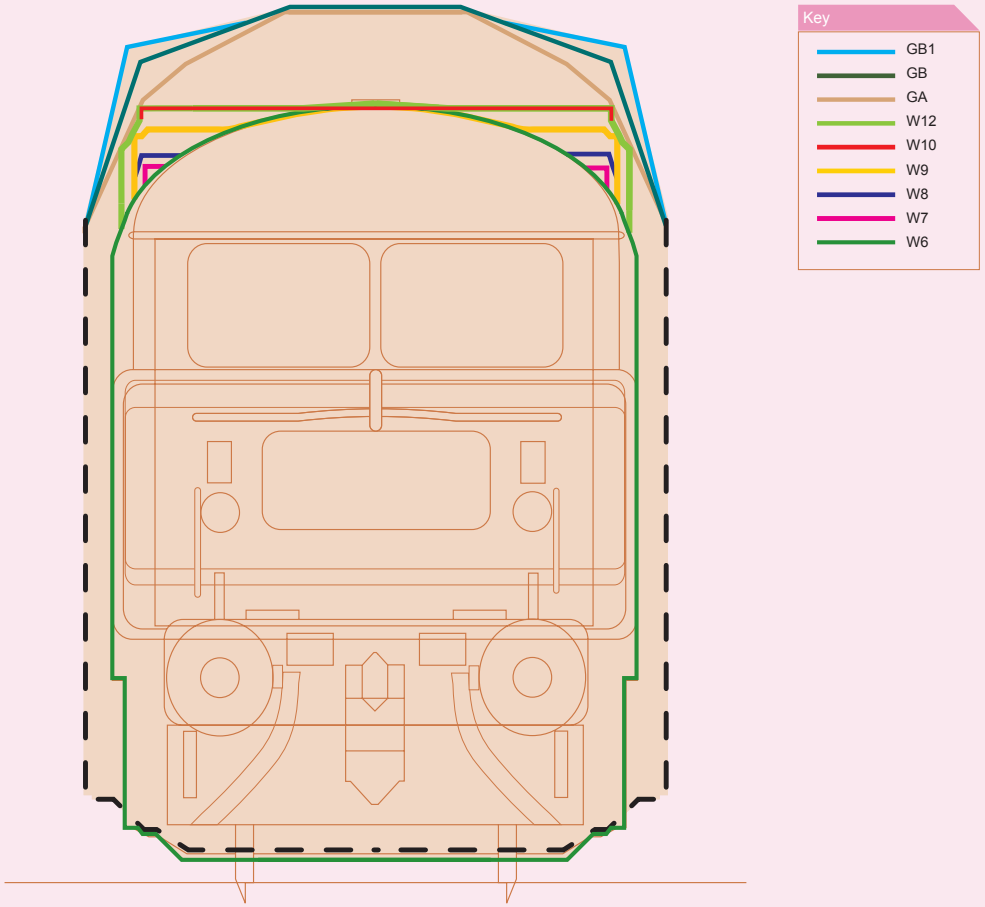
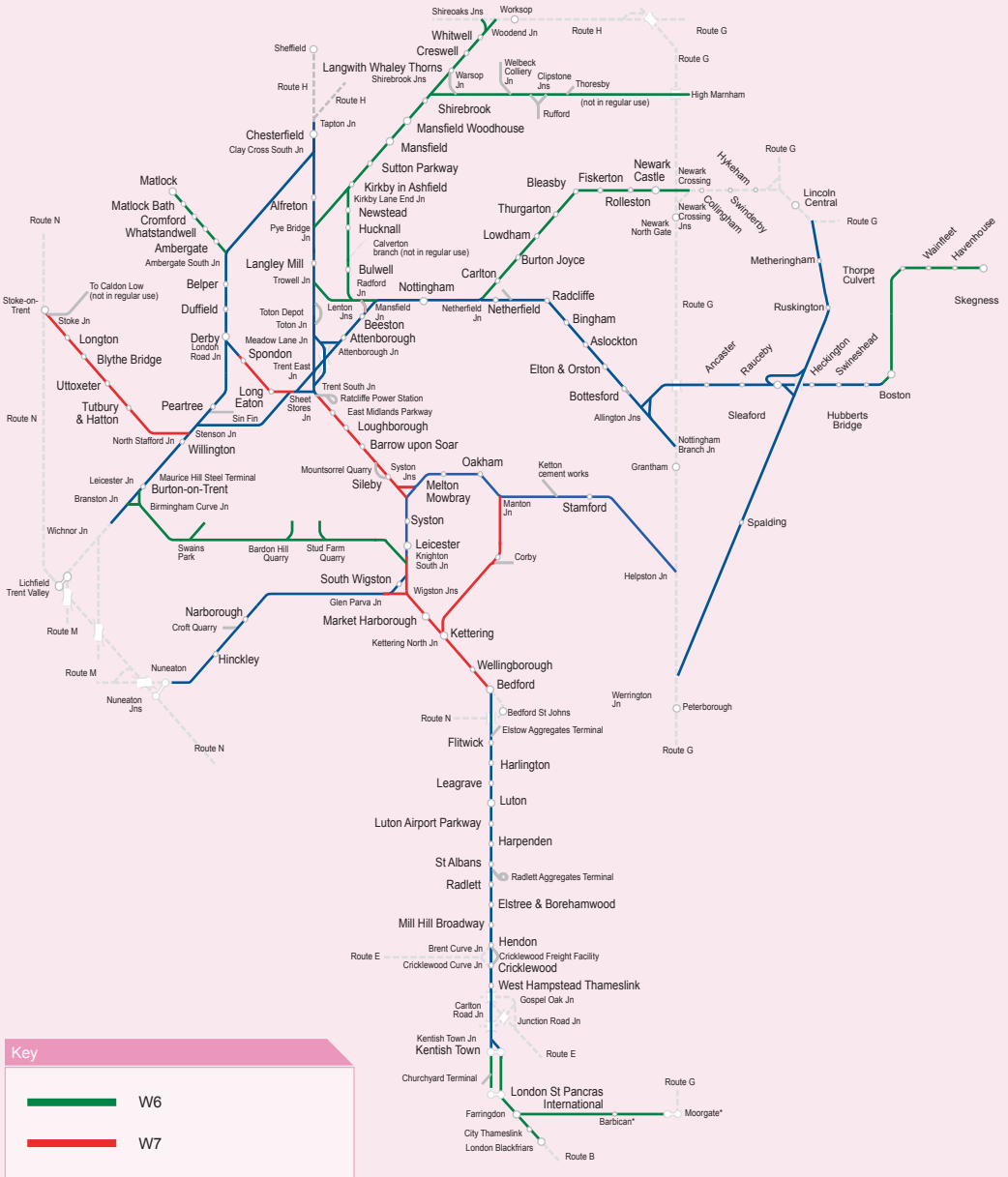


Figure 3.23 – Loading gauge



Key

- W6
- W7
- W8
- Within the RUS scope
- Closest connecting routes outside RUS scope

* Barbican and Moorgate stations are closed to Thameslink services

3.5 Use of the network

3.5.1 Route utilisation and congestion

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

- plain line, where faster trains will catch up with slower ones
- planning headways, which determine the space between consecutive trains
- junctions, where conflicting moves limit capacity
- station platforms, where the next train cannot arrive until the previous one has departed.

The rail industry has developed a high level measure of the level of congestion on the network, known as the Capacity Utilisation Index (CUI). The CUI is a measure of how much of the available capacity on a section of line is used by train services. Although it cannot take account of every factor that impacts upon congestion at a local level, the CUI is based upon:

- route characteristics (eg. number of lines)
- the number of trains in the timetable
- the order in which trains are timetabled and their mix of speeds
- planning headways.

Whilst CUI is a useful measure, it is of limited value as a planning tool, as it does not include all the factors that need to be considered to make a timetable practical.

The key constraints are described in section 3.5.2. These affect performance or the ability to plan train services, and often both.

3.5.2 Constraints by area: London St Pancras International – Leicester

- platform congestion at London St Pancras International (high level) due to only four MML platforms
- infrastructure restrictions on the approaches to London St Pancras International
- speed differentials between EMT and FCC services on the fast lines between London and Leagrave
- single lead junctions between fast and slow lines south of Bedford and slow speed approach control (40mph)
- platform congestion at Bedford (exacerbated by reversing trains and difficulties accessing the depot)
- reduction to three tracks north of Sharnbrook Junction, and two tracks north of Kettering
- speed differentials between EMT and freight services between Bedford and Wigston Jn
- conflicting moves at Wigston Jn.

Leicester – Nottingham/Derby

- platform congestion at Leicester station
- conflicting moves at Trent Jns
- congestion on the western approaches to Nottingham
- platform congestion at Nottingham station.

Derby – Sheffield

- congestion-related reactionary delays in the Derby area (circa 120,000 minutes per annum)
- platform congestion at Derby station
- conflicting moves at Dore Jn.

Other corridors

- single track between Kettering and Corby
- single track between Sleaford and Skegness
- single track between Bulwell and Kirkby in Ashfield.

3.5.3 Timetable structure review

The structure of the timetable, through Rules of the Plan, is updated with the details of committed enhancement schemes up to12 months before the changes to the infrastructure are implemented. This allows passenger and

freight train operators to successfully bid for new train paths in advance of scheme completion and enables the optimum use of the new infrastructure, for capacity, journey time and performance benefits.

In addition, Rules of the Plan are subject to more detailed review where a combination of factors such as infrastructure interventions, rolling stock changes and/or service alterations could result in capacity, journey time or performance benefits. This is a collaborative process, with train operators involved through a consultation process. Within this RUS area, the corridor between Birmingham New Street and Sheffield via Derby is currently being reviewed to determine whether or not a restructuring of the timetable could provide potential journey time and performance benefits. In addition, the utilisation of platforms at Derby is under review as part of the development of the May 2010 timetable and may provide opportunities to improve capacity and performance through the station.

3.5.4 Train service performance

A number of generic factors contribute to overall train service performance. These include:

- the reliability of the infrastructure and rolling stock
- the operability and structure of the timetable (given infrastructure and rolling stock capability)
- the flexibility of the network in reducing overall delay, through effective response and diversionary routeing.

In addition, there are many local variables that affect performance. Analysis is complex because these attributes are often linked, varying in proportion on each route within the RUS area. They include:

- a broad mix of services with varying speeds and stopping patterns, ranging from local and long distance passenger services, to freight trains, and empty coaching stock movements. This further exacerbates delays on the sections of the route which are most highly utilised
- a large number of complex junctions and crossings, usually on the level, with many train movements conflicting with one another. This is worsened when trains are running out of sequence due to an incident
- crowding due to insufficient train capacity causing delays in stations
- track and signalling arrangements which do not feature flexible layouts (for example, bi-directional signalling systems on a two track route allowing relatively easy operation of trains over a single line when the other line is blocked)
- lack of availability of suitable diversionary routes (particularly for electric trains or those restricted by loading gauge). This exacerbates the effect of any incidents
- poor locations for both train and infrastructure maintenance depots. These contribute to the length of delays incurred.

Constraints on the RUS area are listed in section 3.5.2.

Overview of historical performance

One measure of passenger train performance is the Public Performance Measure (PPM) which measures the punctuality of an operator's services against the published timetable. LDHS services have a PPM tolerance of 0 – 9 minutes 59 seconds lateness, whilst commuter and local services are classed as 'on time' for PPM purposes if they are up to four minutes 59 seconds late.

The TOCs, with support from Network Rail, continuously strive to optimise their performance within the constraints of the route. The (franchise-wide) PPM for EMT improved from 81.65 percent in 2006/07 to 86.69 percent in 2007/08 and 90.84 percent in 2009/10. The equivalent figures for CrossCountry are 82.52 percent in 2006/07, 84.70 percent in 2007/08 and 91.31 percent in 2009/10, and for FCC are

87.61 percent in 2006/07, 88.12 percent in 2007/08 and 85.6 percent in 2009/10.

The overall PPM for train operators on the routes within this RUS area as at March 2009 was 92.7 percent, improved from the March 2007 figure of 91.0 percent. Figure 3.24 provides an overview of PPM and indicates the generally upward trend in performance in this RUS area. Meanwhile, train delay minutes (measured against the working timetable) are captured by incident and location, and collated at various levels by Network Rail.

As a result of structural changes to the rail industry following the Railways Act 2005, Network Rail was entrusted with a wider role in managing performance on the network. The primary process for cross-industry continuous performance improvement is the Joint Performance Process. This generates Joint Performance Improvement Plans (JPIPs) in conjunction with each train operating company, and is supported by a period-by-period reporting and review cycle.

The performance of the freight train operators is provided in Figure 3.25 and shows an upward trend.

Analysis of recent performance

Analysis was undertaken for the two-year period (2006/07 and 2007/08) to identify those locations that suffer performance problems caused by 'RUS issues', ie. those issues that are not generally dealt with through established industry processes.

Reactionary delay gives an indication of the impact that a delayed train has on other services due to it not running in its timetabled path. This often leads to other trains also not running on time. Reactionary delays thus provide a measure of timetable and infrastructure resilience and have been the main measure of performance in this RUS.

Analysis of reactionary delays indicates that the 'hot-spots' for delays to passenger services are Derby, Nottingham (including Mansfield Jn), Bedford to Flitwick, the Leicester area, St Albans to Luton and Blackfriars for FCC services entering the RUS area from the south. The 'hot-spots' for delays to freight services are Nuneaton, Derby and Wichnor Jn.

Figure 3.26 gives an indication of which locations cause reactionary delay, with higher numbers signifying proportionately more reactionary impact on trains in the section. Figures 3.27 and 3.28 separate the reactionary delay into freight and passenger.

One of the major drivers of performance in this RUS area is the route between Chesterfield and Birmingham via Derby. Across this section, the mix of fast and stopping passenger trains and freight services presents a major performance challenge. The CrossCountry services passing through this section have usually travelled a long distance outside the RUS area, whilst the infrastructure operates at or near capacity for much of the day. These factors exacerbate the delays that can occur in times of perturbation, and can cause reactionary delays to other services that intersect with this route at Derby or Chesterfield. Meanwhile, just outside the area covered by this RUS, the convergence of numerous routes at Birmingham means that delay incidents within this area can have an impact across much of Great Britain's railway network.

However, the biggest constraint for recovery from perturbation within the RUS area, and thus one of the biggest causes of poor performance is that the MML south of Bedford operates at or near capacity for most of the day. The section between Leicester and Bedford is also near capacity for much of the time.

Funding has been allocated under the national performance fund for the East Midlands area to support the achievement of the performance targets for PPM, cancellations and significant lateness. The schemes planned to deliver the targets include broad initiatives targeted at specific routes, such as:

- the provision of 650v generators throughout the MML to reduce delay caused by 650v power failures
- the installation of CCTV cameras on the Erewash Valley line to monitor trespass, potential fatalities, cable theft, vandalism, flooding and animals on the line
- the fitment of additional point heaters at various locations to reduce point failures during cold weather.

In addition, there are a number of larger schemes aimed at addressing specific performance issues such as alterations to the signalling at Harpenden and Radlett Jns to reduce delays to late running services.

A number of enhancement schemes outside those included in the performance fund are presented in Network Rail's Strategic Business Plan which will also assist in the delivery of the performance targets. For example, the implementation of the recently completed doubling of Trent Jn alongside the planned remodelling of Nottingham station area will provide potentially significant performance benefits. These committed enhancement schemes are listed in **Chapter 4**.

3.5.5 Current engineering access

A cross-industry review of the engineering access strategy is currently underway, together with evaluation of the 'Seven Day Railway' concept. This is being led by Network Rail, and is intended to be gradually implemented, where appropriate, by 2014.

A small number of key routes have been identified for special attention. For passenger services the principle is that Network Rail and train operators will offer a rail journey in almost all circumstances between key stations on these routes. The principle for freight operators is that the ability to deliver key freight traffic flows by means of a preferred or 'fit for purpose' alternative will be maintained. The passenger routes and freight flows on the East Midlands that are covered by these principles are:

- Birmingham – York (key stations: Derby, Sheffield, Leeds)
- Birmingham – Nottingham (key station: Derby)
- London St Pancras International – Nottingham (key stations: Luton, Leicester)
- London St Pancras International – Sheffield (key stations: Luton, Leicester, Derby)
- West Midlands – South Yorkshire (via Water Orton, Derby and Beighton).

Figure 3.24 – All franchised passenger train operators: PPM results, 2007-10

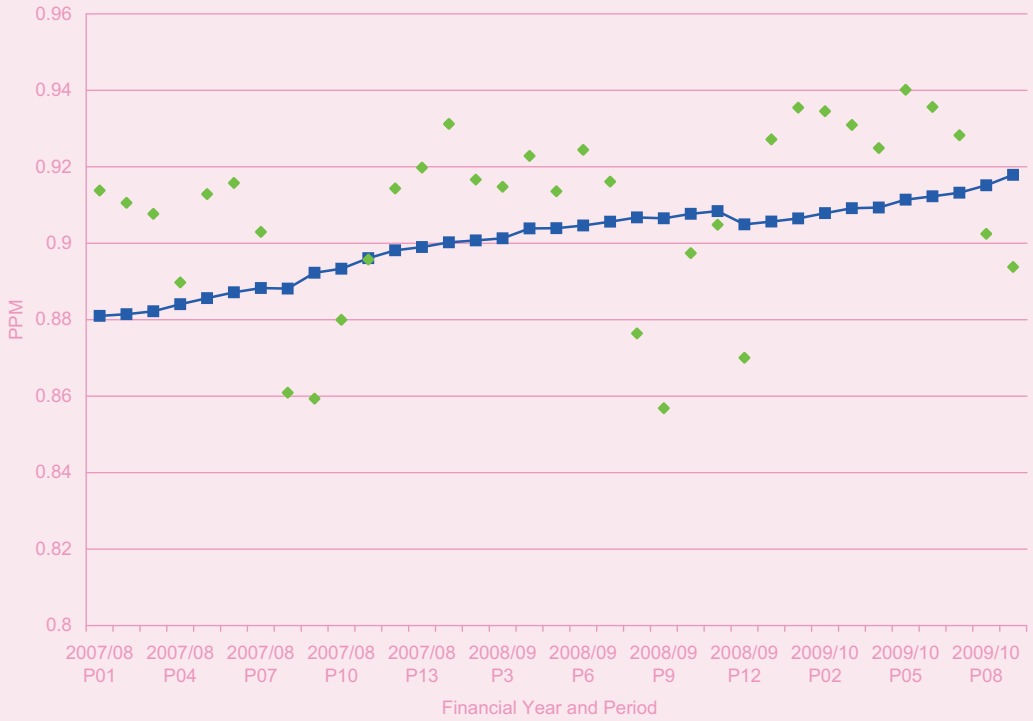


Figure 3.25 – All freight train operators: FPM results, 2007-10

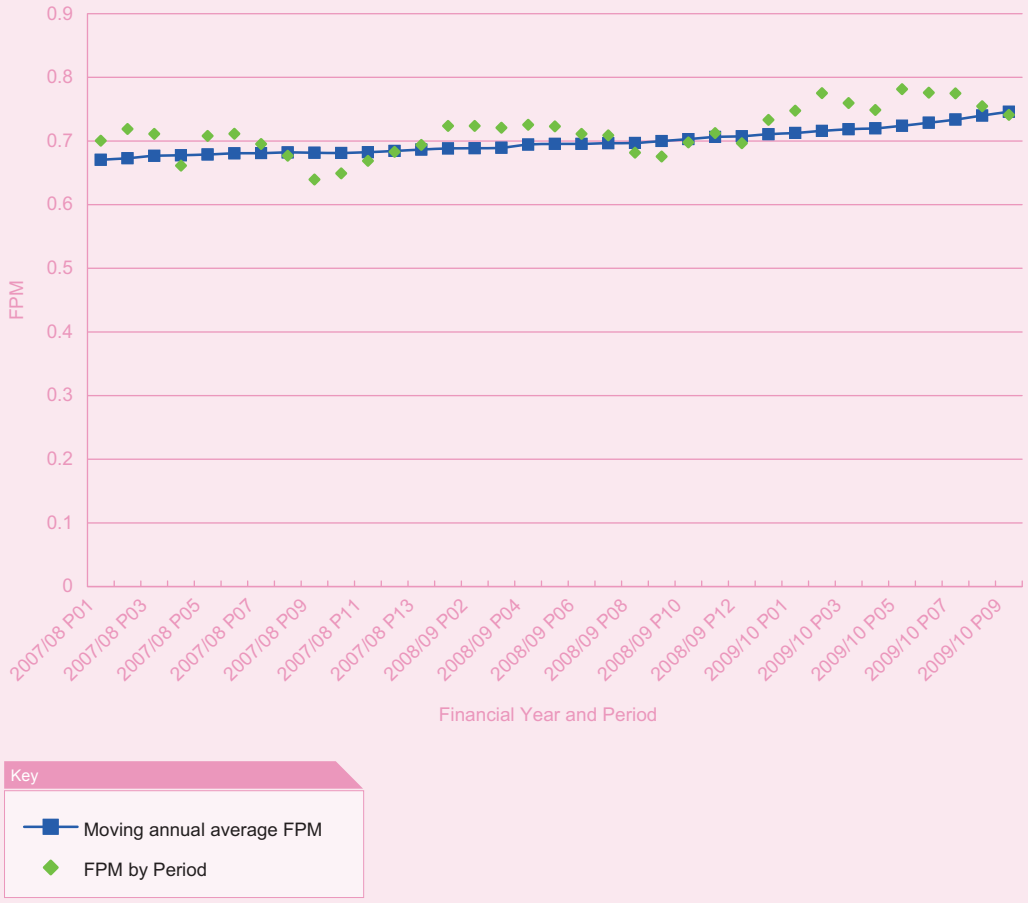


Figure 3.26 – Reactionary delay combined

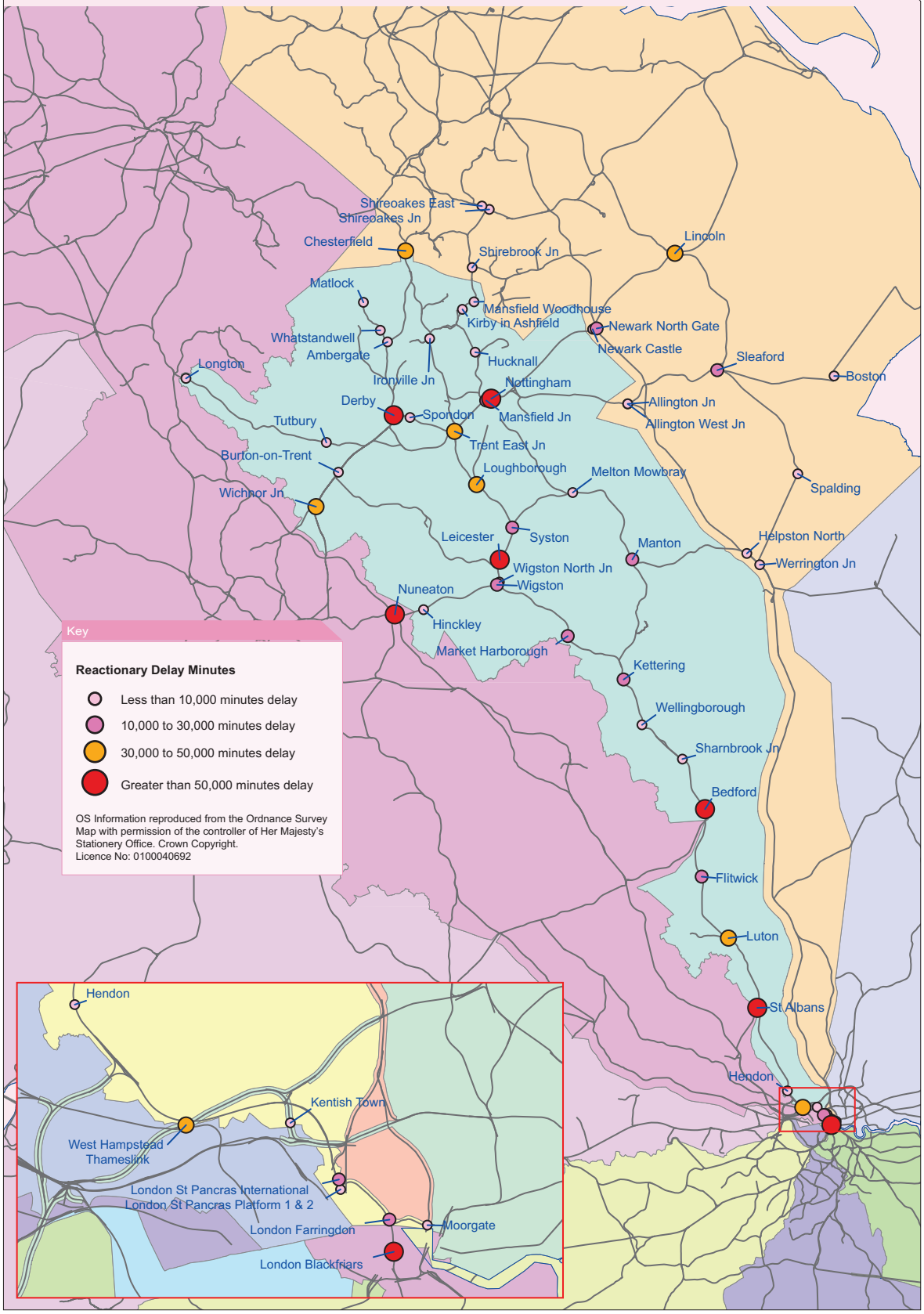


Figure 3.27 – Reactionary delay freight

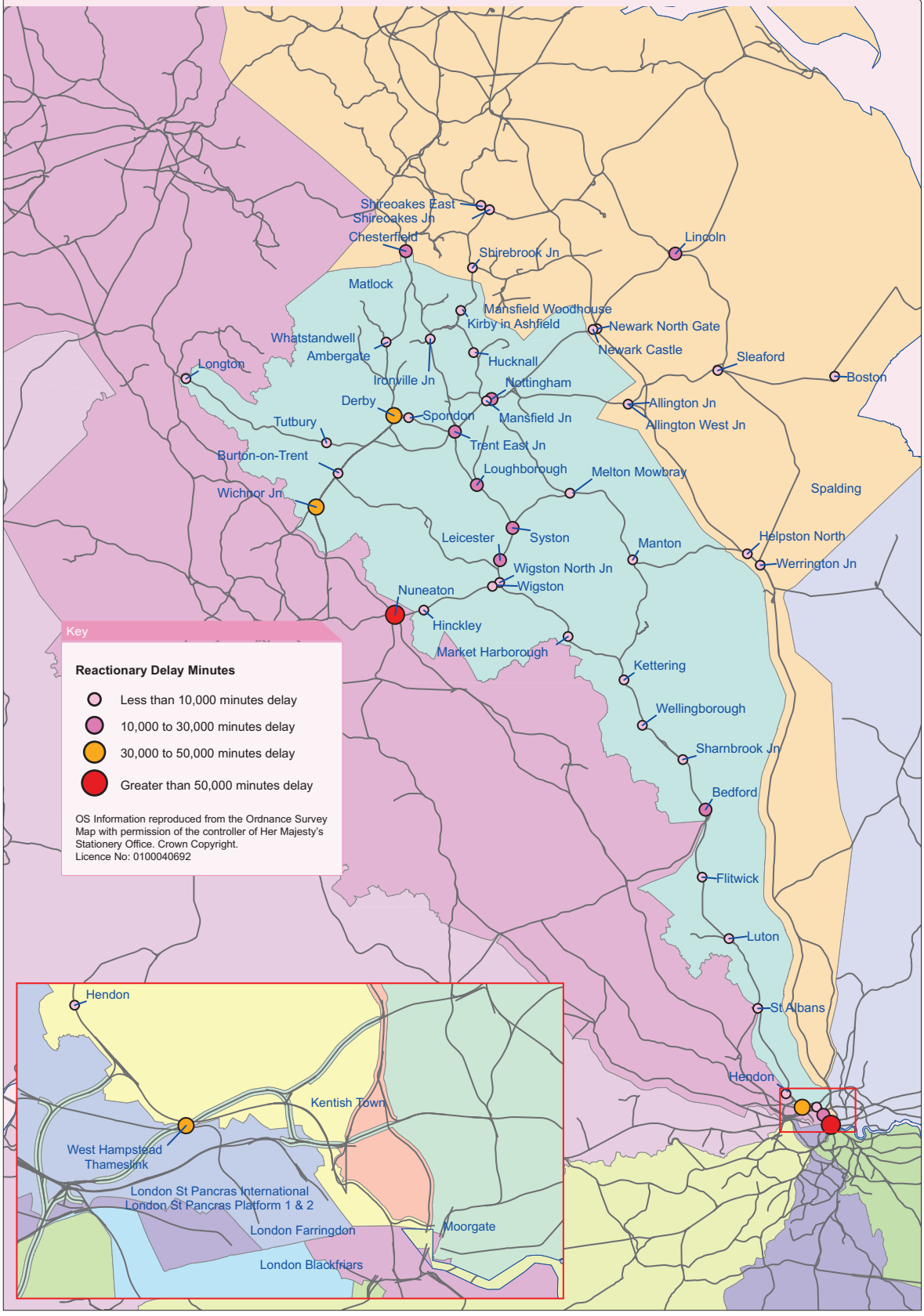
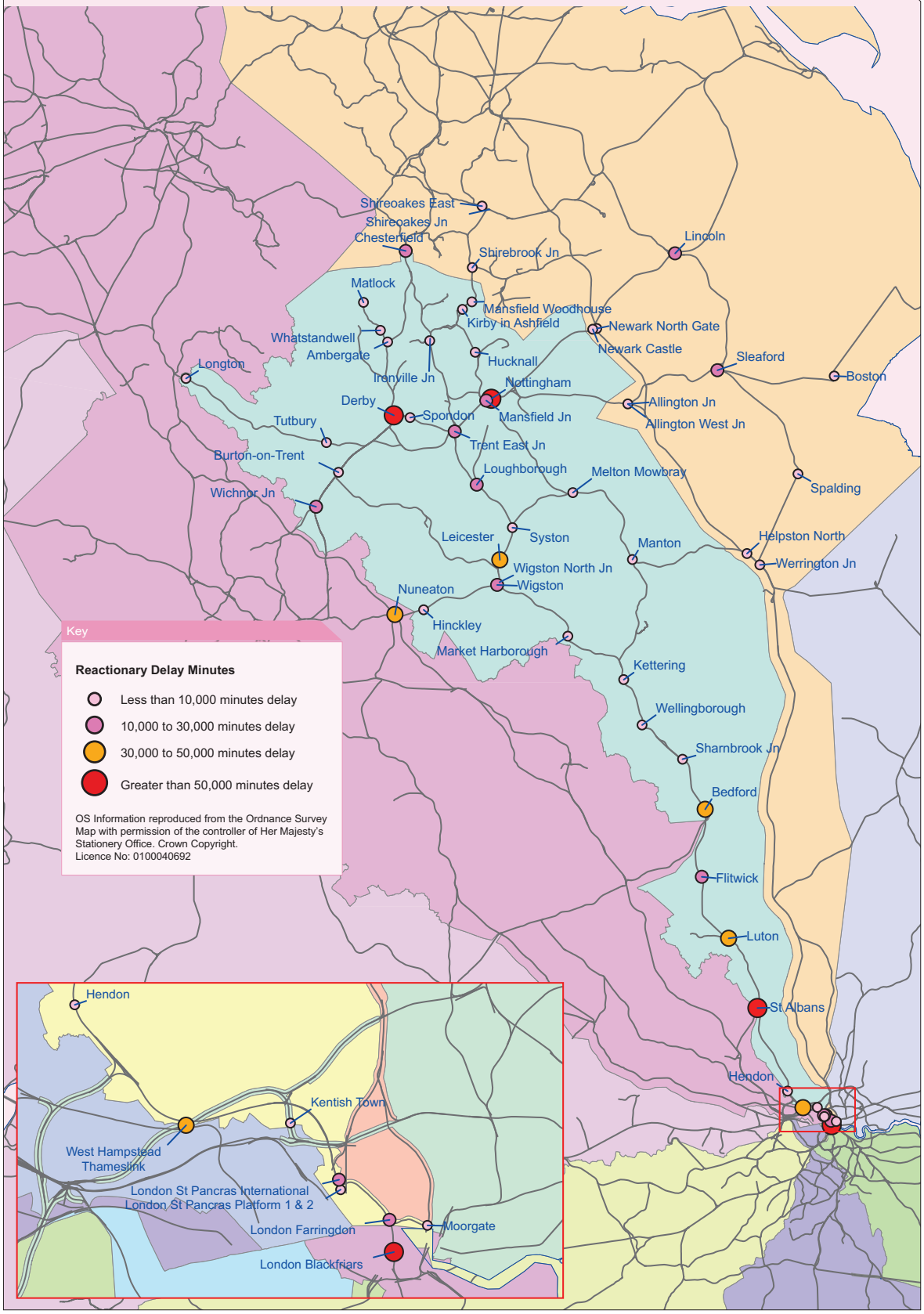


Figure 3.28 – Reactionary delay passenger



4. Anticipated changes in supply and demand

4.1 Planned changes to services and infrastructure

This section identifies planned changes to supply within the railway system over the period of this Route Utilisation Strategy (RUS). Committed changes have been included (to the extent that they are defined) within the RUS baseline and other changes have been considered wherever they affect the RUS proposals. The changes can be to train services or infrastructure or both; major infrastructure schemes are usually accompanied by train service changes, whereas minor ones can affect service outputs like journey time or performance.

The first two subsections list major investments in the railway network currently anticipated to be completed during the RUS period as part of planned track and signalling renewals, or through potential enhancement schemes. Renewals often provide the most cost-effective opportunity to realise infrastructure enhancements as the incremental costs of progressing these in conjunction with planned works is generally significantly lower than progressing them as standalone projects. The national targets included in the High Level Output Specification (HLOS) and schemes in development to support achievement of these targets are described in sections 4.1.3 and 4.1.4. Significant planned train service changes are described in section 4.1.5. The Thameslink Programme is covered in section 4.3.

4.1.1 Committed schemes (funded through to implementation)

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

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

Table 4.1 – Committed schemes (funded through to implemetation)

Scheme	Potential enhancement	Implications for RUS	Main promoter
East Midlands Resignalling. Phase 2a – South Erewash	None currently identified	None	Network Rail Period Review 2008 (PR2008)
East Midlands Resignalling. Phase 2b – Loughborough to Trent East Jn	Doubling of Trent East Jn (completed in December 2009) and increased speeds on the slow lines	Improved performance, capacity and journey times	PR2008 and Network Rail Discretionary Fund (NRDF)

Scheme	Potential enhancement	Implications for RUS	Main promoter
Chesterfield new platform	Provision of new platform	Supports Seven Day Railway (SDR) principles, improved performance and reduced operational costs due to reduction in use of rail replacement buses	Network Rail SDR Fund
W10 gauge clearance Ipswich to Nuneaton	Enhanced gauge	Ability to carry 9'6'' containers on standard height wagons from the terminal at Ipswich to Nuneaton	Transport Innovation Fund (TIF)
Leicester to Loughborough line speed improvements	Increased line speeds on the slow lines	Reduced journey times, better engineering access and supports the HLOS performance target	NRDF
Thameslink Programme	Various infrastructure schemes, see section 4.3 for full details	Improved capacity for Thameslink services. Supports the HLOS capacity target	Thameslink Programme
Nottingham – Worksop line performance improvements	Removal of double block working	Supports the HLOS performance target	NRDF
National Stations Improvement Programme	Enhancements to stations including Derby, Leicester, Skegness, Loughborough, Kettering and Burton-on-Trent	Improved station facilities	PR2008
Derby Station master plan phase 1	Enhancements to the transport interchange facilities	Improved station interchange	Derby Cityscape/ Derby City Council and European Regional Development Funding (ERDF)
Nottingham Hub	Regeneration of Nottingham station	Improved station access and facilities	Various third parties and Network Rail Safety and Environment Fund

4.1.2 Planned schemes (funding not yet authorised to completion)

The schemes highlighted in Table 4.2 are at various stages of development and some are still under discussion with third party project promoters. Details of the implications of each scheme for the RUS and issues that need to be taken into account are also provided. Network Rail will continue to liaise with the promoters of these projects and any new projects that arise.

4.1.3 High Level Output Statement targets

The 2008 Periodic Review (PR2008) set Network Rail's outputs, revenue requirement and access charges for the period 1 April 2009 to 31 March 2014, referred to as Control Period 4 (CP4). This is the first review since the passing of the Railways Act 2005 and introduces the new process whereby the Secretary of State issues the HLOS and a Statement of Funds Available.

Table 4.2 – Planned schemes (funding not yet authorised to completion)

Scheme	Proposed enhancement	Implications for RUS	Main promoter
East Midlands Resignalling. Phase 3 – Nottingham station area	Enhanced layout in Nottingham station area	Improved performance, capacity and approach/ departure speeds. Supports the HLOS performance target	Being developed for funding by Hutchinson Ports UK Ltd (HPUK)
W10 gauge clearance Felixstowe to Yorkshire terminals	Enhanced gauge	Ability to carry 9'6" containers on standard height wagons from Felixstowe to Doncaster, Selby, Wakefield Europort and Leeds Stourton	Being developed for funding by HPUK
East Midlands train lengthening	Platform extensions (Stansted Airport and Loughborough) and fitment of Selective Door Opening (SDO) equipment to remainder of the Class 170s	Increased capacity to accommodate growth. Supports the HLOS capacity target	PR2008
Midland Main Line (MML) line speed improvements	Enhancement to the capability of the infrastructure. Scope is currently being agreed through normal industry processes	A journey time reduction of a minimum of eight minutes between Sheffield and London St Pancras International for services with calls at Chesterfield, Derby and Leicester	PR2008
Bedford station revised layout	Remodelled layout at Bedford	Improved performance and capacity to accommodate growth	Thameslink Programme
Improved signalling at Harpenden and Radlett Jns	Increased speed for trains changing lines	Improved capacity and supports HLOS performance target	Performance Fund
Hope Valley to London train lengthening	Provision of additional loops	Increased length and trailing load for southbound aggregates trains	Strategic Freight Network (SFN) process

Scheme	Proposed enhancement	Implications for RUS	Main promoter
Bedford to Kettering slow line capacity improvements	Linespeed increases and provision of loop	Additional train paths available during engineering works, performance and capacity improvements	Network Rail SDR Fund
Ipswich to Nuneaton capacity improvements	Additional infrastructure	Increased capacity, improved performance and supports SDR principles	SFN process
Nottingham to Lincoln service improvements	Linespeed improvements	Improved frequency and/or journey times	Regional Funding Allocation
Nottingham to Leeds journey time improvements	Linespeed improvements	Improved journey times	Nottinghamshire County Council
Various freight terminals in Burton-on-Trent and Trent Jn areas	New freight terminals and connections	Depends on 2019 SFN growth forecasts and expected number of arrivals/departures	Various third parties
In-fill loading gauge enhancement on various routes including Water Orton – Doncaster	Enhanced gauge to W10/W12	Capability to accommodate increased intermodal traffic	SFN process
GN/GE Joint Line Upgrade between Peterborough and Lincoln via Spalding	Enhanced infrastructure, including linespeed improvements	Increased capacity for freight trains between Peterborough, Spalding and Lincoln	PR2008
Luton station	Regeneration of the station, including a new multi-storey car park	Improved station access, facilities and car parking	Luton Borough Council
Flitwick station	Provision of a station interchange, additional car parking and improvements to the station building	Improved station access, facilities and car parking	Central Bedfordshire Council
Nottingham – Worksop line performance improvements	Linespeed improvements and reduction of the single line section	Improved performance	Nottingham County Council and NRDF
Mountsorrel level crossing removal scheme	Closure of level crossing and provision of a footbridge	Supports the HLOS safety target	Network Rail Safety and Environment Fund
Loughborough station car park	Increased car parking	Improved station access	East Midlands Trains/National Car Parks
Burton-on-Trent station	Bridge strengthening and forecourt improvements	Improved station access	Staffordshire County Council
Loughborough station access	Provision of step free access to platforms 2 and 3	Improved station access and supports HLOS safety target	Network Rail Access for All
Radlett freight terminal	New terminal at Radlett	Additional freight paths on the Midland Main Line south of Radlett	Helioslough

The HLOS specifies national targets for reliability, capacity and safety to be achieved by the end of CP4:

Reliability

- 92 – 93 percent Public Performance Measure (PPM) for services according to service sector (long distance London and South East and regional)
- a 21 – 36 percent reduction on services arriving at their final destination 30 minutes or more late, or cancelled, by service sector

£160 million is allocated to a performance improvement fund to ensure the industry performance meets the PPM and cancellation and significant lateness targets.

Capacity

- a target of additional passenger kilometres to be accommodated on each of the strategic routes. The target for the Midland Main Line (MML) and East Midlands Route is a 22.5 percent increase.
- a number of major cities have target numbers of arriving passengers to be accommodated in the morning peak. Table 4.3 indicates the volumes for the areas within the East Midlands RUS.

The morning peak three hours are 07:00-09:59 with the high-peak hour being 08:00-08:59. The load factor is defined as the number of passengers carried on a train as a percentage of the design capacity of the train (including seats and standing allowances).

Safety

- a three percent reduction in the national risk level to passengers and rail workers from 2008/9 to 2013/14.

4.1.4 Schemes in development to meet the HLOS targets

A number of schemes planned for delivery in CP4 have been developed to help to meet the HLOS targets. This is highlighted in the column 'Implications for RUS' in Tables 4.1 and 4.2, where appropriate. Where capacity or other

Table 4.3 – Peak hour arrivals to be accommodated

London terminals and regional hubs	Peak three hours			High-peak hour		
	Assessed demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at the end CP4 (%)	Assessed demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)
London St Pancras International (including Thameslink and Kent services via High Speed One)	25,900	10,900	67*	13,100	5,700	76*
Nottingham and Leicester**		13% increase on 2008/09	41		16% increase on 2008/09	46

* The aggregate target across London termini
** Included in aggregate target across a number of regional hubs

benefits have been identified for schemes, these are also indicated. Other smaller scale initiatives developed to achieve the reliability targets have been described in the performance section in **Chapter 3**.

The only new rolling stock proposed to support the HLOS capacity targets is that to be supplied as part of the Thameslink Programme. Additional carrying capacity provided in CP4 elsewhere on the route will be delivered through the use of existing rolling stock (on the Birmingham – Stansted corridor) or utilising rolling stock cascaded from other routes (on Liverpool – Norwich corridor).

Most safety improvements for passengers and the workforce will come from more effective and efficient development and management of the network, rather than specific safety initiatives. Some of the remaining schemes included in the tables will contribute to achievement of the safety targets although they have been primarily developed to achieve other objectives. For instance, the Access for All scheme to create step free access to platforms 2 and 3 at Loughborough station will involve the removal of the existing barrow crossing which will contribute to improving the safety of the network.

Other schemes, such as the doubling of the junction at Trent East, which was completed in January 2010, and the planned remodelling of the layout at Nottingham station will reduce the number of conflicting moves across the layout thereby improving safety. Furthermore, both the MML linespeed improvement scheme and the GN/GE Joint Line upgrade between Peterborough and Lincoln via Spalding, include works which would involve the closure of some of the level crossings on these routes. Finally, a number of the smaller initiatives included in both the Performance Fund and the Seven Day Railway Fund, but not listed in the tables above, have safety benefits. For example, the fitment of Closed Circuit Television cameras on the Erewash Valley line to monitor trespass, potential fatalities, cable theft, vandalism, flooding and animals on the line will improve passenger safety, and interventions to support the safety of track workers, whilst enabling the adjacent track to remain open to traffic.

4.1.5 Planned service changes

The train operating company (East Coast) has been granted access rights for a two-hourly semi-fast service between London King's Cross and Lincoln via Newark. This is likely to be implemented in May 2011. Network Rail has been approached by an open access operator regarding an Oakham to London St Pancras International passenger service. This will be subject to the normal industry processes.

4.2 Forecast passenger demand

4.2.1 Strategic context

This section considers the short and medium-term changes in passenger demand within the RUS area. It covers passenger traffic in detail to 2019, beyond which it becomes difficult to accurately forecast the main drivers of demand. In considering demand beyond 2019, the RUS therefore notes the Government's aspiration in the "Delivering a Sustainable Railway" White Paper, to provide a reliable network capable of handling double the number of passengers nationally over the next 30 years. This aspiration sets an overall context for the future development of the railway but is not intended to be a forecast for any specific route or area.

The passenger demand forecasts were produced in summer 2008, using the then current view of key demand drivers, including Gross Domestic Product (GDP). Since then the severity of the economic downturn has worsened. Recent predictions from Oxford Economic Forecasting (OEF) suggest that the long-term effect of the recession may be a permanent loss of approximately seven percent of GDP, compared to a continuation of pre-recession growth. On that basis, and using industry standard forecasting models, it might have been expected that passenger rail demand would have reduced significantly over the last two to three years, and that the forecasts for 2019 in the RUS Draft for Consultation might not be achieved until around 2022 or 2023.

However, it appears that demand in the RUS area has not in fact been affected by the recession in the way implied above. Between 2006/07 and the year to September 2009 (the most recent for which data is available), passenger journeys between all stations in the RUS area and London St Pancras International grew by around four percent, whilst journeys between all stations in the RUS area (excluding London) and Leicester/Nottingham/Derby grew by approximately nine percent. These rates of growth are similar to the forecasts in the RUS Draft for Consultation, and are consistent with experience elsewhere on the network indicating that the recession has not affected demand by as much as might have been expected. There has, nonetheless, been a reduction in yield over this period as some passengers opt to "trade down" from first class to standard class or from full fare to cheaper tickets. It is possible that this effect might be reversed as economic growth resumes.

Looking forward, the timescales for recovery from the recession are inevitably uncertain. However, the RUS forecast is a medium to long-term view of growth in rail demand, and so should not be affected by shorter-term uncertainty. It is also worth noting that, even if future growth is slightly slower than forecast, this will only reduce the benefits of RUS options by a small amount and so is unlikely to have a significant impact on the overall value for money case of an option, unless the business case is marginal to begin with.

On that basis, it is reasonable to conclude that there is no strong reason to change the forecast from the RUS Draft for Consultation.

4.2.2 The forecasting model

The forecasts were produced using a bespoke demand model based on the forecasting framework published in the Passenger Demand Forecasting Handbook version 4.1 (PDFH). This is the industry standard framework for modelling underlying growth, using demand drivers such as the UK demographics, economic performance and the availability of competing modes to predict the change in passenger demand. The model uses LENNON (rail) ticket sales data. A number of sources of data regarding the different drivers of change were used in compiling the forecasts:

- GDP forecast was obtained from OEF predictions
- forecasts of local population, employment and car ownership were obtained from version 5.3 of the Department for Transport's (DfT) TEMPRO model
- elasticity assumptions were drawn from PDFH version 4.1, except for the elasticity to fare increases, for which PDFH 4.0 guidance was used[1]
- fares have been assumed to increase by the Retail Price Index (RPI) +1 percent
- assumptions about the real cost of fuel were derived from the DfT's Appraisal Guide WebTAG.

Evidence from previous RUSs suggests that the PDFH framework can underestimate recent acceleration in passenger growth experienced in some urban and interurban rail markets outside London. In particular, some stakeholders were concerned that the growth prediction for rail demand in the North Northamptonshire area would have been vastly understated if the forecasts were purely based on PDFH.

An extensive validation exercise was undertaken for the East Midlands region to assess how well the PDFH methodology would have explained historic growth on key flows.[2] These flows were split as follows:

- all flows between the East Midlands RUS area and London, representing the Long Distance High Speed (LDHS) services along the MML
- all flows to/from urban centres (excluding London), such as Derby, Leicester and Nottingham

[1] The fare elasticities in PDFH v4.0 are considered more accurate by Network Rail and stakeholders than those in v4.1.

- interurban flows from East Midlands urban centres to/from Birmingham
- East Midlands RUS area to/from other regions.

The exercise concluded that once timetable changes and the impact of performance improvements were included, PDFH was able to reasonably reflect the actual passenger growth that occurred during the period 1996/97 – 2006/07 for all flows between the East Midlands RUS area and London. This was also the case for rail demand to/from the North Northamptonshire area (included in the Milton Keynes South Midlands sub-regional strategy). It was agreed with the industry stakeholders that an alternative forecast was not required in this case. The final forecast for this flow is therefore based on PDFH, and includes the impact of the timetable changes from December 2008 and December 2009, and the impact of any committed schemes such as opening of new stations at Corby and East Midlands Parkway, and the MML linespeed improvements.

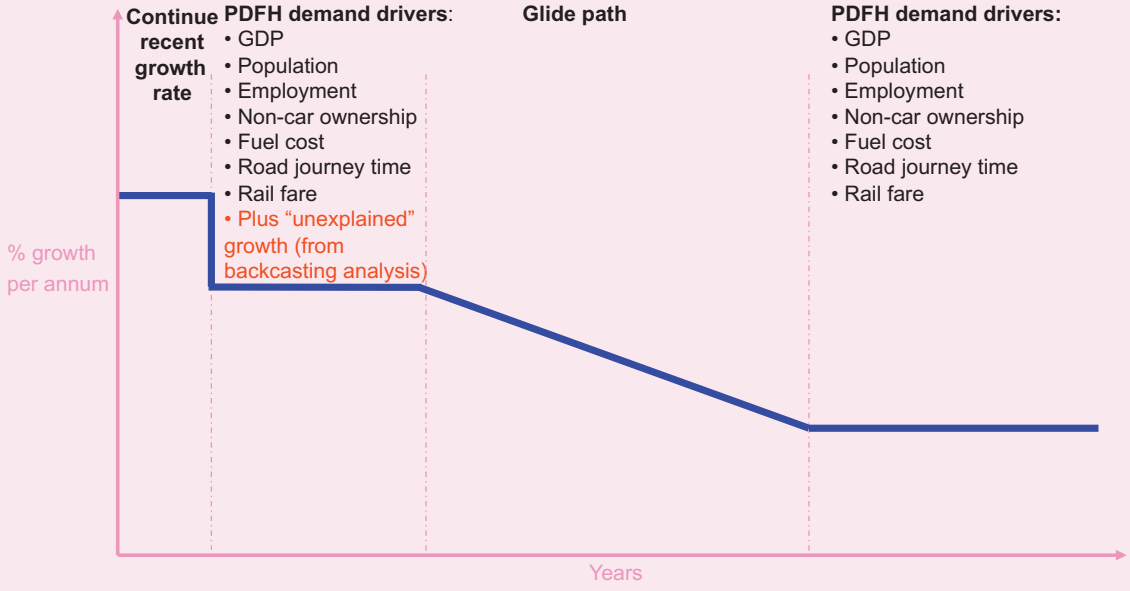
Demand for urban and interurban travel on the other hand was under-predicted by PDFH. An alternative forecast was developed using a combination of historic growth and PDFH estimate in line with the North West and Yorkshire and Humber RUSs. The approach is shown in Figure 4.1. The current short-term rate of growth persists for a further year; this is then followed by two years of the standard PDFH growth with an "overlay" for unexplained growth; the growth rate then declines over the following four years at a steady rate to meet the growth rate implied by the standard PDFH methodology.

4.2.3 Growth by key passenger market

All day growth in passenger demand

Figure 4.2 illustrates the forecast growth in passenger demand (measured in number of rail journeys) throughout the day for key passenger markets in the RUS area. It can be seen that, with the exception of travel to/from Birmingham and eastern England, the demand in passenger travel is expected to grow by 28 percent over

Figure 4.1 – Alternative methodology to forecast passenger demand for the urban and interurban flows in the East Midlands RUS area



NB. This proposed alternative methodology is similar to, and consistent with, North West and Yorkshire and Humber RUSs

[2] This excludes growth on commuter services into London St Pancras International as this is being addressed by the Thameslink Programme.

the 10 years to 2019/20, averaging at 2.5 percent per annum. The market for travel to/from Birmingham is expected to grow at the fastest rate, with the number of trips to increase by 40 percent over the next 10 years. This is in line with the recent high growth experienced in this market as a result of a number of demand drivers, including a greater increase in road congestion, changes in commuting patterns favouring rail travel, and an increase in the attractiveness of the rail service, including improvements to some journey times, to business and leisure travellers.

Benchmarking is difficult as only a few comparable forecasts have been produced; however, the RUS projection of an average annual increase in passenger demand of 2.5 percent is similar to the forecast produced by the East Midlands Regional Planning Assessment (RPA) 2007. This predicts an average increase in passenger demand for the East Midlands region of 1.7 percent per annum over 20 years to 2026/27.

Peak demand forecast for LDHS services into London

Figure 4.3 shows the expected future level of crowding along the MML on LDHS services arriving at London St Pancras International in the morning three-hour peak (between the hours of 07:00 - 09:59). The demand for rail travel along this corridor is expected to grow by an average 2.5 percent per annum for the next 10 years. From the base year 2009/10 this represents growth of 28 percent by 2019/20. Based on current capacity, passengers are expected to stand from as far as Bedford by 2019, with load factors on average 24 percent above seated capacity on arrival at London St Pancras International in the morning three-hour peak.

Figure 4.2 – Forecast passenger growth in rail journeys by key market 2009/10 – 2019/20

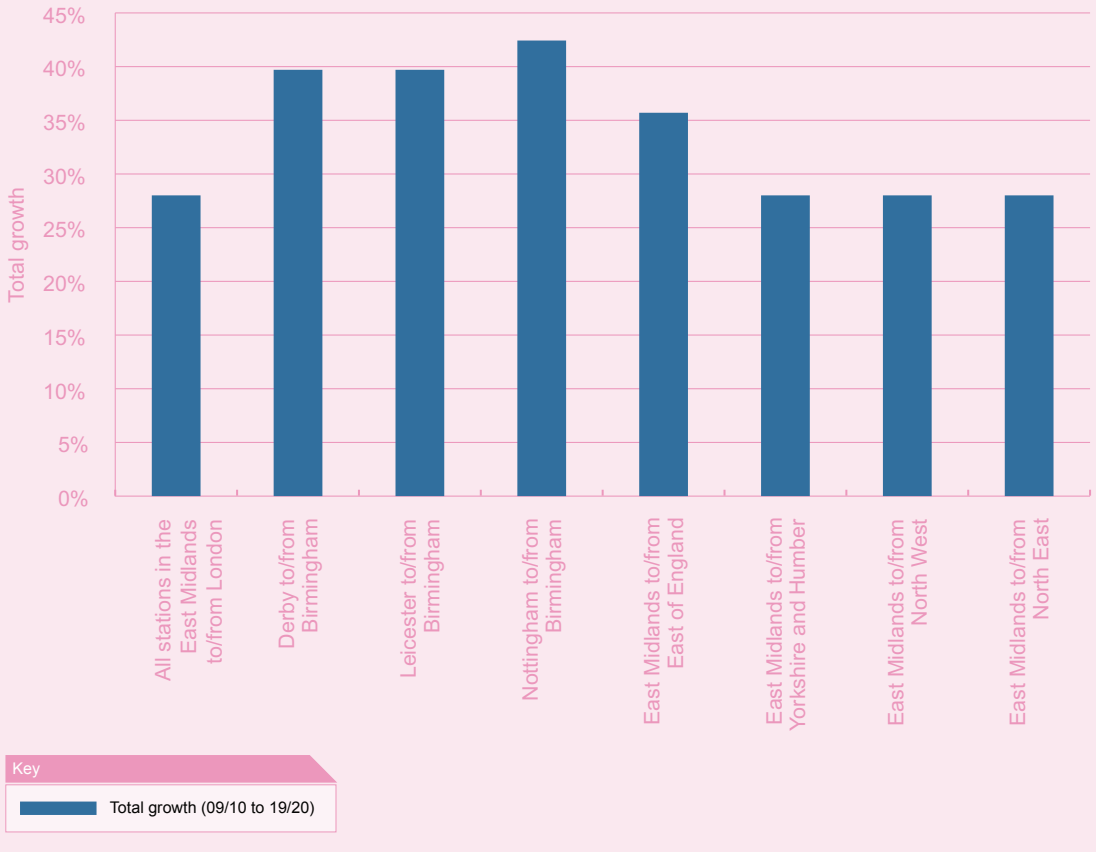
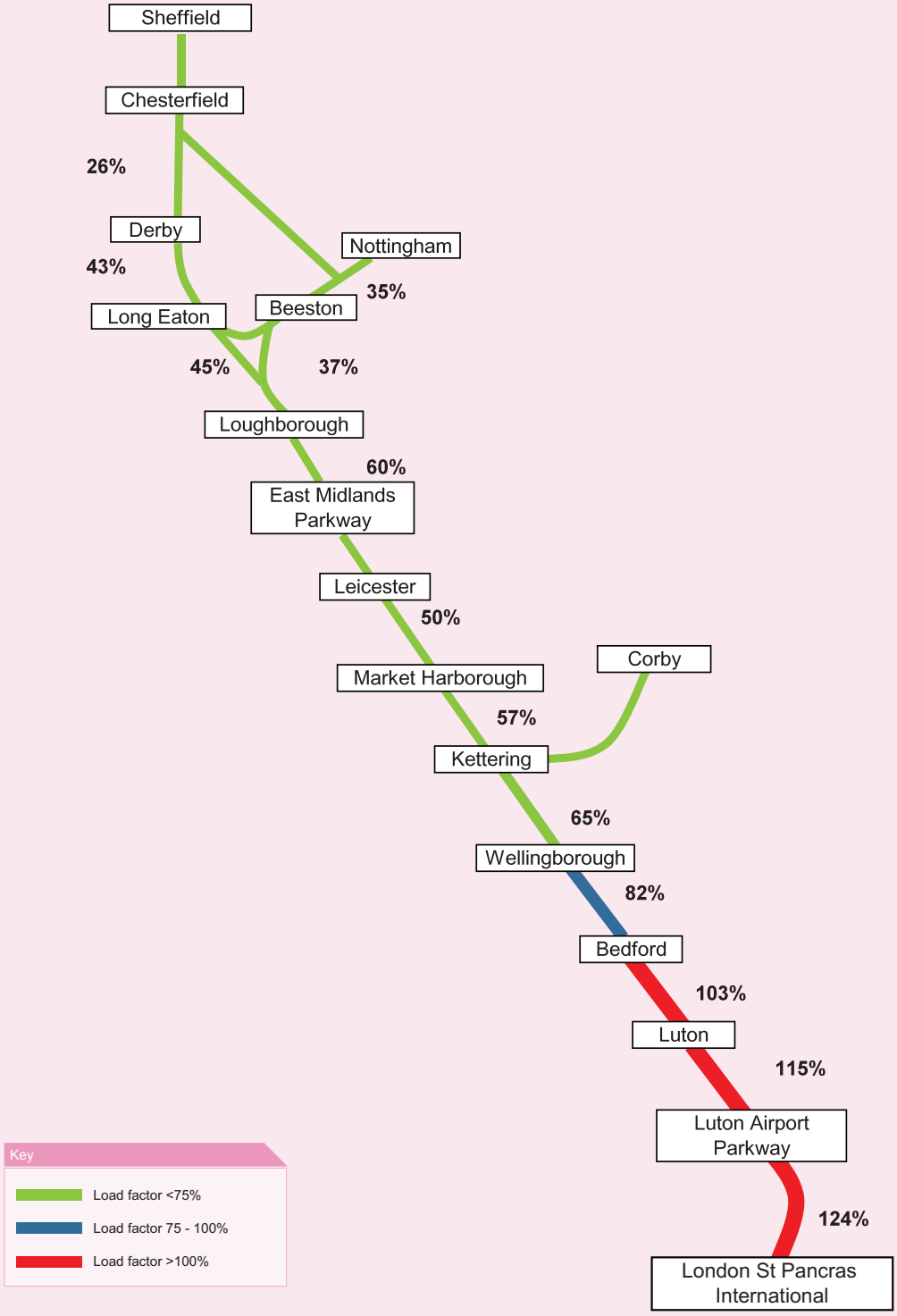
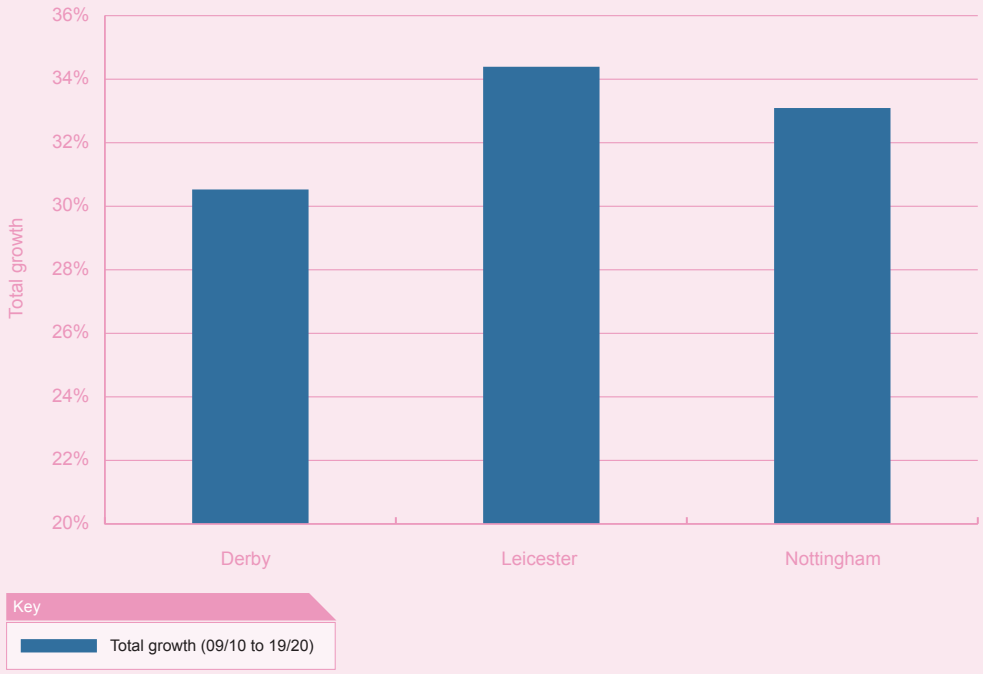


Figure 4.3 – Expected average load factors along the Midland Main Line in 2019/20, for LDHS services arriving into London St Pancras International in the morning three-hour peak.



Source: Network Rail East Midlands RUS Forecast
NB. The above figure shows the expected average passenger loads for intermediary flows, eg. on average, LDHS services are expected to be at 82 percent of their seated capacity between Wellingborough and Bedford. Also, the above figure excludes East Midlands Parkway and Corby stations due to data unavailability as services have only recently become operational.

Figure 4.4 – Peak passenger growth forecast by key urban centre within the East Midlands RUS area for all flows excluding London from 2009/10 – 2019/20



Peak growth in passenger demand for Nottingham, Leicester and Derby

It is anticipated that a greater than proportional share of growth in passenger demand will occur during peak periods at Leicester, Nottingham and Derby in the RUS area. Figure 4.4 illustrates the forecast growth in peak passenger demand for these locations. It can be seen that growth in the three-hour peaks is expected to be in excess of 30 percent over the next 10 years to 2019 to/from all three cities. This sizeable increase in demand will have implications for the ability of the rolling stock and infrastructure to accommodate future passenger numbers for the entire RUS area.

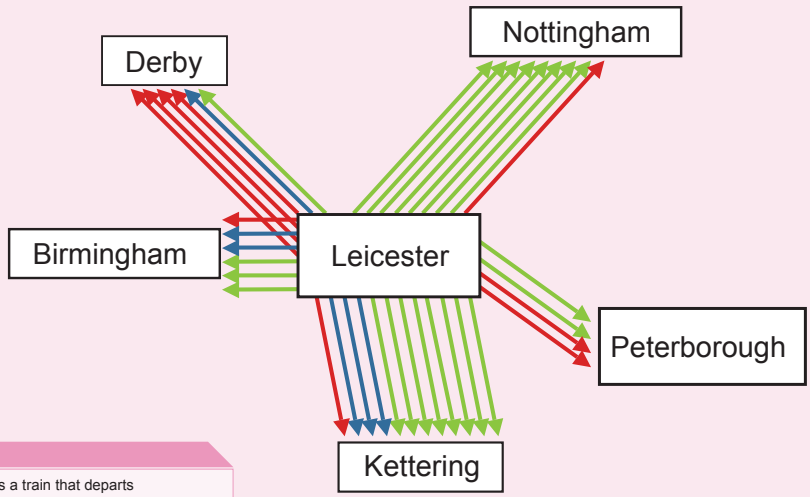
Figure 4.5 shows the expected future level of crowding experienced by passengers when departing Leicester in the evening peak (16:00 - 18:59). Demand for rail travel in the peaks is expected to grow by three percent per annum for the next 10 years at Leicester. Based on current capacity, severe crowding is expected on the Leicester – Derby corridor, with some crowding on the remaining corridors by 2019.

Figure 4.6 shows the expected future level of crowding experienced by passengers when departing Nottingham in the evening peak. Demand for rail travel in the peaks is expected to grow by 2.9 percent per annum for the next 10 years at Nottingham. Based on current capacity, some crowding is expected on most of the corridors, with the exception of the Nottingham – Lincoln corridor which is expected to have sufficient capacity to accomodate future demand.

Demand forecast for Long Distance High Speed interurban services

Demand on the Plymouth – Edinburgh, and Reading – Newcastle corridors is expected to grow by an average of 2.3 percent per annum over the next 30 years, reflecting the higher growth that is anticipated on these services. This is based on the demand forecast in the Network RUS for the cross-country corridor under a “Global Responsibility” scenario. Once growth in rail demand is taken into account, sufficient capacity is expected to remain on the Reading – Newcastle corridor. However, the

Figure 4.5 – Levels of crowding expected by 2019/20 on trains departing Leicester in the three-hour evening peak



Key

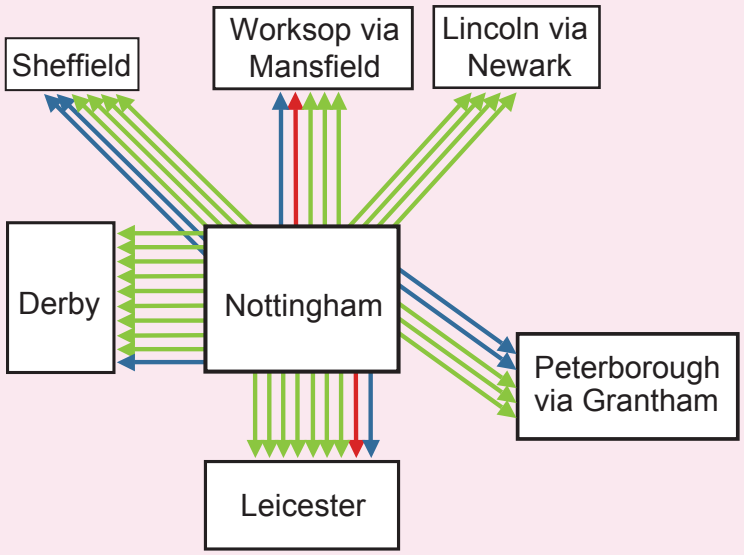
Each line represents a train that departs from Leicester between 16:00 and 18:59

- Load factor <100%
- Load factor 100 - 120%
- Load factor >120%

NB. Total train capacity, including standing allowance, is estimated at 1.2 times the number of standard class seats in line with the generic assumptions used in the HLOS analysis

Source: Network Rail East Midlands RUS Forecast

Figure 4.6 – Levels of crowding expected by 2019/20 on trains departing Nottingham in the three-hour evening peak



Key

Each line represents a train that departs from Nottingham between 16:00 and 18:59

- Load factor <100%
- Load factor 100 - 120%
- Load factor >120%

NB. Total train capacity, including standing allowance, is estimated at 1.2 times the number of standard class seats in line with the generic assumptions used in the HLOS analysis

Source: Network Rail East Midlands RUS Forecast

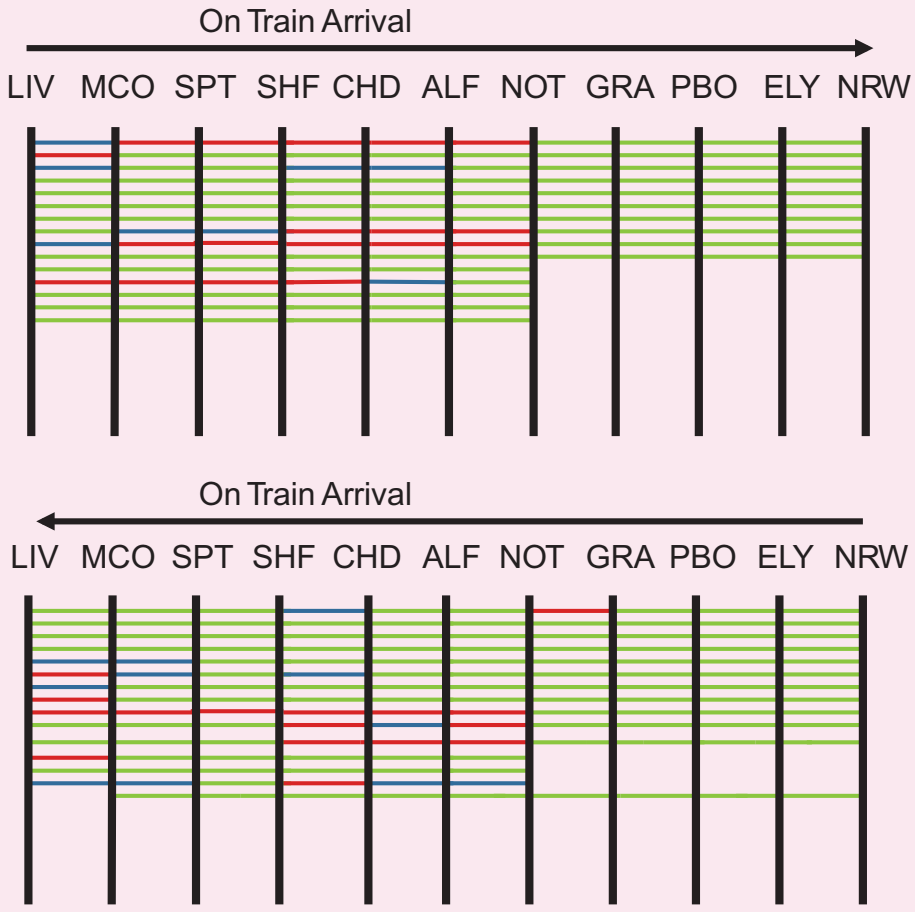
crowding experienced over short periods near urban centres (especially during the peaks) is expected to worsen on some services. Crowding on the Plymouth – Edinburgh corridor is also expected to worsen with many services experiencing load factors (relative to seats) above 100 percent for the majority the route.

Demand forecast for interurban services

Figure 4.7 shows the expected future crowding on the Liverpool Lime Street – Norwich services throughout the day. Demand for rail travel on this corridor is expected to grow by 2.5 percent per annum over the next 10 years. Based on current crowding, there is sufficient capacity on almost all services east of Nottingham. However, unless capacity is increased, there is likely to be severe crowding on many of the services between Liverpool Lime Street and Nottingham by 2019.

Figure 4.8 shows the expected future crowding on the Birmingham New Street – Stansted

Figure 4.7 – Future levels of crowding on trains arriving at stations along the Liverpool Lime Street – Norwich route in each direction throughout the day by 2018/19



Key

- Load factor <100%
- Load factor 100 - 120%
- Load factor >120%

NB. Total train capacity including standing allowance is estimated at 1.2 times the number of standard class seats, in line with the generic assumptions in the HLOS analysis.
Source: Network Rail East Midlands RUS Forecast

Station Key

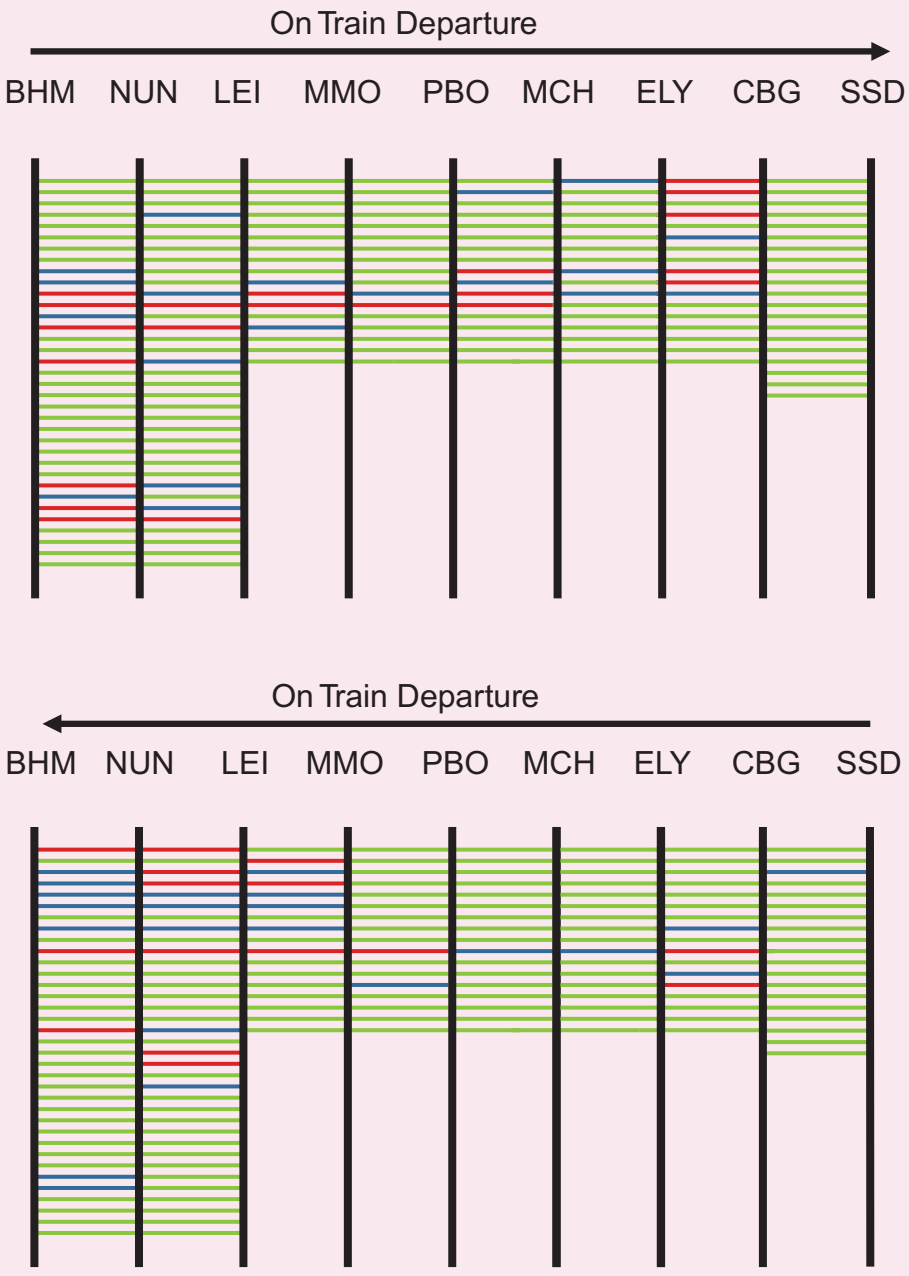
LIV: Liverpool Lime Street
MCO: Manchester Oxford Road
SPT: Stockport
SHF: Sheffield
CHD: Chesterfield
ALF: Alfreton
NOT: Nottingham
GRA: Grantham
PBO: Peterborough
ELY: Ely
NRW: Norwich

Airport service throughout the day. Demand for rail travel on this corridor is expected to grow by three percent per annum to 2019. Based on current capacity, crowding as a result of increased commuting to both Cambridge and Birmingham is expected to get far worse. Crowding in the morning peak is expected between Peterborough and Cambridge in the eastbound direction, and between Leicester and Birmingham in the westbound direction. Services in the inter-peak are expected to be crowded along the whole route by 2019, with westbound services being worse in the mornings towards Leicester and Birmingham, and the eastbound services being worse in the afternoon.

4.2.4 Network RUS: long distance passenger demand forecasts

The Network RUS: Scenarios and Long Distance Forecasts, published in June 2009, presents the growth in long distance rail demand over a 30-year horizon based on four different scenarios: Global Responsibility, Continued Profligacy, Local Awareness and Insularity. The forecast was developed using an alternative approach to PDFH, to incorporate a detailed consideration of factors affecting long distance market size and market share. This was in essence, a recognition of the fact that PDFH is not always appropriate for longer term forecasts. The Global Responsibility and Continued Profligacy scenarios were forecast to have much higher growth than the Local Awareness or Insularity scenarios, reflecting the higher levels of economic growth assumed when undertaking the forecast. For the Midlands corridor, the Network RUS estimated growth in long distance passenger rail demand in the range of 36 – 77 percent to 2036 . Assuming a consistent growth rate, this implies an average annual growth rate of 1.1 – 2.0 percent over the next thirty years.

Figure 4.8 – Future levels of crowding on trains arriving at stations along the Birmingham – Stansted Airport route in each direction throughout the day by 2018/19



Key

- Load factor <100%
- Load factor 100 - 120%
- Load factor >120%

NB. Total train capacity including standing allowance is estimated at 1.2 times the number of standard class seats, in line with the generic assumptions in the HLOS analysis.
Source: Network Rail East Midlands RUS Forecast

Station Key

BHM: Birmingham New Street
LEI: Leicester
PBO: Peterborough
ELY: Ely
SSD: Stansted Airport
NUN: Nuneaton
MMO: Melton Mowbray
MCH: March
CBG: Cambridge

4.3 The Thameslink Programme

4.3.1 Introduction

The Thameslink Programme has several key objectives:

- to meet the challenge of easing congestion into and through London
- to increase capacity on the core of this cross-London network
- to reduce the need to interchange with the London Underground
- to open up new journey opportunities
- to contribute to the attraction and regeneration of parts of the capital to/from London St Pancras International
- to reduce crowding on the London Underground
- to facilitate the increasing passenger flow to/from London St Pancras International now the High Speed 1 (HS1) link to the Channel Tunnel and Europe is complete and as further service changes on HS1 take effect.

To deliver these objectives many changes are needed to stations, track layouts, signalling systems, power supplies, structures and train service patterns.

The Thameslink Programme was approved by the Secretary of State for Transport in July 2007. Initial physical works have started and the first major milestone occurred in March 2009 when services that previously terminated at London Moorgate and London Blackfriars were linked, enabling closure of the Moorgate branch from Farringdon and major reconstruction of Blackfriars and Farringdon stations.

In December 2011, 12-car services will commence operation on the Bedford – Brighton route in the peaks, following completion of platform extension works, the rebuilding of Farringdon and Blackfriars stations and an improved traction supply changeover at Farringdon and City Thameslink stations.

The full Thameslink Programme will see:

- some of the First Capital Connect (FCC), Southeastern and Southern services that currently terminate at London King's Cross, London Bridge or London Cannon Street being re-routed across the core of the Thameslink route
- 24 train paths per hour available in the peak periods between London Blackfriars and London St Pancras International.

Thameslink is targeted for completion in Control Period 5 and will involve main line and suburban routes into Kent, South London and Sussex. The base for the new service pattern is the established Bedford to Brighton service and the Luton/St Albans to Catford Loop services. A new link between the core route and the East Coast Main Line (ECML) will facilitate the release of capacity at King's Cross. The majority of the peak period train services through the Thameslink core route will be formed with 12-car units of a new design that are expected to be progressively introduced into traffic from the middle of this decade on FCC Thameslink services.

4.3.2 Thameslink Programme impact on the East Midlands RUS area.

March 2009 timetable changes

In the timetable which started on 22 March 2009, the former Moorgate services operate to/from a number of locations south of the River Thames. The services terminating at Blackfriars prior to that date operate to/from Kentish Town, St Albans, Luton and Bedford. Suitable dual-voltage rolling stock from the 319 and 377 classes operate the services. The maximum peak period service remains at 15 trains in one hour. Evening, night and early morning services are affected by the works for the Thameslink Programme.

Infrastructure works between March 2009 and December 2011

The overhead line system will be extended to City Thameslink station. Other electrical work will be undertaken to improve the changeover arrangements for trains between the third rail and overhead line power pick-up systems in the Farringdon area. The Clerkenwell crossovers will be removed and will be replaced by new crossovers just north of London St Pancras International, which will enable the low level station to operate as a terminus if needed. The Moorgate branch from Farringdon has now been severed to facilitate the extension of the platforms at Farringdon towards the Snow Hill tunnel entrance in readiness for the operation of 12-car trains. Works will continue to provide suitable length platforms as follows:

- all four platforms at West Hampstead Thameslink, Mill Hill Broadway, St Albans City, Harpenden, Luton Airport Parkway, Luton, Flitwick and Bedford (with a fourth platform expected here – see 7.6.1)
- three platforms at Leagrave and Harlington (excluding the Up fast)
- two platforms at Elstree & Borehamwood and Radlett (the slow lines)
- works at Luton Airport Parkway are now complete and are almost complete at Mill Hill Broadway.

December 2011 timetable changes

Class 377 units will be added when the 12-car peak workings start in December 2011 and will only be replaced as new Thameslink trains are commissioned. The 377s and the 319s currently used by FCC will have been transferred elsewhere before the final service starts in the middle of the decade. The service pattern introduced in March 2009 is expected to continue until the mid 2010s with minimal changes other than as affected by continuing construction work. At London Bridge construction work is likely to radically alter FCC services in the interim; the precise nature of the change is subject to industry consultation processes and is at present unclear.

Infrastructure works between December 2011 and programme conclusion

A Light Maintenance Depot is planned at Cricklewood Yard together with a number of long sidings in the Bedford area capable of holding the new units.

Works are required to enhance electrical supplies to the overhead line system. A new crossover at West Hampstead Thameslink is provided to the north of the station, which will enable the station to act as a terminal for both the north and south during periods of disruption.

Changes will be made to the signalling system based on West Hampstead Area Signalling Centre (ASC) in anticipation of completion of the final stage, when a form of Automatic Train Operation is to be provided in the core section of the Thameslink route (ie. the route from Dock Jn to Blackfriars). Some functionality at West Hampstead ASC will move to the Thameslink Control Centre at a location to be determined.

A new junction will be installed immediately north of London St Pancras International to link up the new Canal Tunnels with the ECML to allow outer suburban trains from the ECML to access the Thameslink route.

Timetable changes at the conclusion of the Programme

The service will be operated by a mix of new, fixed formation 8-car and 12-car units. It is expected that the first unit will be in traffic during 2013. The fleet maintenance will be shared between Hornsey and Three Bridges, where new facilities are proposed to be built.

The final potential peak service pattern on the MML of 16 trains per hour (two of which may be required to terminate from the south at West Hampstead Thameslink to provide capacity for freight services to the north), is still being developed with the DfT.

At present, it is expected that the Wimbledon Loop will not form part of the Thameslink off-peak service pattern and it will be recast in line with the recommendations of the South London RUS.

Beyond the conclusion date

Proposed new stations at Elstow (Wixams) and Cricklewood (Brent Cross) are expected to be served once they have been built by external developers.

4.4 Depots and stabling

Improvements to the facilities at Derby Etches Park depot are currently underway, as part of East Midland Trains' franchise commitments to improve the reliability of the Meridian fleet. The scheme will provide additional capacity in the form of a new maintenance shed and will also provide improved facilities such as a wheel lathe to support the maintenance of both the Class 222 and 15x fleets.

It is recognised that there is limited capacity within the existing depots for the stabling of any more units. However, It is anticipated that those additional vehicles proposed for the East Midlands, to strengthen the Liverpool Lime Street – Norwich services, can be accommodated within the existing stabling and depot facilities. The Thameslink Programme is developing any necessary additional facilities to accommodate the new Thameslink rolling stock and this has been described in section 4.3 above.

4.5 Forecast freight demand

The Freight RUS was published in March 2007 and subsequently established. This predicted growth of 50 percent in gross tonne miles by 2014/15. The forecasts described below are from this document. The DfT's White Paper "Delivering a Sustainable Railway" anticipated a doubling of the rail freight market nationally over the next 30 years. Forecasts beyond 2014/15 have been developed through the Strategic Freight Network (SFN) process. Some stakeholders would like the ability to operate heavier freight trains (60mph with more than 2000 tonnes trailing load) along the MML.

4.5.1 Electricity supply industry (ESI) coal

ESI coal flows to Ratcliffe power station and services that pass through the area to other power stations are expected to continue at broadly current levels. The use of flue-gas desulphurisation (FGD) equipment at power stations requires limestone trains to support the FGD process and gypsum trains to remove the residue. Such equipment is already fitted at Ratcliffe.

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

4.5.2 Construction and aggregates

The aggregates market is a major contributor to rail freight in the RUS area, with four major quarries in the area at Croft, Bardon Hill, Stud Farm and Mountsorrel that serve London and the south east markets using a number of terminals on the MML, in the London area and elsewhere. There is also aggregates traffic from the Peak Forest area. The Freight RUS expected construction traffic to grow by 20 percent in tonnes lifted over the period, and approximately 25 percent in train numbers. The growth in train numbers tends to be incremental rather than delivering a step change in demand levels on any given route. Within the RUS area, the key areas of growth are projected to be limestone from the Peak Forest area to the FGD plants at power stations, general aggregates traffic to various destinations, and cement services from the Hope Valley, where major growth is expected due to change driven by the quarry operator.

4.5.3 Intermodal

Deep sea intermodal containers are carried through the RUS area from Felixstowe, Tilbury and Southampton to terminals in Yorkshire, the West Midlands and the North East. Within the RUS area, there is a terminal at Burton-on-Trent that receives traffic from Southampton and Felixstowe on a daily basis.

The level and distribution of intermodal growth will be dependent upon a number of factors, including the timing and location of new port capacity, the level of grants available, the annual growth of the deep sea business and particularly the enhancement of the loading gauge on routes in the RUS area.

4.5.4 Metals and petroleum traffic

The metals traffic is predominately associated with the steel works at Rotherham, Scunthorpe and in the North East passing over the RUS area to the Midlands and South Wales. The metals terminal at Corby also receives daily services from South Wales. Scrap metal traffic across the RUS area has also increased recently.

The Freight RUS notes the industry projection for metals traffic to increase by up to 19 percent growth in train numbers until 2014/15, although this increase in traffic does not represent a step change in demand on any given route section.

Longer term freight forecasts have been developed as part of the SFN workstream. Freight growth forecasts for the East Midlands RUS area have been agreed by the industry up to 2030. These have been used as the basis for generating the options included in **Chapter 5** and for the longer term vision in **Chapter 7**. This forecast has been further disaggregated to provide a 2019 growth projection. However, this work was not completed and agreed by the industry, in time for it to be incorporated in this RUS.

5. Gaps and options

5.1 Introduction

Previous chapters have outlined the scope of this Route Utilisation Strategy (RUS) by presenting the baseline assessment of the study area, as well as summarising the role of rail in the economic and social wellbeing of the East Midlands region. This analysis has demonstrated that there are several instances where the current rail network is not able to meet existing and future requirements. These are termed “gaps”.

This chapter presents an analysis of the RUS gaps and the series of options that have been developed to address them. The options have been appraised in compliance with the Department for Transport’s (DfT’s) Transport Analysis Guidance (webTAG), and the Passenger Demand Forecasting Handbook (PDFH) version 4.1. Where appropriate, Benefit Cost Ratios (BCRs) have been calculated and reported, as this is the main indicator of a scheme’s value for money used by the DfT. A BCR of between 1.5 and 2.0 indicates medium value for money and a BCR of 2.0 or above indicates high value for money. An option with a BCR of less than 1.5 is generally too low to be recommended, as it is deemed to be low or poor value for money.

The appraisals have been carried out on 10-year, 30-year or 60-year periods depending on whether or not investment in rolling stock or infrastructure is required. The appraisals assume that growth will occur at the appropriate growth rate for the corridor forecast in the East Midlands RUS until 2019/20. Growth is then expected to halve until 2026. Beyond this it is assumed that there is no further growth, in line with the webTAG guidance.

5.2 Generic gaps

For reference, Table 5.1 details the list of generic gaps that were identified in the baseline assessment.

5.2.1 Peak crowding and growth

In order to appraise this capacity gap, the level of crowding experienced by passengers when travelling has been examined. In the case of London St Pancras International, passenger crowding on arrival in the morning peak has been analysed as crowding is more intense at this time, whereas for both Leicester and Nottingham, it was observed that crowding is more concentrated in the evening peak.

Although the appraisals only use either the morning or evening peak crowding data, it is

Table 5.1 – Generic RUS Gaps

Number	Gap
1	Peak crowding and growth in key corridors (**peak crowding and growth**)
2	All day crowding and growth both peak and off-peak (**all day crowding**)
3	Freight capability of the network in terms of route availability, loading gauge, capacity and diversionary routes (**freight capability**)
4	Regional connectivity and journey times between various key locations either within the RUS area or outside the RUS geographical scope (**regional connectivity**)
5	Reactionary delays resulting in performance problems at some locations (**performance**)
6	Demand for travel in late evenings and weekends (**Seven Day Railway**)

assumed that the level of crowding experienced by passengers in either peak will be exactly reflected in the opposite direction in the second peak. The recommendations therefore seek to provide additional capacity to accommodate crowding for both peaks.

There are a number of areas where there is evidence of increased crowding during peak periods. This applies particularly south of Leicester as a result of increased commuting into London driven by significant growth in jobs in central London and, in part at least, by the Milton Keynes South Midlands (MKSM) sub regional strategy. This includes transport plans to support the growth agenda for the region. In addition, crowding in the peaks is increasing on some corridors at Leicester, Nottingham and between Matlock and Derby. Key drivers for increasing rail demand across the RUS area have been discussed in **Chapter 4** and the following gaps have been evaluated:

- crowding and growth into London
- crowding and growth at Leicester
- crowding and growth at Nottingham
- crowding and growth between Matlock and Derby.

5.2.2 All day crowding and growth

There is evidence of increasing crowding throughout the day on the Liverpool Lime Street – Norwich and Birmingham New Street – Stansted Airport services, and on the long distance interurban services between the North East, Yorkshire and the West Midlands. This is believed to be partly driven by the general trend of increased demand for rail travel in recent years. The specific factors driving demand for all day travel are explored in **Chapter 4** and gaps on the following services have been evaluated:

- Liverpool Lime Street – Norwich
- Birmingham New Street – Stansted Airport
- Birmingham New Street – Derby – Sheffield.

5.2.3 Freight capability

The current capacity and capability of the route, as described in **Chapter 3**, is not sufficient to accommodate the aspiration of key stakeholders to operate more frequent or longer, heavier trains, with some parts of the railway within the RUS area being very intensively used by freight trains. Consequently the following issues, some of which were first identified in the Freight RUS, are examined further here:

- freight growth:
  - on the Midland Main Line (MML)
  - between Water Orton and Chesterfield
  - on the Peterborough to Nuneaton corridor
  - between Nottingham and West Holmes Jn
  - in the Lincoln area.
- gauge capability along the Peterborough to Nuneaton corridor
- other initiatives identified through the Strategic Freight Network (SFN) process.

5.2.4 Regional connectivity

Regional planning strategy continues to place emphasis on links between key regional hubs, particularly where the current journey time or service levels do not promote a strong competitive position for rail.

Rail links between major conurbations, both within the RUS area and to other sizeable destinations, have been reviewed where there is evidence that they are reaching capacity, or to bring service levels more in line with those on other key corridors in the UK rail network. For these, the following types of option have been appraised to improve regional connectivity:

- journey time
- frequency of services.

5.2.5 Performance

An analysis of historical reactionary delay across the RUS area has been described in **Chapter 3** and from this, the following options have been identified to improve performance:

- infrastructure solutions ranging from relatively small scale schemes, such as a new crossover to reduce conflicting moves, or more complex options, such as remodelling the layout at Derby
- timetable solutions, such as amendments to sectional running times, or restructuring the timetable to improve platform working.

5.2.6 Seven Day Railway

As part of Network Rail's Seven Day Railway Programme a number of initiatives are being considered to increase access to the network for our customers. The MML was one of eight national routes originally considered and a number of projects were identified. Following further discussions with the Secretary of State for Transport, the Association of Train Operating Companies (ATOC), Passenger Focus and passenger and freight customers, a small number of key routes, which in aggregate, carry 60 percent of all weekend passengers, have been identified for special attention. Network Rail and train operators aim to offer a rail journey in almost all circumstances between key stations on these routes. The most important freight flows have also been identified. The principle for these routes is that Network Rail will maintain the ability to deliver key freight traffic flows by means of a preferred or 'fit for purpose' alternative route, other than in exceptional circumstances. It is intended that any commitments associated with these principles will take effect from the start of the December 2011 timetable.

5.3 Other RUSs

The East Midlands RUS is looking primarily at its own gaps and options, whilst other gaps and options are being dealt with in their respective RUSs. Clearly, however, all RUSs must be closely aligned. There are several areas where an integrated approach is essential and where some gaps and options which cross the RUS boundary have been considered within this RUS:

- Stansted Airport services (jointly with the Greater Anglia RUS)
- freight capacity Nuneaton – Peterborough – Ipswich (jointly with the Greater Anglia RUS)
- crowding on Long Distance High Speed (LDHS) interurban services (in conjunction with the Yorkshire & Humber RUS, the West Midlands and Chiltern RUS and the Great Western RUS)
- Werrington Jn – Lincoln - Doncaster Great Northern/Great Eastern (GN/GE) Joint Line upgrade (jointly with East Coast Main Line (ECML) and Yorkshire & Humber (Y&H) RUSs)
- the West Midlands and Chilterns RUS is considering services between Cardiff/ Birmingham and Nottingham via the Tamworth corridor. However, the East Midlands RUS comments on peak crowding into Nottingham and journey time gas between Birmingham and Nottingham. The East Midlands RUS considers capacity issues between Birmingham and Stansted Airport.

5.4 Option appraisal

The option appraisals[1] that have been carried out to address the various elements of the generic gaps are summarised below:

5.4.1 Peak crowding and growth

Peak crowding and growth into London

Chapter 3 has described the current levels of crowding into London which demonstrates that existing LDHS services into London St Pancras International are already heavily loaded (on average 95 percent seated capacity on arrival in the three-hour morning peak). RUS analysis has demonstrated that future demand will result in passenger numbers exceeding seated capacity by 24 percent, on average, by 2019.

Peak crowding on commuter services into London St Pancras International will be addressed by the introduction of 12-car rolling stock as part of the Thameslink Programme. This will also provide an increase in frequency to 16 trains per hour (tph) each way across the three-hour peaks by the middle of the decade.

However, further capacity is required on the LDHS services into London and the options to address this that have been considered are:

- lengthening to a maximum of 11 vehicles on the busiest trains
- additional nine-car service in the high peak hour to or from Bedford
- combination of lengthening three LDHS trains to a maximum of 11 vehicles plus two additional seven-car peak hour trains to or from Bedford
- introduction of new higher capacity rolling stock (eg. Intercity Express Programme (IEP)).

Each of the above is described separately in the following tables:

[1] The appraisal tables for all options quote monetary values to the nearest £million.

Assessment of Option 1.1 – Lengthening of LDHS services

Concept	Lengthening most LDHS trains into London St Pancras International to a maximum of 11-cars by the provision of an additional 13 vehicles.
Operational analysis	No additional services required. The key operational constraint relates to platform lengths on the route and particularly at London St Pancras International station (see below).
Infrastructure required	Alterations to existing depots and platform lengthening (although the latter would not be required everywhere assuming Selective Door Opening (SDO) is used where appropriate).
Passenger impact	Increased capacity and reduced crowding along the MML. However, standing may re-occur on individual trains by 2019. Lengthening beyond 11-cars would resolve this but would require a rebuild of London St Pancras International station and significant platform lengthening at other stations on the route. The significant infrastructure costs associated with this would be poor value for money.
Freight impact	No impact as strengthening current services.
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
Operating Cost	61
Revenue	-46
Other Government Impacts	9
Total costs	**24**
Benefits (Present Value)	
Rail users benefits	47
Non users benefits	31
Total quantified benefits	**78**
NPV	**54**
Quantified BCR	**3.3**

A sensitivity test has been carried out and demonstrates that a BCR greater than two is still achieved with the inclusion of a spot cost of circa £20 million for depot alterations and platform lengthening at current prices.

Link to other options	Peak crowding and growth at Leicester and Nottingham (Options 1.5 – 1.9).
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available. Analysis has shown that an additional 11 vehicles are required by the end of Control Period 4 (CP4) with the remainder in Control Period 5 (CP5). The few standing passengers that remain south of Bedford will have the option of utilising the lengthened Thameslink services operating on this corridor or taking less crowded trains either before or after their preferred train.

Assessment of Option 1.2 – Additional peak hour service from Bedford

Concept	Provision of an additional nine-car peak service between Bedford and London St Pancras International in the morning and evening high-peak hours.
Operational analysis	It is not possible to path the additional service in the current timetable. However, the development of a new timetable for the Thameslink Programme may allow the provision of this additional train.
Infrastructure required	No additional infrastructure has been assumed.
Passenger impact	Increased capacity and reduced crowding south of Bedford.
Freight impact	None identified as freight services do not operate in the peaks on this section.
Financial and economic analysis	The main costs relate to rolling stock and train crew. The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	0
Operating Cost	27
Revenue	-15
Other Government Impacts	3
Total costs	**16**
Benefits (Present Value)	
Rail users benefits	21
Non users benefits	10
Total quantified benefits	**31**
NPV	**15**
Quantified BCR	**2.0**

Link to other options	
Conclusion	This option is not recommended for implementation as it is inferior to Option 1.1. This option only benefits crowding south of Bedford whereas crowding extends as far as Wellingborough. It also assumes that all standing passengers will shift to the new peak buster train.

Assessment of Option 1.3 – Combination of train lengthening on LDHS services and additional services in the peak hour from Bedford

Concept	Lengthen three LDHS services by a total of four vehicles to a maximum of 11-cars. Plus two additional seven-car peak services from Bedford. This option was developed to more accurately reflect the crowding profile along the route.
Operational analysis	It is not possible to path the additional services in the current timetable. The main constraint is pathing services south of Harpenden which would require major changes to the existing infrastructure (see below).
Infrastructure required	The exact infrastructure solution has not been determined but as the cost is likely to be significant it is unlikely to provide a better economic case than Option 1.1 above.
Passenger impact	Increased capacity and reduced crowding along the MML.
Freight impact	None identified as freight services do not operate in the peaks on this section.
Financial and economic analysis	The main costs relate to rolling stock and train crew. The following table outlines the appraisal results:

30 year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	0
Operating Cost	76
Revenue	-52
Other Government Impacts	11
Total costs	**35**
Benefits (Present Value)	
Rail users benefits	56
Non users benefits	34
Total quantified benefits	**90**
NPV	**55**
Quantified BCR	**2.6**

Link to other options	
Conclusion	This option is not recommended for implementation as it is inferior to Option 1.1. The business case will be further worsened if any infrastructure costs are included.

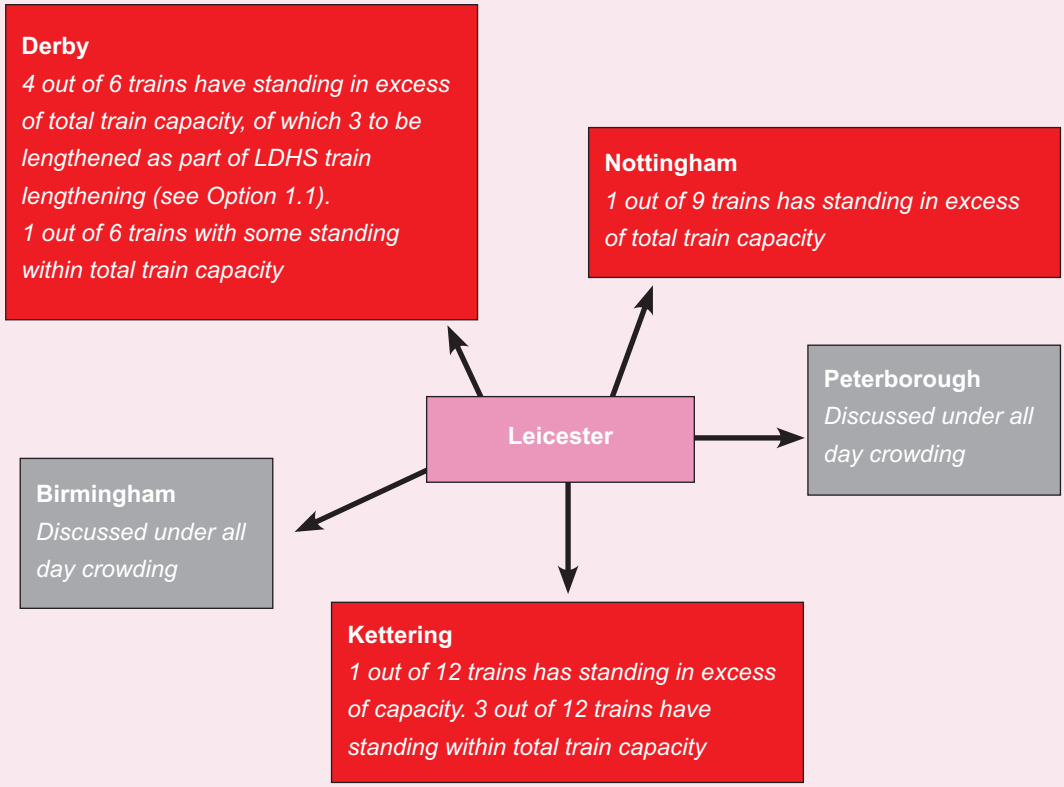
Assessment of Option 1.4 – Introduction of new higher capacity rolling stock on LDHS services	
Concept	Replacement of existing rolling stock with IEP electric or diesel trains.
Operational analysis	No additional services required.
Infrastructure required	The IEP trains are likely to be slightly longer than the existing services which will necessitate some modifications at London St Pancras International. In addition, electrification beyond Bedford would be required for electric trains. However, the full extent of the works will be determined by the IEP.
Passenger impact	Increased capacity and reduced crowding along the MML. Assuming that all trains become 10-car IEPs then the introduction of IEP Diesel would provide 16 percent seated spare capacity to accommodate further growth beyond 2019. With IEP electric stock this seated spare capacity increases to 30 percent.
Freight impact	None identified.
Link to other options	
Conclusion	This option is recommended for further development by the IEP project.

Peak crowding and growth at Leicester

Current demand for peak services at Leicester is described in **Chapter 3** and this is anticipated to increase by 34 percent over the next 10 years, as set out in **Chapter 4**. RUS analysis has shown that overall there is sufficient capacity provided at Leicester across the three-hour peak. However, there are crowding pressures on a number of individual services on all corridors as shown in figure 5.1.

Crowding on services between Birmingham and Stansted Airport is discussed in Options 2.2 – 2.4, as part of the generic gap of all day crowding growth. The detailed options for the remaining corridors are described in the following tables:

Figure 5.1 – Leicester evening peak capacity 2019/20 gap analysis



NB. Total train capacity (including standing allowance) is estimated at 1.2 times the number of standard class seats, in line with the HLOS[2] definition.

[2] High Level Output Specification

Assessment of Option 1.5 – Leicester – Derby: strengthening current services through train lengthening

Concept	Lengthen the busiest Sheffield fast train by two vehicles (not included in LDHS train lengthening Option 1.1).
Operational analysis	No additional services required.
Infrastructure required	None.
Passenger impact	This will eliminate standing for longer than 20 minutes but there may still be some standing within allowances for short periods of time on some other trains. The introduction of new rolling stock in the future will present a further opportunity to reapportion the first class and standard loadings using commercial mechanisms defined by the train operating company.
Freight impact	No impact.
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
Operating Cost	10
Revenue	-9
Other Government Impacts	2
Total costs	**3**
Benefits (Present Value)	
Rail users benefits	7
Non users benefits	2
Total quantified benefits	**9**
NPV	**6**
Quantified BCR	**2.9**

Link to other options	LDHS train lengthening Option 1.1.
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available.

Assessment of Option 1.6 – Leicester – Nottingham: strengthening current services through train lengthening

Concept	Lengthen one peak service between London St Pancras International and Nottingham from five-cars to eight-cars.
Operational analysis	No additional services required.
Infrastructure required	None.
Passenger impact	This will eliminate all standing along the route. The alternative option to reduce crowding would be to insert additional stops in the adjacent services to spread the load more evenly. However, this would have disproportionate disbenefits in terms of generalised journey time for longer distance passengers.
Freight impact	No impact.
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
Operating Cost	13
Revenue	-15
Other Government Impacts	3
Total costs	**0**
Benefits (Present Value)	
Rail users benefits	26
Non users benefits	4
Total quantified benefits	**29**
NPV	**29**
Quantified BCR	**>2.0**

Link to other options	None.
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available.

Assessment of Option 1.7 – Leicester – Kettering: strengthening current services through train lengthening

Concept	Lengthen the busiest Nottingham – London St Pancras International peak service from five-car to seven-car. Lengthen the busiest Sheffield – London St Pancras International peak service from seven-car to eight-car to address crowding between Derby and London on this service.
Operational analysis	No additional services required.
Infrastructure required	None.
Passenger impact	This will eliminate all standing over capacity, although some passengers may stand on individual trains for less than the maximum acceptable standing allowance. The alternative option to reduce crowding would be to insert additional stops in the adjacent services to spread the load more evenly. However, this would have disproportionate disbenefits in terms of generalised journey time for longer distance passengers.
Freight impact	No impact.
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
Operating Cost	13
Revenue	-11
Other Government Impacts	2
Total costs	**5**
Benefits (Present Value)	
Rail users benefits	15
Non users benefits	3
Total quantified benefits	**18**
NPV	**14**
Quantified BCR	**4.0**

Link to other options	Peak crowding and growth at Nottingham Option 1.9.
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available.

Peak crowding and growth at Nottingham

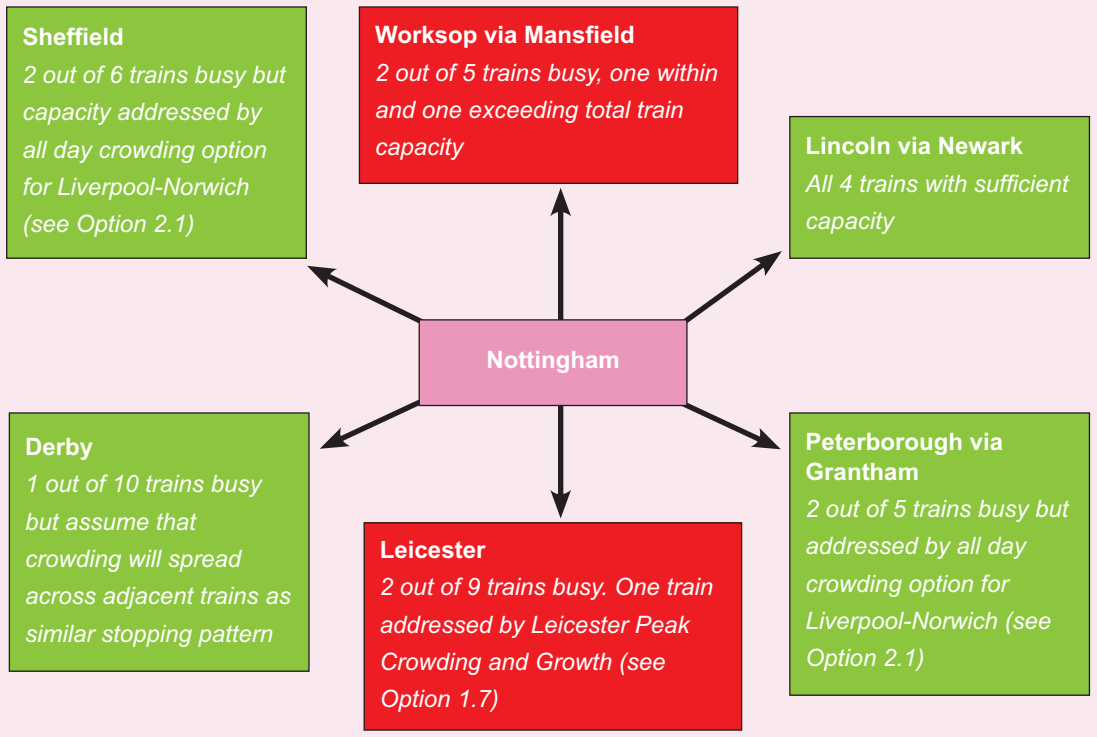
Current demand for peak services at Nottingham is described in **Chapter 3** and this is anticipated to increase by 33 percent over the next 10 years, as set out in **Chapter 4**. RUS analysis has shown that overall there is sufficient capacity provided at Nottingham across the three-hour peaks. There are some crowding pressures on four of the six corridors at Nottingham as shown in Figure 5.2 below.

The capacity gaps on the Nottingham – Sheffield and Nottingham – Peterborough corridors are addressed in Option 2.1. The remaining two corridors with anticipated crowding in 2019 are:

- Nottingham – Mansfield/Worksop
- Nottingham – Leicester.

The detailed options for these two corridors are described in Options 1.8 and 1.9.

Figure 5.2 – Nottingham evening peak capacity 2019/20 gap analysis



NB. Total train capacity (including standing allowance) is estimated at 1.2 times the number of standard class seats, in line with HLOS definition

Assessment of Option 1.8 – Nottingham – Mansfield/Worksop: strengthening current services through train lengthening

Concept	Lengthen the busiest Nottingham – Worksop peak service from two-cars to three-cars.
Operational analysis	No additional services required.
Infrastructure required	None.
Passenger impact	This will eliminate most of the standing between Nottingham and Worksop. However, some passengers may stand between Nottingham and Mansfield which is within capacity and accepted standing allowances.
Freight impact	No impact.
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
Operating Cost	2
Revenue	-1
Other Government Impacts	0
Total costs	**2**
Benefits (Present Value)	
Rail users benefits	3
Non users benefits	0
Total quantified benefits	**4**
NPV	**2**
Quantified BCR	**2.0**

Link to other options	None.
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available.

Assessment of Option 1.9 – Nottingham – Leicester: strengthening current services through train lengthening

Concept	Lengthen the busiest local service between Lincoln and Leicester from two-cars to three-cars and lengthen the busiest Nottingham – London St Pancras International service (this train has been included in the Leicester peak crowding and growth gap – see Option 1.7).
Operational analysis	No additional services required.
Infrastructure required	To operate with three-cars the Lincoln – Leicester service will either be restricted to 3 x 20m vehicles (subject to achieving necessary derogations) or will require some platform lengthening at three stations to accommodate 3 x 23m vehicles.
Passenger impact	This will eliminate all standing on this corridor. The option to increase the frequency of the Nottingham – Lincoln service, discussed in Option 4.6 for Regional Connectivity, would provide further capacity to relieve crowding east of Nottingham.
Freight impact	No impact.
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
Operating Cost	3
Revenue	-1
Other Government Impacts	0
Total costs	**2**
Benefits (Present Value)	
Rail users benefits	6
Non users benefits	0
Total quantified benefits	**6**
NPV	**4**
Quantified BCR	**3.6**

** The appraisal assumes there are no platform lengthening requirements*
NB. The table excludes costs and benefits relating to Nottingham – London St Pancras International strengthening as this is part of the appraisal for Leicester – Kettering capacity.

Link to other options	Regional Connectivity (Option 4.6) Leicester peak crowding and growth (Option 1.7).
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available.

Peak crowding and growth between Derby and Matlock

The introduction of a more frequent service on the Matlock – Derby – Nottingham corridor in December 2008 has increased passenger numbers and resulted in some overcrowding.

Analysis was carried out across the whole day but evidence of crowding was only apparent for short distances in the high peak hours, even after 2019 growth forecasts are applied. The option to reduce crowding and accommodate future growth is described in the table below:

Assessment of Option 1.10 – Matlock – Derby – Nottingham: strengthening current services through train lengthening

Concept	Lengthen high-peak hour trains in both the morning and evening peaks at Derby by one car on the existing service.	
Operational analysis	No additional services required. However, a local derogation is required at Whatstandwell and Spondon stations to operate the lengthened service.	
Infrastructure required	None required.	
Passenger impact	This will eliminate all standing on this corridor.	
Freight impact	No impact.	
Financial and economic analysis	The main costs relate to rolling stock and train crew. The following table outlines the appraisal results:	
	30-year appraisal	**£million (2002 PV)**
	Costs (Present Value)	
	Investment Cost	0
	Operating Cost	3
	Revenue	0
	Other Government Impacts	0
	Total costs	**3**
	Benefits (Present Value)	
	Rail users benefits	2
	Non users benefits	0
	Current TOCs revenue	0
	Current TOCs/NR opex	0
	Total quantified benefits	**2**
	NPV	**-1**
	Quantified BCR	**0.6**
Link to other options	Stoke – Derby – Nottingham Regional Connectivity (Option 4.10).	
Conclusion	It is not possible to recommend this option as the costs associated with operating the lengthened services far outweigh the benefits from crowding relief. This is due to the short duration over which the crowding occurs. However, it should be noted that by 2019 it is anticipated that severe crowding will occur at Derby on these services if no action is taken. Therefore, it is recommended that opportunities are examined to strengthen services in the high-peak hours from within the existing resource base and that this is introduced as soon as practicable.	

5.4.2. All day crowding and growth

Crowding pressures throughout the day have been identified on the following interurban services:

- Liverpool Lime Street – Norwich
- Birmingham New Street – Stansted Airport
- Birmingham New Street – Derby – Sheffield.

The options to address the all day crowding and growth gap are described below.

All day crowding and growth between Liverpool and Norwich

The majority of crowding that occurs on this corridor is between Liverpool and Nottingham. There is generally sufficient capacity on the existing services to address future growth between Nottingham and Norwich. Some of the crowding between Nottingham and Sheffield has been alleviated following the introduction of the new service between Nottingham and Leeds from December 2008.

Crowding on this route coincides with the peaks for commuter travel at Liverpool, Manchester, Sheffield and Nottingham. Due to the length of the journey, this crowding is spread across a number of trains resulting in all day crowding along the corridor. Most of the services currently comprise two vehicles and are expected to reach crowding levels as high as 200 percent of seated capacity by 2019 for some parts of their journey. It should be noted that there are already some sections of the journey where standing is in excess of total capacity. The option to reduce current crowding and accommodate future growth between Liverpool and Norwich is described in the table below:

Assessment of Option 2.1 – Lengthening and extension of current services between Liverpool and Norwich	
Concept	Lengthen the busiest two-car services to four-cars (five trains in the eastbound direction and seven trains in the westbound direction) and provide an hourly service throughout the day. This will require the provision of an additional 12 vehicles.
Operational analysis	This option has been reviewed against the new layout proposed for Nottingham station as part of the CP4 Delivery Plan performance improvement works planned to occur in 2012/13. There is believed to be sufficient capacity in the new layout to enable trains to be split and joined at Nottingham if required.
Infrastructure required	None.
Passenger impact	This will eliminate most standing on this corridor. Crowding will still remain on one morning service and two evening services between Liverpool and Manchester Oxford Road. This will be examined by the Northern RUS.
Freight impact	Minimal impact.
Financial and economic analysis	The main costs relate to rolling stock and train crew and form part of ongoing discussions between East Midlands Trains (EMT) and the Department for Transport. It is anticipated that this option would represent good value for money, in line with the train operator's financial appraisal.
Link to other options	Nottingham peak crowding and growth (Figure 5.2). Also Yorkshire and Humber RUS Option HV1, providing additional peak Manchester – Sheffield services via New Mills.
Conclusion	This option is recommended for implementation as soon as rolling stock becomes available, subject to the conclusion of commercial negotiations between EMT and the DfT.

All day crowding and growth between Birmingham New Street and Stansted Airport

The majority of crowding on this service occurs between Birmingham and Cambridge, with the highest levels as a result of:

- commuter demand into Birmingham between Leicester and Birmingham New Street
- commuter demand into Cambridge between Peterborough, Ely and Cambridge
- off-peak crowding between Birmingham New Street and Cambridge to meet leisure demand.

Crowding levels along the Birmingham – Stansted Airport corridor are expected to rise due to continued passenger growth. By 2019, trains arriving at and leaving Birmingham New Street, in the morning and evening three-hour peaks, are expected to have average load factors of 120 percent at Birmingham New Street, with some services reaching load factors up to 200 percent of seated capacity. Commuters at Cambridge can expect to see average load factors of 160 percent of seated capacity on peak services. Across all Birmingham New Street – Stansted Airport services the load factor will average 120 percent of seated capacity at their busiest points, and even in the off-peak load factors may reach 150 percent of seated capacity at core leisure destinations. Further capacity is therefore required in order to address these levels of crowding.

In addition, there are stakeholder aspirations to improve regional connectivity by increasing the service frequency between Birmingham New Street and Stansted Airport. Options to address crowding, growth and regional connectivity are detailed in the following tables.

In the options, load factors into Cambridge exceed 100 percent but standing will be within the maximum standing allowance, and the Greater Anglia RUS, established in February 2008, also proposed interventions on this section of route.

Assessment of Option 2.2 – Extension of current services between Birmingham and Leicester to Cambridge

Concept	The hourly Birmingham New Street – Leicester service is extended to Cambridge every second hour. This requires no additional vehicles, as vehicles can be obtained from the current fleet, but does require additional train crew.
Operational analysis	The assumed timetable cannot be validated until the scheme to remodel Peterborough included in the CP4 Delivery Plan is further developed. However, the concept of an additional hourly service to Cambridge is accepted and capacity is thought to exist.
Infrastructure required	None.
Passenger impact	The improved service frequency lowers the generalised journey time along the route. The extra capacity results in lower crowding levels in 2019, compared to those expected if no change in capacity occurred. Peak services at Birmingham New Street show a reduction in average load factor to 110 percent; peak services to Cambridge show a reduction in average load factor to 140 percent; and the Birmingham New Street – Stansted Airport services' average maximum load factor is reduced to 105 percent of seated capacity. There will still be crowding, particularly in the evening peak from Birmingham New Street, and the morning peak to Cambridge.
Freight impact	Reduction in capacity for future growth, however the additional trains have been included in the scheme currently being developed to improve capacity between Helpston Jn and Nuneaton.
Financial and economic analysis	The main costs relate to rolling stock and train crew. The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	0
Operating Cost	32
Revenue	-19
Other Government Impacts	4
Total costs	**17**
Benefits (Present Value)	
Rail users benefits	42
Non users benefits	6
Total quantified benefits	**48**
NPV	**31**
Quantified BCR	**2.8**

Link to other options	
Conclusion	This option has high value for money and requires no investment in rolling stock or capital expenditure. It does not address all the areas of crowding, although the service frequency increase delivers improved regional connectivity. This option is therefore not preferred.

Assessment of Option 2.3 – Lengthening of current services between Birmingham New Street and Stansted Airport

Concept	The busiest Birmingham New Street – Stansted Airport and Birmingham New Street – Leicester services are lengthened to either three-car or four-car units throughout the week and at weekends. This requires the provision of an additional eight vehicles.
Operational analysis	Manea, Whittlesea (Up), Stamford and Melton Mowbray platforms do not accommodate four-car trains, so some services require interventions to solve this problem.
Infrastructure required	Platform extension work to Platform 2 at Stansted Airport would be required to enable four-car units to call there. Partial fitment of SDO capability on some existing Turbostar Fleet (Class 170) to enable them to stop at Manea, Whittlesea, Stamford and Melton Mowbray.
Passenger impact	The extra capacity significantly reduces crowding: weekday peak services to Birmingham show a reduction in their average load factor from 120 percent to 90 percent; weekday peak services at Cambridge show a reduction in average load factor from 160 percent to 110 percent; and the Birmingham New Street – Stansted Airport services' average maximum load factor is reduced from 120 percent to 90 percent of seated capacity.
Freight impact	No impact.
Financial and economic analysis	The main costs relate to rolling stock. The capital expenditure required for the infrastructure work is a small fraction of the total costs. The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	1
Operating Cost	30
Revenue	-22
Other Government Impacts	4
Total costs	**13**
Benefits (Present Value)	
Rail users benefits	47
Non users benefits	8
Total quantified benefits	**55**
NPV	**42**
Quantified BCR	**4.2**

Link to other options	
Conclusion	This option is high value for money. The extra capacity provided reduces crowding throughout the week and at weekends, however it requires a significant amount of additional rolling stock and does not improve regional connectivity. This option is therefore not preferred.

Assessment of Option 2.4 – Service extensions and train lengthening

Concept	Birmingham New Street – Leicester service extensions to Cambridge as per Option 2.2 are supplemented by train lengthening from 2014 throughout the week and at weekends, to target crowding in the peaks which is not addressed by the service extensions. This requires six additional vehicles, additional train crews and infrastructure work at Stansted Airport.
Operational analysis	Manea, Whittlesea (Up), Stamford and Melton Mowbray platforms do not accommodate four-car trains, so some services require interventions to solve this problem.
Infrastructure required	Platform extension work to Platform 2 at Stansted Airport would be required to enable four-car trains to call there. Partial fitment of SDO capability on some existing Turbostar Fleet (Class 170) to enable them to stop at Manea, Whittlesea, Stamford and Melton Mowbray.
Passenger impact	The service extensions improve regional connectivity along the route and the extra capacity results in reduced crowding. In 2019, peak services at Birmingham New Street show a reduction in their average load factor to 95 percent; peak services at Cambridge show a reduction in average load factor to 140 percent; and the Birmingham New Street – Stansted Airport services' average maximum load factor is reduced to 95 percent of seated capacity.
Freight impact	Reduction in capacity for future growth, however the additional trains have been included in the scheme currently being developed to improve capacity between Helpston Jn and Nuneaton.
Financial and economic analysis	The main costs relate to rolling stock and train crew. The capital expediture required for the infrastructure work is a small fraction of the total costs. The following table outlines the appraisal results:

30-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**

Link to other options	Assessing this option incrementally from the service extensions in Option 2.2 shows there is a good value for money case to add the train lengthening to better address the capacity gap. A further iteration of a combined option, requiring nine additional vehicles and further reducing crowding was tested, but only had an incremental BCR of one, so is low value for money.
Conclusion	After implementing the service extensions, there is a high value for money case for some train lengthening. This will target areas of crowding throughout the week and at weekends better than any other option, as well as improving regional connectivity. Therefore this option, requiring six additional vehicles, is recommended as soon as rolling stock becomes available.

All day crowding and growth between Birmingham, Derby and Sheffield

Crowding currently occurs between Birmingham New Street and Sheffield (via Derby) on long distance interurban services between the West Midlands, Yorkshire and the North East. Options which would address crowding on the corridor between Sheffield and Leeds have been examined as part of the Yorkshire and Humber RUS (Option YS2).

Crowding on the interurban services between Plymouth and Edinburgh via Derby and Leeds, and between Reading and Newcastle via Derby and Doncaster has been examined during the consultation period for this RUS. Where evidence of crowding has been found, the option of lengthening existing trains has been appraised.

Where only localised crowding occurs, the case for lengthening existing trains offers low value for money as a result of high operational costs. Various alternative options have been considered to address this gap.

The optimum solution to address crowding on the long distance interurban network can only be determined by evaluating options across all of the services. Final recommendations will be detailed in the West Midlands and Chilterns RUS, taking into account the entire long distance interurban network currently operated by CrossCountry.

Assessment of Option 2.5 – Train lengthening on long distance interurban services between Plymouth and Edinburgh via Derby and Leeds

Concept	Lengthen the five busiest northbound services and four busiest southbound services between Plymouth and Edinburgh.
Operational analysis	No additional services required. The number of additional vehicles required is dependant on the resourcing plan (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) has been used to establish the range of vehicles required.
Infrastructure required	None.
Passenger impact	This will eliminate most standing between Plymouth and Edinburgh via Derby and Leeds.
Freight impact	None.
Financial and economic analysis	The main costs relate to rolling stock. A case exists for providing between six and nine additional vehicles between Plymouth and Edinburgh dependant upon the resourcing plan (diagram). The following table outlines the appraisal results:

	£million (2002 PV)	£million (2002 PV)
30-year appraisal	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**

NB. A case exists for nine additional vehicles if the operating costs are based on "one return trip". This reduces to six vehicles if the operating costs are based on a "two day diagram" instead.

Link to other options	
Conclusion	This option is recommended for further development in West Midlands and Chilterns RUS which will provide a final recommendation on the total number of vehicles required for the entire long distance interurban network operated by the CrossCountry franchise. The optimum solution may involve alterations to the routeing of services and calling patterns.

Assessment of Option 2.6 – Reduce crowding on long distance interurban services between Reading and Newcastle via Derby and Doncaster

Concept

The following options have been reviewed:

- lengthen the busiest evening northbound service and busiest morning southbound service between Reading and Newcastle
- additional trains to provide a shuttle service between York and Birmingham New Street
- lengthening of existing services between Newcastle and Birmingham New Street only. Beyond Birmingham New Street the service operates at its current length.

Operational analysis

Capacity constraints may preclude the provision of additional services.

Infrastructure required

Interventions necessary to address any capacity constraints which would preclude the operation of additional services, or attaching/detaching on route.

Passenger impact

Localised standing is anticipated in the morning and evening peaks. These options would eliminate this crowding. There is sufficient capacity on the remaining services on this corridor.

Freight impact

Reduced capacity for freight as a result of additional trains.

Financial and economic analysis

The main operational costs relate to rolling stock and train crew.

The following tables outline the appraisal results for the first of the above options:

	£million (2002 PV)	£million (2002 PV)
30-year appraisal	One return trip	Two day diagram
Costs (Present Value)		
Investment Cost	0	0
Operating Cost	12	16
Revenue	-2	-2
Other Government Impacts	0	0
Total costs	**10**	**14**
Benefits (Present Value)		
Rail users benefits	10	10
Non users benefits	1	1
Total quantified benefits	**11**	**11**
NPV	**1**	**-3**
Quantified BCR	**1.1**	**0.8**

	NB. An appraisal based on a "two-day diagram" will have a lower BCR due to the higher mileage related costs. Average load factors are expected to reach 125 percent between York and Birmingham New Street in the morning peak and 114 percent between Newcastle and Sheffield in the evening peak. These levels of crowding are only experienced on a couple of services and therefore the benefits are not sufficient to justify the additional operational costs, particularly rolling stock leasing charges. It is anticipated that the costs for providing additional shuttle services between York and Birmingham New street or partially lengthening the existing services between Newcastle and Birmingham New Street will exceed the crowding relief benefits provided from all these options.
Link to other options	
Conclusion	It is not possible to recommend any of these options as they provide a poor value for money business case. However, as part of the final strategy to be developed by the West Midlands and Chilterns RUS for all interurban services operated by CrossCountry, opportunities to reconfigure train lengths may be available. The optimum solution may involve alterations to the routeing of services and calling patterns.

5.4.3 Freight capability

Chapter 3 has described the current freight capability on routes within the East Midlands RUS area. Freight growth forecasts to 2030 have been produced as part of the SFN workstream and agreed by the industry. An interim forecast to 2019 is in development and was not available prior to the publication of this RUS. Consequently, the RUS has used the 2030 forecasts in its analysis. CP4 SFN funding includes provisions for train lengthening and gauge enhancement schemes and candidate schemes for the MML are being developed.

The constraints associated with the availability of freight paths on the MML are detailed in **Chapter 3**. Analysis has demonstrated that the current provision of generally two off-peak daytime freight paths per hour in each direction on the MML, with most northbound services having light weight trailing loads, and with current utilisation levels of 60 percent, is sufficient to accommodate the forecast growth in freight traffic that needs to operate on this section of the route. There is limited ability to serve multiple destinations from these paths. The RUS assessment of freight capacity south of Bedford also concluded that there is a potential conflict between the operation of additional Thameslink off-peak services north of Cricklewood and the need to accommodate freight trains. This conclusion will need to be tested as part of the timetable development work led by the Thameslink Programme.

However, it is not possible, with the existing infrastructure and passenger services, to operate heavier freight trains (60mph with more than 2000 tonnes trailing load) during the daytime. If options to address this can be funded then less additional freight services may be required.

Options to provide increased freight capability are described in the following tables:

Assessment of Option 3.1 – Additional infrastructure to operate heavier freight trains during the day

Concept	Provision of a loop south of Bedford, and a loop between Kettering and Leicester (not required if the trains operate via Corby).
Operational analysis	No increase in number of freight trains per day. Whilst this option has been successfully modelled against the current timetable which included assumptions about the Thameslink timetable structure, until the timetable is complete it is not possible to determine that this is the optimal infrastructure solution.
Infrastructure required	■ southbound 775m electrified loop south of Bedford ■ southbound 775m loop between Leicester and Kettering.
Passenger impact	This will provide both performance and Seven Day Railway benefits to passenger services but these have not been quantified in the appraisal.
Freight impact	Enables the daytime operation of 60mph trains with 2500 tonnes trailing loads between the Leicestershire quarries and London. It is assumed that eight trains per day will operate at this trailing load between the East Midlands and London.
Financial and economic analysis	The main costs relate to additional infrastructure south of Bedford and between Kettering and Leicester. The following table outlines the appraisal results:

60-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	19
Operating Cost	0
Revenue	0
Other Government Impacts	25
Total costs	**44**
Benefits (Present Value)	
Rail users benefits	0
Non users benefits	147
Total quantified benefits	**147**
NPV	**103**
Quantified BCR	**3.3**

A sensitivity test has been carried out assuming only four trains per day will operate at 2500 tonnes trailing loads between the East Midlands and London. The case remains high value for money.

Link to other options	None.
Conclusion	This option is recommended for further development as part of the Hope Valley train lengthening scheme included in the SFN development programme for CP4. The scheme should include consideration of any potential additional benefits to be gained from a dynamic freight loop and will need to incorporate any output from the new Thameslink timetable, once this workstream has been completed.

Timetable analysis on other key freight corridors, using the SFN freight forecasts, has identified a number of additional infrastructure interventions which will be required to provide sufficient capacity on other routes within the RUS area to accommodate growth anticipated by 2030. Options have been identified for the following corridors and are described in the tables below:

- Water Orton Jn – Stenson Jn – Chesterfield
- Helpston Jn – Syston – Wigston Jn
- Nottingham – West Holmes Jn.

Further work will be required to determine the phasing of these interventions once the 2019 forecast has been completed by the SFN workstream.

Assessment of Option 3.2 – Additional infrastructure to operate more freight trains between Water Orton Jn and Chesterfield

Concept	Identify any additional infrastructure to accommodate three freight trains per hour (Water Orton Jn – Stenson Jn) and the current level of passenger services.
Operational analysis	The additional infrastructure would allow three trains per hour to operate (hauled by a Class 66 locomotive) with the following characteristics: ■ Class 6 with 3000 tonnes trailing load and Class 4 with 1600 tonnes trailing load via Stenson Jn and Sheet Stores Jn ■ Class 6 with 2500 tonnes trailing load via Derby.
Infrastructure required	■ remodelled layout at Wichnor Jn to provide a 775m loop facility in the northbound direction. ■ remodelled layout in the Stenson Jn area to provide looping facilities up to 775m ■ four aspect signalling to reduce the signalling headways.
Passenger impact	This will provide potential performance, journey time and Seven Day Railway benefits but will not provide sufficient capacity to accommodate the anticipated growth in passenger services.
Freight impact	Provides capacity for three trains per hour in each direction between the West Midlands area, the East Midlands and South Yorkshire.
Financial and economic analysis	The main costs relate to additional infrastructure between Water Orton Jn and Stenson Jn.
Link to other options	
Conclusion	This option is not recommended as it does not accommodate anticipated growth in future passenger services on the corridor between Water Orton Jn and Chesterfield.

Assessment of Option 3.3 – Additional infrastructure to operate more freight and passenger trains between Water Orton and Chesterfield	
Concept	Identify any additional infrastructure to accommodate three freight trains per hour (Water Orton Jn – Stenson Jn) and an additional long distance interurban service between the South West/West Midlands and the north east of England (identified in the Yorkshire & Humber RUS as a likely medium term intervention).
Operational analysis	The additional infrastructure would allow eight trains per hour in each diraction to operate in a new timetable with the following characteristics (applying in both directions except where shown: Freight trains: ■ Class 4 with 1600 tonnes trailing load Chesterfield – Water Orton Jn via Erewash Valley and Sheet Stores Jn ■ Class 6 with 3000 tonnes trailing load Sheet Stores Jn – Stenson Jn – Water Orton Jn (southbound) ■ Class 6 with 2000 tonnes trailing Water Orton Jn – Stenson Jn – Sheet Stores Jn (northbound) ■ Class 6 with 2600 tonnes trailing load Chesterfield to Water Orton via Derby. Passenger trains: ■ Three 125mph long distance interurban services between the South West/West Midlands and the north east of England ■ Two Class 170 interurban services between Birmingham and Nottingham. Analysis has identified that the critical route section is between Kingsbury Jn and Burton Leicester Jn where the slower trains are caught up by the faster trains. Unfortunately the recess facility identified in Option 3.2 does not resolve this as it provides insufficient usable service gaps. Elimination of the three minute penalty currently incurred by all freight trains using the slow lines at Clay Mills Jn is also required to operate all services. Finally, analysis indicated that, whilst all services could be operated with the infrastructure interventions above, the increase of two trains per hour utilising the south junction at Derby represented a performance risk.
Infrastructure required	■ four tracks between Wichnor Jn and the Burton-on-Trent area ■ enhanced layout between Burton-on-Trent and Clay Mills Jn ■ remodelled layout in the Stenson Jn area ■ four aspect signalling to reduce the signalling headways.
Passenger impact	This will provide increased capacity and connectivity, and potential journey time, performance and Seven Day Railway benefits.
Freight impact	Provides capacity for three trains per hour in each direction between the West Midlands area, the East Midlands and Yorkshire.

Financial and economic analysis	The main costs relate to additional infrastructure between Water Orton Jn and Stenson Jn.
Link to other options	Improved journey time between Nottingham and Derby to Birmingham under Option 4.3.
Conclusion	This option is recommended for further development to accommodate anticipated future freight and passenger growth. The optimum solution may involve the complete remodelling of the Burton-on-Trent station area to enable journey times to be improved. The phasing of the interventions are dependent upon the output from the 2019 freight forecast, being developed by the SFN programme, and the timing of the introduction of a third south west/north east long distance interurban service.

Assessment of Option 3.4 – Additional infrastructure to operate more freight and passenger trains between Helpston Jn – Syston Jn – Wigston Jn (on the Ipswich – Nuneaton corridor)

Concept	The Ipswich to Nuneaton Capacity Improvement scheme has already identified the following infrastructure interventions between Helpston Jn and Nuneaton to provide additional capacity for a minimum of 24 intermodal freight trains per day (in each direction) originating at the Haven Ports, along with the anticipated growth in passenger services between Birmingham New Street and Stansted Airport to two per hour in each direction: ■ four tracks between Syston Jn and Leicester Station ■ three tracks between Leicester station and Wigston Jn ■ improved junction at Syston Jn and relocate Syston station. RUS analysis has identified that further additional infrastructure is required to accommodate the forecast growth in freight trains by 2030 alongside the anticipated additional passenger services.
Operational analysis	The existing infrastructure can accommodate two freight trains per hour between Helpston Jn – Syston Jn – Wigston Jn with a 25/35 minute passenger service interval between Leicester and Peterborough. Beyond two freight trains per hour, four tracking between Syston Jn and Wigston Jn, along with reduced signalling headways, are required to provide the additional capacity for freight and passenger services with the following characteristics: ■ two Class 4 with 1600 tonnes trailing and one Class 6 with 2500 tonnes trailing between Helpston Jn and Syston Jn ■ two Class 4 with 1600 tonnes trailing and one Class 6 with 2000 tonnes trailing between Syston Jn and Wigston Jn ■ two passenger services per hour between Birmingham New Street and Stansted Airport (with 25/35 minute service intervals east of Leicester) ■ other passenger services through Leicester as now. Both the Ipswich to Nuneaton Capacity Improvement scheme and the RUS analysis concurs that grade separation at Wigston Jn is not required to accommodate future freight and passenger growth forecasts.

Infrastructure required	■ four track between Syston Jn, Leicester Station and Wigston Jn ■ double the junction at Syston Jn and relocate the station ■ shortening the longest block section between Helpston Jn and Ketton to reduce signalling headways.
Passenger impact	This will provide potential performance, journey time and Seven Day Railway benefits and will provide sufficient capacity to accommodate the anticipated growth in passenger services to two trains per hour.
Freight impact	This will provide potential performance, journey time and Seven Day Railway benefits and will provide sufficient capacity to accommodate growth in freight services to three trains per hour.
Financial and economic analysis	The main costs relate to additional infrastructure between Helpston Jn, Syston Jn and Wigston Jn.
Link to other options	Regional connectivity and relief of crowding under Options 2.2 – 2.4. Improved journey time between Birmingham New Street and Stansted Airport under Option 4.2.
Conclusion	It is recommended that this option is incorporated into an integrated scheme for the Leicester area, to include Leicester resignalling, to be developed for implementation in early CP5.

Nottingham to West Holmes Jn

Analysis has demonstrated that the existing infrastructure provides capacity for one Class 6 freight train with 3000 tonnes trailing load per hour and is broadly sufficient to accommodate the growth in quantum of trains anticipated in the 2030 SFN freight forecast for this corridor. However, it is only possible to path two trains per hour in each direction (one freight and one passenger) over the flat crossing at Newark and the remodelled layout planned for Nottingham will only accommodate one freight path per hour. Therefore, once the quantum of freight trains requires more than one freight path to operate per hour, the additional services would have to run during the night (subject to engineering access) or a flyover would be required at Newark (see Option 5.3 – provision of a flyover to improve performance at Newark) along with an additional through line at Nottingham station (the scheme in development to remodel Nottingham station in CP4 includes passive provision for this facility on the south side of the station, along with the potential for a new platform). The phasing of these interventions is dependent upon the output from the 2019 SFN freight forecast.

Lincoln area

The flexibility of a flyover at Newark provides benefits far greater than simply the accommodation of a higher quantum of services as it would also improve the timing of freight services through the Lincoln area. Analysis has identified that the interaction between terminating passenger services and freight trains passing through the station area (on both the Immingham – Nottingham corridor and GN/GE Joint Line between Doncaster and Peterborough via Spalding) limits the capacity for additional services. The ECML RUS assumed a standard pattern of passenger and freight services on the Joint Line, including the Peterborough services running through Lincoln rather than terminating there. The GN/GE Joint Line scheme, which is being developed for implementation in CP4, will need to consider whether or not the introduction of more through services to reduce the number of services terminating at Lincoln, would be required to accommodate the 2030 SFN freight growth forecast with the revised infrastructure proposed by the scheme.

Further initiatives to enhance freight capability in the East Midlands are being considered as part of the SFN programme which is described in **Chapter 4**. This includes gauge enhancement to W10 (or possibly W12) between Water Orton and Doncaster (via Castle Donnington, the Erewash Valley and Beighton). This will enable this corridor to be used by freight services carrying deep sea containers on standard deck height wagons, and swapbodies.

5.4.4 Regional connectivity

Existing levels of demand between the urban centres within the RUS area have been explored in **Chapter 3**. This analysis has demonstrated that only about 25 percent of all journeys are within the RUS area (excluding London St Pancras International/Blackfriars. Of the key flows to destinations outside the RUS area, 56 percent are to London and the South East, West Midlands and the Yorkshire and Humber region. The remaining 19 percent are to the North West, the East of England and other destinations away from the RUS area.

Journey time

Options to improve the journey times between the following urban centres have been appraised and are shown in the following tables:

- London and Leicester, Derby, Nottingham and Sheffield
- Birmingham and Stansted Airport
- Nottingham, Derby and Birmingham
- East Midlands and the North West
- Nottingham and Leeds
- Nottingham and Lincoln.

Given the size of the existing rail passenger market in the above list, it is believed that an improvement in the journey time will promote even greater rail travel between the centres shown, as rail would become more competitive with road.

Assessment of Option 4.1 – Improved journey time between London and Leicester, Derby, Nottingham and Sheffield

Concept	Enhancement of the capability of the infrastructure to enable a minimum eight minute improvement in journey times on the Midland Main Line for passenger services between London St Pancras International and Sheffield calling only at Leicester, Derby and Chesterfield. This enhancement would also reduce the journey times of other services on the route.
Operational analysis	Development of the scope of the scheme is currently progressing through industry processes to determine how the outputs will be delivered. The work includes an assessment of the actual Sectional Running Times (SRTs) for the Class 222 Meridians and HSTs operated on the route to determine whether or not these are accurately reflected in the timetable. Where the timetable structure restricts the opportunity to reduce the journey time any SRT reductions will result in performance benefits.
Infrastructure required	Infrastructure works at a number of sites along the route to improve the capability of the infrastructure.
Passenger impact	Reduced journey time and/or improved performance.
Freight impact	No impact currently identified.
Financial and economic analysis	As defined in the 2007 Strategic Business Plan.
Link to other options	None currently identified.
Conclusion	This option is included in the CP4 Delivery Plan.

Assessment of Option 4.2 – Improved journey time between Birmingham New Street and Stansted Airport

Concept	Provision of enhanced infrastructure between Helpston Jn and Nuneaton (on the Ipswich to Nuneaton corridor).
Operational analysis	The Ipswich to Nuneaton Capacity Improvement scheme is examining the provision of additional infrastructure between Helpston Jn and Nuneaton. The preferred option, includes: ■ four tracks between Syston Jn and Leicester Station ■ three tracks between Leicester station and Wigston Jn ■ improved junction at Syston Jn and relocate Syston station. The objective of this scheme is to provide additional capacity for intermodal freight originating at the Haven Ports and the Birmingham New Street – Stansted Airport passenger services on this corridor. It is anticipated that the additional infrastructure will also allow journey times to be improved between Birmingham New Street and Stansted Airport. Further analysis is recommended to incorporate all stakeholder aspirations in the Syston Jn – Wigston Jn area, many of which emerged as the initial Ipswich – Nuneaton study neared completion. This will enable an option delivering maximum value to be developed for implementation in future control periods.

Infrastructure required	As detailed above and included in the Ipswich to Nuneaton Capacity Improvement scheme currently in development and any further value for money linespeed improvements.
Passenger impact	Improved capacity, performance and journey time.
Freight impact	Improved capacity, performance and potentially journey time.
Financial and economic analysis	The following table outlines the appraisal results which been 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 – Stansted Airport corridor: ■ Birmingham New Street – Nuneaton ■ Nuneaton – Leicester ■ Leicester – Melton Mowbray.

60-year appraisal	BHM NUN £million (2002 PV)	NUN LEI £million (2002 PV)	LEI MMO £million (2002 PV)
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**

NB. Total maximum infrastructure spend of £15m in current prices (spot costs), assuming a one minute journey time saving for each of the three sections (three minutes in total for the Birmingham – Stansted Airport corridor).

Link to other options	All day crowding and growth between Birmingham and Stansted Airport (Options 2.2 – 2.4). Additional infrastructure to operate more freight on the Ipswich to Nuneaton corridor (Option 3.4).
Conclusion	It is recommended that linespeed improvements are incorporated into an integrated scheme for the Leicester area, to include Leicester resignalling, for implementation in early CP5.

The following options have been evaluated to reduce journey times between Nottingham and Birmingham New Street via Derby:

- linespeed improvements between Nottingham and Birmingham New Street
- alternative routeing of the Nottingham – Cardiff service, avoiding Derby
- faster rolling stock on the Nottingham – Cardiff and Nottingham – Birmingham New Street services.

Assessment of Option 4.3(a) – Improved journey time between Nottingham and Birmingham New Street via Derby: linespeed improvements along the corridor

Concept	Remodelling of Burton-on-Trent and Derby and linespeed improvements between Spondon and Attenborough to reduce journey times on the Birmingham New Street – Nottingham corridor. It is noted that the recent doubling of the junction at Trent East Jn and the planned CP4 schemes to enhance Nottingham Station area should provide the opportunity to reduce some journey times by removing pathing time.
Operational analysis	**Burton-on-Trent** For LDHS interurban services not stopping at Burton-on-Trent a journey time reduction of two minutes may be achieved between Clay Mills Jn and Wichnor Jn. This will enable the rolling stock to run at maximum speed through this section. However, as all the services between Nottingham and Birmingham call at Burton-on-Trent there will be no benefit to these services. **Derby** Linespeed improvements in conjunction with remodelling to enable rolling stock to arrive or depart at higher speed will result in possible journey time reductions on the following route sections: ■ Derby – Duffield: an average of 45 seconds for all services in both directions ■ Derby – Peartree: an average of one minute for all services in both directions ■ Derby – Spondon: one minute in one direction only (to Derby) for all services. ■ remodelling could also reduce conflicts so pathing time would be reduced leading to further journey time reductions. **Spondon – Attenborough** For most of the services operating on this section linespeed improvements to enable rolling stock to operate at maximum speed will result in a 1.5 minute journey time reduction.

Infrastructure requred	To be defined as part of a scheme to upgrade the Birmingham New Street to Nottingham corridor in CP5. This may include: ■ improved junction speeds along the corridor ■ remodel Burton-on-Trent to relocate the platforms to enable linespeed increases on the main lines ■ remodelling of Derby station area to improve approach speeds and reduce the level of conflict between services. The ideal opportunity to change the layout is in conjunction with signalling renewals currently planned for CP6 or beyond ■ possible improved looping facilities. The speed improvement opportunities between Spondon and Attenborough relate to the junction areas and curves between Trent East Jn and Sheet Stores Jn, for which there is probably not a practical upgrade solution.
Passenger impact	Improved journey time for the following services: ■ Birmingham New Street – Nottingham ■ LDHS interurban ■ Matlock – Nottingham ■ LDHS on Midland Main Line. It is likely that these infrastructure solutions will also improve performance along the route.
Freight impact	Performance and potential journey time improvement.
Financial and economic analysis	These appraisals have been produced to identify the level of infrastructure spend that can be justified for the amount of journey time improvement indicated by the above operational analysis, to generate a BCR of 2.0. The journey time benefits vary across the different services along the route sections. Therefore, a weighted average of the number of passengers on the different services has been calculated and used to determine the total benefits for each section. The main costs relate to infrastructure changes to improve linespeed or to remodel Burton-on-Trent and Derby station areas. The following table outlines the appraisal results for Burton-on-Trent:

60-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	33
Operating Cost	0
Revenue	-20
Other Government Impacts	4
Total costs	**17**
Benefits (Present Value)	
Rail users benefits	28
Non users benefits	6
Total quantified benefits	**34**
NPV	**17**
Quantified BCR	**2.0**

This appraisal relates to LDHS interurban services. A sensitivity test was carried out to establish the benefits of removing the Burton-on-Trent stop from the Nottingham – Cardiff Central service. It was assumed that this would reduce the journey time between Birmingham New Street – Nottingham by two minutes. However, this is outweighed by the socioeconomic disbenefit to passengers travelling to or from Burton-on-Trent and results in a poor value for money business case. A further option was tested to remove Tamworth stops instead of Burton-On-Trent with similar results.

The following table outlines the appraisal results for Derby:

60-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	52
Operating Cost	0
Revenue	-29
Other Government Impacts	6
Total costs	**29**
Benefits (Present Value)	
Rail users benefits	49
Non users benefits	9
Total quantified benefits	**58**
NPV	**29**
Quantified BCR	**2.0**

The following table outlines the appraisal results for Spondon – Attenborough:

60-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	15
Operating Cost	0
Revenue	-9
Other Government Impacts	2
Total costs	**9**
Benefits (Present Value)	
Rail users benefits	15
Non users benefits	3
Total quantified benefits	**17**
NPV	**9**
Quantified BCR	**2.0**

Link to other options	Remodelled layout to improve performance at Derby under Option 5.4.
Conclusion	It is recommended that the infrastructure works are further developed as part of a scheme to upgrade this corridor in CP5. The journey time benefits presented in this option for Derby have been combined with the performance benefits from the remodelled layout in Option 5.4 to present an overall case for remodelling the station area.

Assessment of Option 4.3(b) – Improved journey time between Nottingham and Derby to Birmingham: alternative routeing of the Nottingham – Cardiff Central service

Concept	Route the Nottingham – Cardiff Central service via Sheet Stores Jn and Stenson Jn to avoid reversal at Derby and reduce the overall journey time of the service. This could save up to 17 minutes in the eastbound direction and 13 minutes in the westbound direction.
Operational analysis	To maintain existing service levels between Burton-on-Trent and Derby an additional stop has been inserted in the Newcastle – Bristol interurban service which adds three minutes to the journey time in both directions.The reduction in journey time on the Nottingham – Cardiff Central service also enables the operation of this service to be optimised thereby saving a unit and associated train crew costs. In addition, avoiding Derby would reduce the number of services in the station area and potentially improve performance. However, this benefit has not been quantified.
Infrastructure requred	Upgrade of the infrastructure between Sheet Stores Jn and Stenson Jn to allow the rolling stock to operate at maximum speed.
Passenger impact	The reduced journey time primarily benefits passengers starting or ending their journeys at Nottingham or Birmingham New Street. However, the reduced level of service to Derby results in a significant disbenefit to passengers starting or ending their journeys there.
Freight impact	Reduced capacity for future growth on the section between Sheet Stores Jn and Stenson Jn and this would require further evaluation if this option is recommended for implementation.
Financial and economic analysis	The main savings associated with this option are related to rolling stock and train miles operated. The following table outlines the appraisal results over a 60 year period:

60-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	6
Operating Cost	-14
Revenue	6
Other Government Impacts	-1
Total costs	**-4**
Benefits (Present Value)	
Rail users benefits	-2
Non users benefits	-1
Total quantified benefits	**-3**
NPV	**1**
Quantified BCR	**N/A**

Note: All figures are presented in 2002 market prices.

The decision criteria is based on the appraisal having a NPV greater than zero and a financially positive business case as the appraisal has net dis-benefits vs. cost savings.

This suggests that the maximum infrastructure spend available is £3.5m over a 60-year appraisal period.

Link to other options	
Conclusion	This option is not recommended for implementation as the infrastructure costs are likely to exceed £3.5m.

Assessment of Option 4.3(c) – Improved journey time between Nottingham and Derby to Birmingham: introduction of faster rolling stock

Concept	Replace the current rolling stock on the Nottingham – Cardiff Central and the Nottingham – Birmingham New Street services with 125mph rolling stock.
Operational analysis	The improved acceleration and higher maximum speed provided by the faster rolling stock will result in a reduction in the overall journey time. In addition, the rolling stock would provide additional capacity which would relieve crowding into Birmingham New Street. The availability of suitable train paths and alternative rolling stock would require further assessment, if this option is taken forward.
Infrastructure requred	None.
Passenger impact	Reduced journey time and crowding for passengers.
Freight impact	Potential improved journey time for freight services as timetable may improve if interurban stopping services are faster.
Financial and economic analysis	The main costs associated with this option are related to the additional costs of operating and leasing the 125mph alternative rolling stock. The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	0
Operating Cost	62
Revenue	-11
Other Government Impacts	2
Total costs	**53**
Benefits (Present Value)	
Rail users benefits	28
Non users benefits	3
Total quantified benefits	**31**
NPV	**-23**
Quantified BCR	**0.6**

Note: All figures are presented in 2002 market prices.

Link to other options	
Conclusion	This option is recommended for further development by the West Midlands and Chilterns RUS to incorporate the additional benefits of improved journey times on services that cross Birmingham and reduced crowding during the peaks at Birmingham New Street. This should include assessment of the costs and benefits associated with the provision of faster rolling stock which does not provide full 125mph capability.

Assessment of Option 4.4 – Improved connectivity between the East Midlands and the North West	
Concept	Improved connectivity between the East Midlands and the North West by: Option a) Removing the Sheffield stop on the Liverpool Lime Street to Norwich service and the extension of the London to Sheffield semi-fast service to Manchester as the extra train path identified in the Yorkshire and Humber RUS (Option HV3). However, this undermines the purpose of the option to provide additional capacity between Sheffield and Manchester. Option b) Provision of a direct hourly service between London and Manchester via Leicester by extending the Sheffield semi-fast service beyond Sheffield to Manchester. Option c) Provision of a direct hourly service between Leicester and Manchester by extending the Manchester – Sheffield service identified in the Yorkshire and Humber RUS (Option HV3) to Leicester.
Operational analysis	Option a) requires 10 vehicles (four of which have already been identified as part of the Yorkshire and Humber RUS option). It has been assumed that removal of the Sheffield stop will reduce the journey time on the Liverpool Lime Street – Norwich service by 16 minutes in both directions. Option b) requires 10 vehicles to extend the service. Option c) requires eight vehicles (four of which have already been identified as part of the Yorkshire and Humber RUS option).
Infrastructure requred	The analysis assumed that no additional infrastructure is required beyond Dore curve doubling and the loops in the Hope/Grindleford area identified in the Yorkshire and Humber RUS (Option HV3).
Passenger impact	Improved connectivity between London, the East Midlands, South Yorkshire and the North West and reduced generalised journey time for passengers travelling between these conurbations. Option a) also improves the journey time between Liverpool and Norwich.
Freight impact	Level of impact depends on the option. Capacity in the Hope Valley is a key constraining factor.

Financial and economic analysis

The main costs relate to rolling stock and train crew. The appraisals cover incremental costs and benefits over those in Option HV3 in the Yorkshire and Humber RUS.

The following table outlines the appraisal results for Option a):

60-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	0
Operating Cost	29
Revenue	-4
Other Government Impacts	1
Total costs	**26**
Benefits (Present Value)	
Rail users benefits	11
Non users benefits	1
Total quantified benefits	**12**
NPV	**-14**
Quantified BCR	**0.5**

The following table outlines the appraisal results for Option b):

60-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	0
Operating Cost	89
Revenue	-13
Other Government Impacts	3
Total costs	**79**
Benefits (Present Value)	
Rail users benefits	29
Non users benefits	6
Total quantified benefits	**35**
NPV	**-44**
Quantified BCR	**0.4**

	The following table outlines the appraisal results for Option c)	
	60-year appraisal	**£million (2002 PV)**
	Costs (Present Value)	
	Investment Cost	0
	Operating Cost	51
	Revenue	-11
	Other Government Impacts	3
	Total costs	**43**
	Benefits (Present Value)	
	Rail users benefits	24
	Non users benefits	4
	Total quantified benefits	**28**
	NPV	**-15**
	Quantified BCR	**0.6**
Link to other options	Yorkshire and Humber RUS Option HV3. Increased frequency of service between London and Sheffield (Option 4.7).	
Conclusion	These options are not recommended. The services do not deliver sufficient reduction in generalised journey time to cover the high level of operational costs required to support these options.	

Assessment of Option 4.5 – Improved journey time between Nottingham and Leeds

Concept	Linespeed improvements between Nottingham and Leeds to reduce the journey times on this corridor.
Operational analysis	The corridor has been divided for appraisal into the following route sections: ■ Nottingham – Langley Mill ■ Langley Mill – Alfreton ■ Alfreton – Chesterfield ■ Meadowhall – Chapeltown ■ Darton – Wakefield Kirkgate.
Infrastructure required	Further development work is required to identify the specific infrastructure changes necessary to deliver any linespeed improvements on the corridor.
Passenger impact	Improved journey time for all passengers travelling on any relevant part of the Nottingham – Leeds via Barnsley corridor.
Freight impact	Dependent on the specific infrastructure changes.

Financial and economic analysis	The appraisal has identified the capital expenditure justifiable to achieve a journey time reduction of one minute, for each route section, to generate a BCR of 2:

60-year appraisal	**£million (2008 PV)***
Nottingham – Langley Mill	2.8
Langley Mill – Alfreton	2.7
Alfreton – Chesterfield	2.9
Meadowhall – Chapeltown	3.1
Darton – Wakefield Kirkgate	1.8

** Spot cost in 2008 prices to one decimal place (ie. without DfT appraisal optimism bias)*

The case would be further improved if the overall journey time between Nottingham and Leeds could be reduced by 30 minutes in both directions combined, including reduction in current pathing time thereby providing the opportunity to save a unit. One means of achieving this would be to route the service via Wakefield Westgate and Moorthorpe, but this would reduce the number of services operating between Sheffield and Barnsley.

Link to other options	The section between Normanton and Leeds has been examined in the Yorkshire and Humber RUS (Option BP6).
Conclusion	This option is recommended for further development to identify the infrastructure changes necessary to deliver any journey time reductions.

Assessment of Option 4.6 – Improved journey time between Nottingham and Lincoln

Concept	Reduce the journey time between Nottingham and Lincoln by: ■ Option a) linespeed improvements along the route ■ Option b) the provision of faster rolling stock with increased acceleration (Class 185s or 222s) ■ Option c) improving the journey time between Nottingham and Lincoln through the provision of a fast hourly service and an additional slow hourly service between Nottingham and Newark Castle ■ Option d) increasing the frequency of trains by providing an additional fast hourly service between Nottingham and Lincoln.
Operational analysis	For Option a) no specific linespeed improvements have been identified, but the appraisal examines how much infrastructure cost could be supported for a one minute journey time improvement to generate a BCR of 2.0. The provision of faster rolling stock in Option b) saves on average 2.25 minutes in each direction along the route. Option c) assumes that the stopping service can be pathed. Option d) cannot be pathed, see infrastructure required below.

<table>
<tr><td>Infrastructure required</td><td>Further development work is required to identify the specific infrastructure changes necessary to deliver the linespeed improvements in Option a). Initial development work on the ECML May 2011 timetable indicates that the additional service in Option d) cannot be pathed without the provision of a flyover at Newark. This is appraised in Option 5.3.</td></tr>
<tr><td>Passenger impact</td><td>Reduced journey time for passengers along this corridor.</td></tr>
<tr><td>Freight impact</td><td>Level of impact depends on the option.</td></tr>
<tr><td>Financial and economic analysis</td><td>The main costs associated with these options are either infrastructure (Option a and d), rolling stock (Options b – d) or train crew (Options c and d). The appraisals for Options a) and b) have identified the maximum expenditure justifiable to achieve a journey time reduction, as shown below:
<table>
<tr><th>Option</th><th>Journey Time Savings</th><th>£million (2002 PV)*</th></tr>
<tr><td>Option a) Linespeed Improvements</td><td>1 minute</td><td>0.6</td></tr>
<tr><td>Option b) Faster Rolling Stock</td><td>2.25 minutes</td><td>1.3</td></tr>
</table>
* Spot cost in 2002 prices to one decimal place (i.e. without DfT appraisal optimism bias) over a 30-year appraisal period

The following table outlines the appraisal result for Option c):
<table>
<tr><td>60-year appraisal</td><td></td></tr>
<tr><td>Costs (Present Value)</td><td></td></tr>
<tr><td>Investment Cost</td><td>0</td></tr>
<tr><td>Operating Cost</td><td>20</td></tr>
<tr><td>Revenue</td><td>-4</td></tr>
<tr><td>Other Government Impacts</td><td>1</td></tr>
<tr><td>Total costs</td><td>17</td></tr>
<tr><td>Benefits (Present Value)</td><td></td></tr>
<tr><td>Rail users benefits</td><td>11</td></tr>
<tr><td>Non users benefits</td><td>1</td></tr>
<tr><td>Total quantified benefits</td><td>13</td></tr>
<tr><td>NPV</td><td>-4</td></tr>
<tr><td>Quantified BCR</td><td>0.8</td></tr>
</table>
</td></tr>
</table>

	The following table outlines the appraisal result for Option d) but excludes the flyover at Newark which is appraised under Option 5.3:	
	60-year appraisal	
	Costs (Present Value)	
	Investment Cost	0
	Operating Cost	42
	Revenue	-16
	Other Government Impacts	4
	Total costs	**30**
	Benefits (Present Value)	
	Rail users benefits	54
	Non users benefits	9
	Total quantified benefits	**63**
	NPV	**34**
	Quantified BCR	**2.1**
Link to other options	Option d) appraised under Provision of a flyover at Newark to improve performance, Option 5.3.	
Conclusion	Options a) to c) are not recommended as they provide poor value for money. However, whilst Option d) demonstrates a good business case it is not feasible without the provision of a flyover at Newark which is appraised in Option 5.3.	

Frequency of services

Another method of improving regional connectivity is to increase the frequency of train services. Options to improve the frequency of services between the following locations have been appraised and are shown in the following tables:

- London and Sheffield
- Luton (M25 catchment area), Bedford, North Northamptonshire (MKSM area) and the north
- Peterborough and Lincoln
- doubling the frequency of service between Derby and West Yorkshire, which has been examined in the Yorkshire and Humber RUS to improve connectivity on this corridor (Option YS2)
- Stoke-on-Trent and Nottingham
- Birmingham and Stansted Airport (earlier/ later services).

In each of the above cases the current service is deemed inadequate by stakeholders. It is believed that improving the frequency of service will stimulate additional rail demand as rail becomes more competitive with road travel. In addition, the extension of the existing Birmingham New Street to Leicester services, to Cambridge has been appraised under Options 2.2 and 2.4.

Assessment of Option 4.7 – More frequent trains between London and Sheffield	
Concept	Improve the connection between London and Sheffield by extending the former Derby semi fast service to Sheffield.
Operational analysis	East Midland Trains (EMT) extended the former London – Derby semi-fast services to Sheffield from the start of the December 2009.
Infrastructure required	None identified.
Passenger impact	Doubling of off-peak frequency between London and Sheffield.
Freight impact	Assessed through the December 2009 timetable development process.
Financial and economic analysis	The main costs relate to rolling stock and train crew. This option represents good value for money, in line with the train operator's financial appraisal. The service extension is being funded, in the short term, by South Yorkshire Passenger Transport Executive.
Link to other options	Improved journey time between East Midlands and the North West (Option 4.4). More frequent trains between North Northamptonshire and the north (Option 4.8).
Conclusion	The RUS notes this option was implemented in the December 2009 timetable.

Assessment of Option 4.8 – More frequent trains between Luton, Bedford, North Northamptonshire and the north

Concept	Improve the connection between Luton, Bedford, North Northamptonshire and the north by: ■ Option a) providing an additional semi-fast hourly service between Bedford and Derby or Nottingham ■ Option b) inserting an additional stop in the Sheffield semi-fast service at one of Luton, Luton Airport Parkway, Bedford, Kettering or Wellingborough ■ Option c) Insert an additional stop at Kettering in the Sheffield semi-fast service (the optimum solution in Option b) and replace the Long Eaton stop with either Luton or Luton Airport Parkway.
Operational analysis	Option a) requires eight additional vehicles. It has been assumed that a path exists for the additional trains which would be confirmed if a strong case exists for the service. Option b) increases the journey time by three minutes for each additional stop except at Bedford in the Up direction. The call at Bedford increases the journey time by seven minutes instead. Option c) increases the journey time by a total of three minutes to reflect the additional stop at either Luton or Luton Airport Parkway and removal of the stop at Long Eaton. Analysis has demonstrated that it is not possible to path a service with this stopping pattern in the current timetable.
Infrastructure required	None required.
Passenger impact	Option a) improves connectivity between North Northamptonshire, the north and London. Option b) also improves connectivity between Luton (M25 catchment area), the north and London. Option c) provides the same benefits as Options a) and b) but disbenefits passengers travelling to or from Long Eaton.
Freight impact	The interaction with existing freight paths would need to be examined if Option a) is recommended. There is no impact on freight as a result of Options b) or c).
Financial and economic analysis	The following table outlines the appraisal result for Option c):

30-year appraisal	
Costs (Present Value)	
Investment Cost	0
Operating Cost	58
Revenue	-13
Other Government Impacts	3
Total costs	**49**
Benefits (Present Value)	
Rail users benefits	26
Non users benefits	4
Total quantified benefits	**29**
NPV	**-20**
Quantified BCR	**0.6**

A sensitivity test has been carried out to determine the level of growth in passenger numbers required to justify the operational costs associated with this option. The RUS forecasts passenger growth at 2.5 percent per annum for this corridor, as detailed in **Chapter 4**. Growth levels of 18 percent per annum are necessary to recommend this option.

The following table outlines the appraisal results for Options b) and c). MOIRA has been used to evaluate the change in annual passenger journeys.

	Change in Annual Passenger Journeys (000s)				**NPV (10 yrs)***
Option Description	**Increase (south)**	**Increase (North)**	**Decrease**	**Net Change**	**£m**
Additional Kettering stop	14	19	-8	25	**3.2**
Additional Wellingborough stop	10	11	-8	13	**0.9**
Additional Bedford stop	17	10	-12	15	**0.9**
Additional Luton stop	12	15	-8	19	**3.0**
Additional Luton Airport Parkway stop	40	9	-11	38	**3.5**
Replace Long Eaton stop in the inter-peak with Luton plus additional stop at Kettering	17	30	-22	25	**1.9**
Replace Long Eaton stop in the inter-peak with Luton Airport Parkway plus additional stop at Kettering	27	27	-22	32	**1.5**

**2002 Present Value, based on December 2008 timetable*

This demonstrates that an additional stop at Kettering provides the best value for money and addresses the gap. A higher NPV is generated by inserting an additional stop at Luton Airport Parkway, however this is as a result of the large proportion of passengers travelling south into London and this option therefore does not address the gap. Furthermore, the appraisal has not included the potential disbenefits associated with additional crowding into London which would occur if the stop was inserted at Luton Airport Parkway. Nor has it considered the potential modal shift benefits associated with this option, as these issues are outside the scope of the RUS but may be worth further evaluation as part of any future multi-modal studies.

Link to other options

More frequent trains between London and Sheffield in Option 4.7.

Improved journey times between London and Sheffield/Nottingham in Option 4.1.

Conclusion

It is recommended that an additional stop is inserted in the Sheffield semi-fast service at Kettering (Option b) once the funding agreement with South Yorkshire Passenger Transport Executive (SYPTE) has terminated, subject to the service continuing to be financially supported by the DfT. This will also improve connectivity between stations south of Leicester and East Midlands Parkway and to Chesterfield and Sheffield. The case would be further improved by linespeed improvements on the MML included in the CP4 Delivery Plan.

Assessment of Option 4.9 – More frequent trains between Peterborough and Lincoln

Concept	Improve the competitive position of rail by providing a standard hourly service frequency between Peterborough and Lincoln (via Sleaford and Spalding) throughout the day. This is expected to stimulate additional demand through improved connectivity.
Operational analysis	Assumes an additional one-car train.
Infrastructure required	The operation of this service requires the signal boxes to be open throughout the day and the infrastructure changes associated with this are included in the GN/GE Joint Line upgrade for implementation in CP4.
Passenger impact	Provides an hourly service between Peterborough and Lincoln throughout the day.
Freight impact	The upgrade aims to provide capacity for forecast freight growth and an hourly passenger service.
Financial and economic analysis	The main costs associated with this option are rolling stock and train crew. The following table outlines the appraisal results for this option:

30-year appraisal	**£million (2002 PV)**
Costs (Present Value)	
Investment Cost	0
Operating Cost	8
Revenue	-2
Other Government Impacts	0
Total costs	**6**
Benefits (Present Value)	
Rail users benefits	3
Non users benefits	1
Total quantified benefits	**4**
NPV	**-3**
Quantified BCR	**0.6**

Link to other options	Upgrade of GN/GE Joint Line as recommended in the ECML RUS (section 6.15.3 Option c).
Conclusion	This option cannot be recommended at this time as the benefits of an all day service between Peterborough and Lincoln (via Sleaford and Spalding) are not justified by the operational costs associated with the additional resources. However, the upgrade of the GN/GE Joint line may provide more opportunity to use existing resources to support more journeys.

Assessment of Option 4.10 – Direct trains between Stoke-on-Trent and Nottingham	
Concept	Improve connectivity between Stoke on Trent and Nottingham by extending the existing hourly Crewe – Stoke-on-Trent – Derby service to Nottingham. This is expected to stimulate additional demand. Two options have been identified: Option a) ■ extend existing hourly Crewe – Stoke-on-Trent – Derby service to Nottingham (including stops at Long Eaton and Beeston) ■ remove stops at Long Eaton and Beeston from the existing Cardiff Central – Nottingham interurban service to improve journey time ■ existing Matlock – Nottingham service to be retimed to run approximately 30 minutes earlier to provide a more even spread of services in the timetable. Option b) ■ existing Matlock – Nottingham service to be curtailed at Derby to provide a shuttle service between Derby and Matlock ■ extend existing hourly Crewe – Stoke-on-Trent – Derby service to Nottingham using the Matlock – Nottingham calling pattern.
Operational analysis	Option a) requires an additional two-car train to provide the extra service between Derby and Nottingham. This option is very dependant on paths being available on the busy Derby – Nottingham corridor. It is also likely to produce significant performance disbenefits as it generates extra trains at the south end of Derby station and between there and Nottingham. Option b) incurs no additional leasing or crew costs but has the disbenefit of increasing congestion in the Derby station area as it requires occupation of the north end of platform 3. Currently there are four Birmingham services per hour that need to reverse, at least two of these could use the south end of platform 3, making this platform largely a platform for terminating trains. However, this option is also very timetable dependant due to the mix of services on the Derby – Nottingham corridor. So as to avoid disbenefits to other services the extended service may not get a good path and thereby require an additional two-car train.
Infrastructure required	None included.
Passenger impact	■ Options a) and b) provide an hourly service between Crewe/Stoke-on-Trent and Nottingham via Derby ■ Option a) provides an additional benefit of improving the journey time for passengers travelling between Nottingham and Cardiff ■ Option b) disbenefits more passengers than Option a) due to the curtailment of the current Matlock – Nottingham service at Derby. However, there is a net increase in passenger journeys.
Freight impact	Impact on freight services would require further assessment if Option a) were recommended due to the potential increased congestion at the south end of Derby, at Sheet Stores Jn and at Trent Jn.

Financial and economic analysis

The main costs associated with these options are rolling stock and train crew.

The following tables outline the appraisal results for each option:

Option a):

30-year appraisal	**Option a PV £m**
Costs (Present Value)	
Investment Cost	0
Operating Cost	19
Revenue	-8
Other Government Impacts	2
Total costs	**13**
Benefits (Present Value)	
Rail users benefits	21
Non users benefits	3
Total quantified benefits	**24**
NPV	**11**
Quantified BCR	**1.8**

Note: All figures are presented in 2002 market prices

Option b):

30-year appraisal	**Option b PV £m**
Costs (Present Value)	
Investment Cost	0
Operating Cost	0
Revenue	-1
Other Government Impacts	0
Total costs	**-1**
Benefits (Present Value)	
Rail users benefits	3
Non users benefits	0
Total quantified benefits	**3**
NPV	**4**
Quantified BCR	**N/A**

Note: All figures are presented in 2002 market prices

If an additional two-car unit is required due to pathing requirements then Option b) would represent poor value for money.

Link to other options

Peak crowding and growth between Matlock and Derby (Option 1.10)

Conclusion

Both options are very dependant on the timings of other services on the Derby – Nottingham corridor. Assuming that the options as described can be timetabled then Option a) represents medium value for money whereas Option b) has a financially positive business case. Therefore the RUS recommends that any proposal to improve connectivity between Nottingham and Stoke-on-Trent/Crewe must examine the pathing, performance and rolling stock implications of options to extend the Crewe – Stoke-on-Trent – Derby services to Nottingham to confirm that there is an overall net benefit.

During the consultation period options to extend the hours of operation of the Birmingham New Street to Stansted Airport services to better match the spread of aircraft arrivals and departures were evaluated. A passenger demand profile was created based on the aircraft arrival and departure times and this was mapped against the existing rail service. The following gaps were identified:

- early morning peak between 03:30 – 06:30 for flight departures
- late evening peak between 23:00 – 01:00 for flight arrivals.

The options to address these gaps are shown in the following tables:

Assessment of Option 4.11 – Provision of earlier and later services to Stansted Airport

Concept	Three options have been identified to provide earlier and later services to Stansted Airport: ■ Option a) two additional services from Cambridge to Stansted Airport in the early morning, and two additional services from Stansted Airport to Cambridge in the late evening ■ Option b) run hourly services between Peterborough and Stansted Airport through the night ■ Option c) run services between Peterborough and Stansted Airport every second hour through the night.
Operational analysis	The current maintenance regime would not support additional overnight services.
Infrastructure required	None.
Passenger impact	Improved connectivity to Stansted Airport from Cambridge (Options a, b and c) and from Peterborough (Options b and c).
Freight impact	Reduced capacity for freight services operating between East Anglia and the West Midlands and Yorkshire (Options b and c).
Financial and economic analysis	The main costs relate to additional train crews and alterations to the maintenance regime. The operational costs have been estimated for each option and would need to be verified if any of the options were taken forward. The increase in passengers required to support the additional services has been calculated and is presented below.

Option	Estimated annual operational costs (£m, 2009 PV)	Required additional passengers per annum	Required market share
Option a)	0.4	80,000	3.10%
Option b)	1.8	340,000	4.20%
Option c)	1.4	260,000	3.90%

The proportion of airport passengers required to support Options a), b) and c) are close to the current market share of approximately three percent given the hours in which the current service operates. Therefore it appears feasible that the demand levels would support additional services. An incremental approach to monitor how demand increases as the gaps are met seems an appropriate strategy.

Link to other options	All day crowding and growth between Birmingham New Street and Stansted Airport (Options 2.2 – 2.4).
Conclusion	Option a) is recommended for implementation as soon as possible subject to the completion of commercial negotiations between the DfT and the incumbent franchisee. Options b) and c) are recommended for further development subject to evaluation of the levels of demand following the introduction of the additional services to Cambridge (Option a) have been assessed.

5.4.5 Performance

The RUS analysis has identified a number of locations where performance improvement may be justified.

Where possible low cost solutions such as amendments to the timetable have been examined. However, in isolation these options have not been sufficient to fully address the performance gap. Therefore, the timetable options are discussed alongside the infrastructure solutions where appropriate.

Infrastructure solutions have been examined for the following locations:

- Bedford – London
- Kettering area
- Wigston Jn – Helpston Jn
- Loughborough
- Mountsorrel
- Newark
- Derby
- Nottingham
- Chesterfield
- Nottingham – Worksop
- Sleaford – Skegness.

Where specific appraisals have been undertaken for the above locations the analysis is shown in tabular form in the sections below.

5.4.5.1 Bedford – London

The highest levels of reactionary delay to train services between Bedford and London have been identified in **Chapter 3** and are attributed to:

- Blackfriars station, where issues at the south end of the station have been highlighted in the South London RUS and the data shared with the Thameslink Programme
- Kings Cross Thameslink (delay now recorded at London St Pancras International platforms A and B) and Farringdon which will be analysed in conjunction with the Thameslink Programme
- Kentish Town to Flitwick reflecting the complex interaction of flat junctions at West Hampstead, Kentish Town and Carlton Road Jn. Also, as a result of the signalling control arrangements for trains crossing between the fast and slow lines, where these moves are not planned up to two minutes delay can be incurred
- Flitwick to Bedford South Jn, particularly on the slow lines
- the Bedford station area where most passenger services that call, start or terminate at Bedford station and are limited to the use of three platforms. Furthermore, such services must use the slow lines between the station and Bedford South Jn in conjunction with freight services. This results in performance delays during perturbed operations.

A number of schemes are in development for possible implementation in CP4 to deliver improved performance on this section of route and these include:

- provision of a new crossover to the north of West Hampstead Thameslink station as part of the Thameslink Programme
- a signalling scheme to improve the approach control at Radlett and Harpenden Jns
- review of sectional running times between Farringdon and Kentish Town
- a revised layout is being developed for Bedford station area by the Thameslink Programme to enable the new Thameslink Programme timetable to operate. The current proposal provides a new line through the existing station onto a new platform on the east side of the station. It is believed that this will improve performance at Bedford station and will be assessed by the Thameslink Programme once the new timetable has been developed.

RUS analysis has demonstrated that it is likely that additional fast to slow crossovers will be required on the London side of Carlton Road Jn. This would allow Thameslink services to cross from the fast lines to the slow lines, without conflicting with trains from the Tottenham and Hampstead Line as a result of future increases in freight services and off-peak Thameslink trains. This, and any further requirements which emerge as part of the performance assessment of the new Thameslink timetable, will have to be examined by the Thameslink Programme.

The provision of an additional loop south of Bedford, recommended in Option 3.1, will also improve performance on this route section.

Kettering area

The infrastructure between Bedford and Wigston Jn is a mixture of four, three and two-track sections which constrains capacity and affects performance when trains are running late. The Kettering station area, and along the single line to Corby, are affected by high levels of congestion related delay as a result of the mix and timing of services.

Various options have been examined in the RUS to improve performance in the Kettering area, including:

- an additional track between Sharnbrook Jn and Kettering South Jn
- doubling the single line from Kettering North Jn to Corby
- freight loops at Desborough (on the Down line) and East Langton (on the Up line)
- faster junction speeds at Kettering North Jn (from 40mph to 60mph) and Kilby Bridge Jns (from 40mph to 60mph)
- faster junction speeds at Kettering South Jn.

Performance benefits alone are insufficient to justify the capital expenditure required to provide the loops. However, the case for the provision of appropriate loops is being examined in CP4 as part of the Hope Valley to London train lengthening scheme, to increase freight carrying capacity on this route section (Option 3.1). In addition, a scheme to increase capacity on the slow line between Sharnbrook Jn and Kettering through the provision of an additional loop is in development as part of the Seven Day Railway programme. This scheme should incorporate the additional performance benefits and freight capacity improvements identified in the RUS to determine the optimal infrastructure solution.

Wigston Jn – Helpston Jn

The Leicester area and the east – west corridor through to Helpston Jn account for high levels of reactionary delay. The scheme to increase capacity between Ipswich and Nuneaton for both freight and passenger services described in Options 3.4 and 4.2 would also provide significant performance benefits in the Leicester area. The ideal opportunity to remodel the layout in the Leicester station area to improve capacity, performance and journey times would be as part of any future electrification programme or in conjunction with signalling renewals in CP5.

Assessment of Option 5.1 – Additional infrastructure at Loughborough to improve performance	
Concept	Provide an additional Up slow platform at Loughborough to reduce conflicts between northbound and southbound local services.
Operational analysis	The following benefits are accrued for passengers travelling on each local train: ■ average reduction in lateness of three seconds in the northbound direction ■ average reduction in lateness of nine seconds in the southbound direction.
Infrastructure required	A new platform on the Up slow line.
Passenger impact	Detailed analysis of the 31,000 reactionary minutes delay (over two years) recorded at Loughborough has indicated that the majority of the delay originates at Leicester, Derby and Trent East Jn. Solutions for these locations are discussed in the following tables. The new platform at Loughborough will improve performance for passengers travelling on local services through this station.
Freight impact	Minimal.
Financial and economic analysis	The performance benefits for this option have been evaluated assuming a 60-year asset life and produce a total benefit of £420k. This suggests that the maximum infrastructure expenditure available at Loughborough is £125,000. However, the expected cost for the new platform and footbridge extension is expected to be in excess of £3 million.
Link to other options	Provision of a flyover at Newark to improve performance in Option 5.3.
Conclusion	This option cannot be recommended based on performance improvement alone.

Assessment of Option 5.2 – Additional infrastructure at Mountsorrel to improve performance

Concept

To reduce the performance impact of freight trains on passenger trains at Mountsorrel, the following options have been identified:

- Option a) to provide a new access from the north via a new crossover
- Option b) to extend the existing reception line to Sileby Jn
- Option c) to relocate Mountsorrel terminal to the east side of the railway.

Operational analysis

No additional trains are required. Both Options a) and c) require the timetable to be restructured in order that freight services can utilise the new infrastructure. Option b) avoids extended use of the Down fast line for trains departing Mountsorrel. Option c) removes the conflict with LDHS trains on the fast lines by locating the terminal on the slow lines.

Infrastructure required

Option a) Provide a new entrance to Mountsorrel from the north with a facing crossover.

Option b) Extend the reception line from Mountsorrel to Sileby Jn which includes the need for land take, a potential compulsory purchase order, and bridge and embankment works.

Option c) Replace the existing track layout at Mountsorrel with new facing connections to and from the slow lines (and remove the fast line connections). Provide an extended conveyor belt across the railway, new terminal facilities and internal sidings.

Passenger impact

All passengers travelling on the LDHS services will benefit from these options. For Option b) however, these benefits are limited to passengers travelling in the northbound direction only. RUS analysis has identified a reduction in average minute lateness ranging from a minimum of five seconds to a maximum of 20 seconds for each passenger using these services.

Freight impact

Performance improvement by reducing conflicts with passenger services.

Financial and economic analysis

The main costs associated with these options are infrastructure as identified above.

The appraisal has identified the capital expenditure justifiable to achieve the performance improvement. The maximum infrastructure expenditure available for each option is shown below along with the estimated infrastructure costs:

Option	Maximum Infrastructure expenditure available (£m, 2008 PV)*	Estimated Infrastructure costs (£m, 2008 PV)
Option a)	3.8	6.0
Option b)	3.2	>3.2[#]
Option c)	7.8	>7.8[#]

[#] *the full extent of the additional costs associated with Options b) and c) are unknown but are likely to be substantial*

* *Spot cost in 2008 prices (ie. without DfT appraisal optimism bias), to the nearest decimal place*

Link to other options	None.
Conclusion	It is not possible to recommend any of the above options on the basis of performance benefits alone. The relocation of the terminal to the other side of the railway generates significant industry benefits. However, these benefits are not sufficient against the high capital cost of the scheme.

Assessment of Option 5.3 – Provision of a flyover at Newark to improve performance

Concept	Provision of a flyover at Newark to provide the following benefits: ■ improved regional connectivity between Nottingham and Lincoln through the provision of an additional fast hourly service (see Option 4.6) ■ journey time improvements for both ECML LDHS services and local east – west services ■ increased capacity to accommodate freight growth (see Nottingham – West Holmes Jn in section 5.4.3) ■ reduced reactionary delay to passenger and freight trains ■ reduced operational costs for LDHS services operating along the ECML.
Operational analysis	■ the existing flat crossing at Newark is the main capacity constraint which limits the expansion of east – west services to two paths an hour. The flyover provides the capacity to introduce an additional hourly fast service which requires two additional one-car units. These units would be transferred to the slow service to enable the fast service to be operated with the current two-car units ■ currently ECML LDHS services not stoping at Newark Northgate are required to slow down from 125mph to 100mph at Newark Crossing. The provision of a flyover for east – west services would enable those ECML services to continue at full speed improving journey time and resulting in fuel and brake wear cost savings ■ existing dwell times at Nottingham can be removed thereby improving journey time between Leicester and Lincoln and also reducing the conflicts at Loughborough mentioned in Option 5.1.
Infrastructure required	A new east – west flyover at Newark to replace the existing flat crossing. The gradient of the flyover will need to be able to accommodate the freight trains travelling east – west along this corridor. A key geographical constraint is the proximity to the River Trent and the A1 trunk road which adds to the overall construction cost for the flyover.

<table>
<tr><td>Passenger impact</td><td>

a faster, more frequent service between Nottingham and Lincoln increasing the competitiveness of rail travel along this corridor
journey time savings of 30 seconds on all services not calling at Newark Northgate on the ECML
a reduction in reactionary delay minutes of 1200 minutes per annum on the east-west corridor and a slight reduction in delay minutes on the ECML
journey time savings averaging two minutes on all services on the east-west corridor, in addition to the journey time saving of 15 minutes on Leicester to Lincoln services.

</td></tr>
<tr><td>Freight impact</td><td>Significant reduction in freight reactionary delay minutes and increased capacity to accommodate future freight growth.</td></tr>
<tr><td>Financial and economic analysis</td><td>The main costs associated with this option are infrastructure and, for the additional service, rolling stock and train crew.

The following table outlines the appraisal results for this option:
<table>
<tr><th>60-year appraisal</th><th>£million (2002 PV)</th></tr>
<tr><td>Costs (Present Value)</td><td></td></tr>
<tr><td>Investment Cost</td><td>82</td></tr>
<tr><td>Operating Cost</td><td>29</td></tr>
<tr><td>Revenue</td><td>-45</td></tr>
<tr><td>Other Government Impacts</td><td>9</td></tr>
<tr><td>Total costs</td><td>77</td></tr>
<tr><td>Benefits (Present Value)</td><td></td></tr>
<tr><td>Rail users benefits</td><td>89</td></tr>
<tr><td>Non users benefits</td><td>20</td></tr>
<tr><td>Total quantified benefits</td><td>109</td></tr>
<tr><td>NPV</td><td>32</td></tr>
<tr><td>Quantified BCR</td><td>1.4</td></tr>
</table>
</td></tr>
</table>

	A sensitivity analysis was carried out using a journey time saving of 1 minute rather than 30 seconds for all ECML services not calling at Newark Northgate. This generates a BCR of 2.7. The sensitivity analysis reflects the potential impact on journey time as a result of more restrictive signalling (such as double red signalling) at Newark which may occur in the future as a result of resignalling the layout to modern standards. The business case could be further strengthened if the appraisals included modelling techniques which are outside the accepted DfT appraisal criteria for RUSs. This would address the following issues: ■ this appraisal is based on the standard PDFH methodology in accordance with DfT guidelines. However, it underestimates the benefits associated with the additional hourly service between Nottingham and Lincoln which represents a significant step change from the current service provision. An alternative method of appraisal could be developed to provide a more robust estimate of the benefits ■ potential future increases in the frequency of services as a result of IEP trains on the ECML would worsen the performance impact of the existing crossing at Newark and further constrain capacity on the east – west corridor ■ future modal shift as the high level of car journeys on the east – west corridor is likely to be reduced with the significantly improved service. There are signficant benefits to freight performance which cannot be included in the appraisal in accordance with DfT guidance. These benefits would be even greater once freight growth on this corridor exceeds 18 trains per day.
Link to other options	Improved journey time between Nottingham and Lincoln (Option 4.6).
Conclusion	This option is recommended for further development during CP4 to refine the infrastructure costs and the potential benefits detailed above. It is recognised that the development of the ECML IEP service requirements beyond those proposed for LDHS services from December 2010, combined with freight growth beyond 18 trains per day on the east – west corridor, may drive the requirement for a flyover in CP5.

Assessment of Option 5.4 – Remodelled layout at Derby to improve performance	
Concept	Provide a remodelled layout at Derby to reduce the reactionary delay minutes at this location as a result of the number of conflicts occurring between services: ■ Option a) an additional platform between the goods lines and Platform 6 ■ Option b) as above, with the ability for additional parallel moves ■ Option c) an additional double faced island platform utilising the existing sidings plus the provision of crossovers ■ Option d) completely remodel the layout at Derby to segregate the Matlock/ Nottingham/London bound services from services towards Birmingham New Street and Sheffield.
Operational analysis	Analysis has demonstrated that there is a considerable amount of conflict between services at Derby, particularly at the southern end of the layout. This would be reduced by varying degrees as a result of the options above. All options require an element of timetable restructuring. However, the impact of Option d) on the operation of trains through Derby would be so extensive that the timetable would require major restructuring to capture all of the benefits.
Infrastructure required	Infrastructure changes as in concept above.
Passenger impact	Derby has the highest level of reactionary delay minutes in the RUS area (circa. 120,000 minutes over two years as detailed in **Chapter 3**). The largest number of delay minutes are for interurban services travelling to or from Nottingham (which reverse at Derby) and occur at the southern end of the station where the Nottingham and Birmingham lines converge. The proportion of delays attributed to trains from the north is relatively low. All of the four options will reduce the level of reactionary delay at Derby. Conflict analysis indicates the level of improvement ranges from 11 percent for the most simple intervention Option a) to 68 percent for the most complex solution Option d). Passengers will benefit from reduced journey times for Option d) as previously identified in Option 4.3: ■ Derby – Duffield: an average of 45 seconds for all services in both direction ■ Derby – Peartree: an average of one minute for all services in both direction ■ Derby – Spondon: one minute in one direction only (to Derby) for all service. Journey time reductions for the other options are unlikely to be significant.
Freight impact	Improvement in performance for freight services is expected to varying degrees as a result of the infrastructure options.

Financial and economic analysis

Appraisal has been carried out for all options based on two alternative scenarios for improved performance through a reduction in conflicts at Derby. The optimistic scenario considers the impact of the infrastructure changes on the total reactionary delay at Derby. Whereas the pessimistic scenario only considers the delay attributed directly to the layout at Derby. The performance appraisals are set out in the table below:

Option	Infrastructure Costs (£million 2009)*	BCR for Optimistic Scenario	BCR for Pessimistic Scenario
Option a)	10	0.49	0.04
Option b)	13	0.41	0.04
Option c)	14	0.68	0.05
Option d)	35	0.29	0.03

*Spot cost in 2009 prices (ie. without DfT appraisal optimism bias) The cost for Option d) assumes that the works will be carried out in conjunction with track and signalling renewals planned in CP5 and beyond to reduce the cost of the overall scheme.

Based on performance benefits alone, all options offer poor value for money. However, the potential journey time benefits presented by Option d) significantly improve the case for a remodelled layout at Derby. See table below:

60-year appraisal	Optimistic Option d) £million (2002 PV)	Pessimistic Option) d £million (2002 PV)
Costs (Present Value)		
Investment Cost	49	49
Operating Cost	0	0
Revenue	-41	-31
Other Government Impacts	9	6
Total costs	**17**	**25**
Benefits (Present Value)		
Rail users benefits	58	50
Non users benefits	12	9
Total quantified benefits	**70**	**60**
NPV	**53**	**35**
Quantified BCR	**4.1**	**2.4**

Link to other options

Journey time improvements between Nottingham and Birmingham (Option 4.3).

Conclusion

Remodelling the layout at Derby to segregate services and reduce conflicts. Option d) is recommended for further development in CP4. More detailed work is required to refine the potential performance and journey time benefits. Where early opportunities can be taken to derive benefits from track renewals planned to occur in advance of the major renewal/resignalling scheme in CP6/7, then any enhancements must be shown to support the overall business case for the revised layout.

Nottingham area

In the Nottingham area, the locations with the highest levels of reactionary delay are at:

- Trent East Jn, where the lines from Nottingham, Derby, Leicester and Toton converge and the number of conflicting moves over the short single line sections regularly result in significant levels of reactionary delay minutes during perturbed operations
- Nottingham station area, particularly the heavily congested western approaches to the station. This level of congestion, combined with current signalling control arrangements and the number of terminating services, significantly reduces capacity at the station and results in high levels of delay when trains are running late.

The implementation of two major infrastructure schemes in CP4 will result in considerable improvements in the Nottingham area:

- doubling of the single lead at Trent East Jn to allow more parallel moves, which was completed in December 2009
- remodelling of the layout of Nottingham station to improve performance through the segregation of trains at the west end of Nottingham with bi-directionally paired tracks for trains to Derby/Leicester and Mansfield/Sheffield.

Chesterfield

The inflexibility of the layout at Chesterfield has resulted in historically high levels of reactionary delay as there are few alternative routeing opportunities when trains are running late. This has recently been improved by the upgrade of the former Goods line to a bi-directional Down Slow line as part of the East Midlands Signalling Renewals scheme. Operational flexibility at Chesterfield will be further enhanced by the provision of a new platform to allow passenger services to use the bi-directional Down Slow line during perturbations. This scheme is currently being implemented as part of the Seven Day Railway Programme and will also deliver performance improvements at Chesterfield.

Nottingham to Worksop Line

The Nottingham to Worksop Line suffers from particularly poor performance mainly as a result of the single line sections and linespeeds which allow for little recovery time in the timetable. The level of performance benefits are insufficient to justify significant investment in the linespeed improvements, level crossing modernisation and signalling headway reductions which would make the timetable much more robust. However, a number of small scale schemes are currently at varying stages of development which would improve performance on this route section, including:

- signalling improvements at Bulwell
- doubling the track to reduce the length of the single line section between Bulwell and Kirkby South Jn
- increasing the linespeed at Mansfield Woodhouse and Sutton Forest from 40mph to 50mph (completed in December 2009)
- linespeed improvements north of Shirebrook, between Mansfield Woodhouse and Shireoaks East Jn.

These schemes will enable additional performance recovery time to be incorporated into the timetable for the Robin Hood Line.

Sleaford

RUS analysis of historical delays at this location has shown that the majority of delays occur as a result of the Nottingham to Skegness services waiting to gain access to the single line sections. The following options were identified to address this:

- timetable recast or the provision of additional rolling stock to provide improved turn-round times
- doubling the track on the single line section between Sleaford and Heckington, and Hubberts Bridge and Sibsey.

A review of the current timetable identified turn-round times of a minimum of seven minutes at Skegness (on three occasions only) but generally they are in excess of 14 minutes. At Nottingham turn-rounds are between 25 and 35 minutes. There is no evidence that these are too tight or are contributing to the poor performance of the corridor.

Delay minutes attributed to trains awaiting a path on the single line sections were examined. Sleaford demonstrates the best case for track doubling. However, the infrastructure costs will far outweigh the performance benefits, therefore this option was not developed any further and cannot be recommended in the RUS.

5.4.6 Seven Day Railway

Initiatives to provide similar access on Saturday evenings and all day on Sundays to operate the working timetable are being developed as part of the Seven Day Railway Programme. This development work along with any additional initiatives underway on the route to improve network availability are discussed below.

A small number of key routes have been identified for special attention. For passenger services the principle is that Network Rail and train operators will offer a rail journey in almost all circumstances between key stations on these routes. The principle for freight operators is that the ability to deliver key freight traffic flows by means of a preferred route or 'fit for purpose' alternative route will be maintained. The passenger routes and freight flows within the RUS area that are covered by these principles are:

- Birmingham – York (key stations: Derby, Sheffield, Leeds)
- Birmingham – Nottingham (key station: Derby)
- London St Pancras International – Nottingham (key stations: Luton, Leicester)
- London St Pancras International – Sheffield (key stations: Luton, Leicester, Derby)
- West Midlands – South Yorkshire (via Water Orton, Derby and Beighton)

Options to support improvements to network availability on these routes are at various stages of developed and those currently being progressed by the Programme team include :

- additional infrastructure to improve capacity
- initiatives to improve the productivity and efficiency of maintenance and renewal activities
- improvements to diversionary routes.

The main benefits of these initiatives are improvements to: direct journey opportunities, train performance, journey times, carrying capacity, passenger satisfaction, infrastructure capacity, and a reduced requirement for bus replacement services. On some corridors where Sunday is a very busy day of the week, the benefits are considerably higher.

These initiatives must demonstrate that they will contribute to an improvement in the availability of the infrastructure for passenger services and at least maintain the same availability for freight services. Furthermore, the schemes must not have an adverse material effect on capacity, performance and journey times for freight or passenger services.

The provision of engineering access in accordance with the Seven Day Railway principles is not generally an issue south of Bedford which already operates as a two-track railway overnight and on Sundays.

However, additional infrastructure at London St Pancras International low level is being considered as part of the Thameslink Programme to facilitate trains turning back to or from the north. This facility was already provided, in part, as a result of works carried out in December 2009.

North of Bedford, a number of schemes are currently being developed as part of the Seven Day Railway Programme for delivery in CP4.

Schemes identified to improve the capacity of the route to enable more services to operate during periods of disruption include:

- an additional platform at Chesterfield station
- loops between Sharnbrook Jn and Kettering
- linespeed improvements on the slow lines between Wellingborough and Harrowden.

Further initiatives aimed at improving the productivity and efficiency of maintenance and renewal activities so that engineering work can be undertaken with less disruption to train services include:

- adjacent line open initiatives including additional bi-directional signalling and fixed/mobile warning systems for engineering staff
- facilities to enable the increased use of mechanised track patrolling at night (such as lighting at junctions and trolleys)
- facilities to improve efficiency (such as safe refuges, and pedestrian and vehicle access points).

The aspiration to operate additional Saturday late evening services from London St Pancras International is proving problematical due to the level of the reduction in maintenance time between Leicester and Derby. These issues are currently being reviewed by the Programme.

On other routes within the East Midlands RUS area, initiatives to achieve Seven Day Railway principles on the section of route between Wichnor Jn and Derby are also currently being developed by the Programme. This is an important corridor for passengers using interurban services as the diversionary route via Leicester adds considerable time to journeys and is not consistent with Seven Day Railway Principles.


Trams to Nottingha
Hucknall
Trains

6. Consultation process and overview

6.1 The Draft for Consultation

The East Midlands Route Utilisation Strategy (RUS) Draft for Consultation was published in August 2009, along with a press release announcing its publication. The document outlined a number of gaps between the present capability of the rail routes throughout the East Midlands (in terms of capacity and performance), and the predicted demand for both freight and passenger traffic up to 2019. A set of options were proposed to address these gaps.

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

The Draft for Consultation was distributed to a wide range of stakeholders and a period of 12 weeks was given to allow stakeholders to respond. The consultation period ended on 13th November 2009.

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

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

6.2 Consultation responses

A total of 91 consultation responses were received and these are broken down as follows:

Train Operating Companies	4
Government and local authorities	24
Businesses	8
User groups	21
MPs	3
Members of the public	31

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

6.3 Key themes in the consultation responses

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

6.3.1 Positive reaction

General reaction from most respondents was positive, welcoming the fact that the East Midlands area was the subject of detailed study, following attention to the adjoining Yorkshire and Humber area and East Coast Main Line (ECML). Responses were generally supportive of the gaps identified, the options proposed for recommendation, the overall direction of the RUS, and the work being done, recognising the level of consultation that has been carried out with stakeholders throughout the development of this strategy.

6.3.2 Further analysis

As a result of the consultation responses, further analysis was carried out on a number of new gaps and some alternative options. This work is detailed in **Chapter 5**.

This further analysis resulted in some additional recommendations and adjustments to the overall strategy for the East Midlands. The themes of the responses and, where appropriate, the results of the analysis are shown below, reported by generic gap type.

6.3.3 Peak crowding and growth

Passenger demand forecasts for the RUS area were originally produced in the summer of 2008. Over the last 18 months the severity of the recession has worsened and the

Department for Transport (DfT) requested that the final RUS update its forecasts with the most recent passenger demand data and economic projections to identify any emerging impacts of the changing economic situation and to consider whether adjustment of the rate or timing of the predicted future demand growth would be appropriate. This analysis has been carried out and detailed in **Chapter 4**.

The original forecasts were based on the DfT's Passenger Demand Forecasting Handbook (PDFH) plus an 'x factor' for committed schemes and/or higher historic levels of growth, as described fully in **Chapter 4**. Some stakeholders queried the level of underlying rail growth and the impact of initiatives, such as the December 2008 timetable changes, the opening of Corby and East Midlands Parkway stations, the introduction of a Sheffield – London St Pancras International half hourly service and the planned reduction in journey times, on these services in Control Period 4 (CP4) on the passenger demand forecast. As a result the 'do minimum' forecast was reviewed and was found to have adequately allowed for the above schemes in the 'x factor'.

Growth in demand at the southern end of the route is largely addressed in the strategy by the Thameslink Programme. Stakeholder responses varied between those who suggested that the impact of the Thameslink Programme had been well integrated into the strategy and those seeking further clarification.

Freightliner considers that the Thameslink Programme's unspecified factors should be clearly and separately listed in the text of the RUS, and that gaps related to the introduction of Thameslink should be re-opened and reconsidered once the requisite information becomes available. First Capital Connect (FCC) requested more precise documentation of the Thameslink Programme timetable stages so that they are explicitly provided for and protected by the RUS. Furthermore, they suggested that a more detailed description of the principal Thameslink enhancements is needed for the RUS to provide for and protect them. DB Schenker (DBS) noted that the Thameslink Programme has not yet been able to identify a timetable solution that satisfies the requirements of all existing operators on the Midland Main Line (MML).

Chapter 3 has been updated with the latest details of the current status of the Thameslink Programme. The development of the new Thameslink timetable is not due to be completed until March 2011. It is anticipated that a further review of the RUS recommendations may be required should the final timetable introduce new or fundamentally change existing gaps.

There was general support amongst all stakeholders for the recommendation to lengthen Long Distance High Speed (LDHS) trains on the MML to accommodate future passenger growth (see Option 1.1).

However, East Midlands Trains (EMT) stated that the implications of the longer trains on depots and at stations need to be considered. These have been assessed and are reflected in the revised appraisal for LDHS train lengthening (Option 1.1) in **Chapter 5**. The Office of Rail Regulation (ORR) requested that consideration be given to the impact on crowding at stations and increased demand for station facilities as a result of the RUS recommendations. The potential for two fully loaded trains arriving in the peak, on adjacent platforms, at London St Pancras International is

likely to represent the most significant issue on the route. This scenario was reviewed after the consultation period and station operations can be managed such that it does not represent an issue.

A number of stakeholders noted the work by Passenger Focus to progress car park surveys during the consultation period. This work has now been completed. **Chapter 3** has been updated to include the priorities arising from the surveys within a new section on station accessibility, which also seeks to address stakeholder concerns about the lack of detail on interchanges and station access in the Draft for Consultation.

6.3.4 All day crowding

Derbyshire County Council raised the issue of increased passenger growth that has occurred on the Nottingham – Matlock corridor since the introduction of an hourly service in December 2008, resulting in crowding throughout the day. This additional gap was further analysed after the consultation period and is discussed in **Chapter 5**.

Stakeholders were generally supportive of the RUS recommendations to lengthen services on the Norwich – Liverpool and Birmingham – Stansted Airport corridors, and to extend the Birmingham – Leicester service to Cambridge every second hour.

EMT requested that the recommendation for lengthening and extending current services between Liverpool and Norwich (Option 2.1) be revised to better reflect the problems that the Norwich – Liverpool service currently faces and the urgency of the strengthening requirement. Passenger Focus concurred with this, requesting that a clear timeline is set out to bring the lengthening proposals to fruition. They also noted that the 16:52 from Liverpool terminates at Nottingham, leaving a gap in North West, South Yorkshire and East Midlands to East of England journey opportunities at a key time of the day.

On the Birmingham – Stansted Airport corridor, Passenger Focus expressed concern that the option to extend Birmingham – Leicester services to Cambridge and lengthen the busiest Birmingham – Stansted Airport services (Option 2.4) would still leave some passengers standing on particular trains even after the recommended interventions. They suggested that the final RUS should recommend that all Birmingham – Stansted Airport trains should be at least three-car trains and that Birmingham – Leicester trains should be extended to Cambridge every hour and run as at least three-car trains. Unfortunately, the demand forecasts are not sufficient to justify the additional operational costs associated with further lengthening and the infrastructure works required to permit extension of the service to Cambridge every hour, over the 10-year RUS period.

DBS, Freightliner and Rail Freight Group (RFG) all express concerns at the potential impact on future freight capacity of the proposal to extend Birmingham – Leicester trains to Cambridge, in addition to lengthening of Birmingham – Stansted Airport trains (Option 2.4). As noted in the Draft for Consultation, the additional trains have been included in the scheme currently being developed to improve capacity between Helpston Jn and Nuneaton. This scheme aims to deliver sufficient capacity on this corridor to meet both freight and passenger growth in Control Period 5 (CP5).

6.3.5 Freight Capability

A number of stakeholders noted that the freight growth forecasts beyond 2014 would be further analysed during the consultation period and were concerned that this work must be completed to inform recommendations in the final RUS. RFG expressed their disappointment with the strategy for freight outlined in the RUS, adding that the extent of incomplete work means that the emerging strategy has not yet provided any clear view on how current flows and future freight will be accommodated within the RUS area.

DBS stated that the final RUS should define the characteristics of the four freight paths identified between Stenson Jn and Wichnor Jn, as not all paths may be suitable for every

speed/weight combination of freight service. In addition, DBS believes that the benefits of increased turnout speeds at Clay Mills Jn will provide significant capacity and performance benefits to all operators and should therefore be evaluated both as a stand-alone scheme and as part of a potential larger scheme for remodelling the entire Burton-on-Trent area.

Freight forecasts up to 2030 were analysed during the consultation period and the longer term strategy in **Chapter 7** has been updated to reflect this analysis. Options to address forecast freight growth have also been updated in **Chapter 5**. Unfortunately, 2019 forecasts were not available prior to publication of the final RUS therefore the phasing of interventions in the short to medium term will be addressed as part of the development of a programme of works for CP5 and beyond.

6.3.6 Regional Connectivity

There was much support amongst stakeholders for the recommendations to improve connectivity between urban centres recommended in the Draft for Consultation.

However, a number of stakeholders expressed disappointment that a case could not be found to improve connections between the East Midlands and the North West. These comments are noted and it is intended that connectivity between these two regions has been considered in the Manchester Hub study. The study has examined interventions to deliver conditional outputs (as set out in phase one of the study) which include connectivity to deliver economic benefit to the north of England. These gaps sit outside the geographical RUS process.

Improved connections between north Northamptonshire and the north were largely welcomed by stakeholders. However, EMT suggested better connectivity to the north could be derived from capturing the M25 catchment area around Luton. Further RUS analysis established that a connectivity gap does exist between Luton and the north, and options to appraise this gap are discussed in **Chapter 5**.

More frequent services to improve the journey time between Nottingham and Lincoln are supported by stakeholders. The DfT requested that an additional option to provide an hourly Nottingham – Newark stopping service and an hourly Nottingham – Newark – Lincoln fast service (with limited stops between Newark and Lincoln) be considered. This option was appraised after the consultation period and is detailed in **Chapter 5**.

Lincolnshire County Council suggested that through services to Derby would also be of significant value to improve connectivity to the West Midlands. An additional option was analysed to establish the benefits associated with replacing the current Matlock – Nottingham and Leicester – Lincoln services with Matlock – Lincoln and Leicester – Nottingham services. The results demonstrated that the benefits of improved connectivity to the West Midlands were far outweighed by the journey time disbenefits to passengers travelling between Lincoln and Leicester. No further work was therefore progressed on this option.

Improved connectivity to Nottingham was also raised by North Staffordshire Community Rail Partnership, Staffordshire County Council and Janet Dean, Member of Parliament for the Burton Constituency. The consensus was that the reinstatement of the through service between Crewe/Stoke-on-Trent and Nottingham would be the best solution. Analysis was carried out on a number of alternative options, after the consultation period, and the results are reported in **Chapter 5**.

6.3.7 Performance

The extent of the analysis carried out in the RUS on performance issues was welcomed by stakeholders. However, some stakeholders were disappointed that a viable performance improvement scheme had not yet been identified for Derby, particularly as the Draft for Consultation had identified Derby as the largest source of reactionary delay in the RUS area. Further work was carried out during the consultation period on various alternative

infrastructure options for Derby station area. This analysis and the recommended option are detailed in **Chapter 5**.

Following the consultation period, the appraisal for Newark flyover was reviewed as a result of queries from some stakeholders about the level of benefits and disbenefits assumed. The revised results are reported in **Chapter 5**.

EMT requested confirmation that the appraisal included the proposal to dual the A46 road between Widmerpool and Newark, which has the potential to have a large impact on Newark – Nottingham rail passenger volumes. This analysis for future modal shift falls outside the scope of the normal RUS appraisal process. However, this is something that may need to be considered if the recommendation in **Chapter 5** to further develop the case for Newark flyover is progressed.

6.3.8 Seven Day Railway

The general consensus amongst stakeholders was that the options being progressed as part of the Seven Day Railway Programme, outlined in the Draft for Consultation, would improve access to the rail network for all users. Freightliner raised concerns that the aspirations of freight operators to operate intermodal and construction traffic seven days a week were not adequately discussed in the Draft and were completely omitted from the emerging strategy.

Chapter 5 and **Chapter 7** have been updated with the latest position regarding seven day railway initiatives on the East Midlands RUS area.

6.3.9 30-year vision

Opportunities presented by the potential extension of electrification beyond Bedford on the MML to Corby, Derby, Nottingham and Sheffield featured prominently in many of the stakeholder responses. East Midlands Development Agency (EMDA) raised concerns that the Draft for Consultation considered extended electrification only in the longer term. South Yorkshire Passenger Transport Executive (SYPTE) were disappointed that the Draft did not include the further benefits of electrification to the wider regional economy and the merits associated with reduced pollution in Sheffield City Centre.

DBS presented the benefits of electrification for rail freight in their response, highlighting the potentially significant resource savings and more efficient use of capacity that could be generated from the deployment of electrically hauled freight trains. The Regional Transport Advisory Board for Yorkshire & Humber suggested that the potential quantum change of track access demand for freight associated with gauge enhancements carried out in conjunction with electrification needs to be further considered by the RUS.

Network Rail published the Network RUS: Electrification in October 2009 and continues to present the positive financial case for the electrification of the MML beyond Bedford to Corby, Derby, Nottingham and Sheffield. The decision on the timing and full extent of any future extended electrification rests with the Government.

Responses related to High Speed 2 (HS2) followed a similar theme, with wider stakeholder support for the overall benefits associated with a new high speed line balanced by the suggestion from some stakeholders that the merits of connections from HS2 into the East Midlands need to be strengthened in the final RUS.

Network Rail published the Strategic Business Case for New Lines in August 2009 which concluded that additional capacity will be required along the corridor between central London and Birmingham and the North West by the end of the next decade. The Study therefore recommended the construction of a new line, capable of running high speed services from London to the West Midlands, North West and beyond.

Work has since commenced on a further study into a potential high speed line connecting London to Leeds, the North East and the East Midlands which will be reported in due course.

6.4 Responses outside the RUS scope

Issues relating to specific options already included in the Draft for Consultation have been addressed under the relevant generic gap in the sections above. Any remaining concerns raised during the consultation process which fall outside the scope of this RUS have been detailed below.

By far the greatest recurring issue raised during the consultation process by individual members of the public was the omission from the Draft for Consultation of stakeholder aspirations for the reopening of the east – west rail link between Oxford and Cambridge. This, along with all other stakeholder aspirations for which funding is not yet fully committed, is listed in **Appendix A**, but falls outside the scope for further consideration in the RUS.

A number of the key recommendations in the Draft for Consultation are reliant upon the availability of additional rolling stock to the Train Operating Companies (TOCs). EMDA requested that the final RUS should provide some clarity of the likely timetable for delivery of this stock. The DfT went further in their response and suggested that the final RUS should explore options for revised deployment of the current rolling stock fleet and opportunities presented by the electrification of the route, particularly as the MML is outside the scope of the current Intercity Express Programme (IEP).

Timescales and final capacity interventions are dependent on the DfT's rolling stock strategy and subsequent acquisition, cascade and deployment of rolling stock across the network as a whole. It would not be constructive for individual geographical RUSs to speculate about the potential scenarios for specific routes where these are not already known, as the ramifications to the rolling stock strategy for the rest of the network may be significant.

6.5 Further wider stakeholder briefings

The Wider Stakeholder Group (WSG), comprising representatives from the wider industry such as local authorities, development agencies, rail user groups and community rail partnerships, has been kept up-to-date with progress on the East Midlands RUS throughout its development through a series of briefings. The last of these briefings will take place in March 2010, following publication of the final RUS. At these briefings the WSG will be updated on the additional analysis completed during the consultation period, further work undertaken as a result of consultation responses and the final strategy for the East Midlands over the next 10 years and through the longer term.

In addition to the WSG briefings, individual briefings have been held with a number of stakeholders.

7. Strategy

7.1 Introduction

Previous chapters have set out the existing ability of the route to accommodate the current and forecast levels of demand for passenger and freight traffic in the East Midlands. This has included identification of interventions which are committed within the next five years.

Chapter 5 has discussed the remaining major gaps between the current functionality of the route and that required as a result of anticipated growth, along with the options identified to address these gaps.

Areas where existing provision falls short of future requirements predominantly centre around: peak crowding into London, Leicester, Nottingham and between Derby and Matlock; all day crowding between Birmingham and Stansted Airport and the East Midlands and North West; required increase in capability for freight; regional connectivity: particularly the frequency, journey times and routeing between urban centres within the East Midlands, and from these urban centres to London, the north, the West Midlands, the south and west and to Stansted Airport; and the reliability of services at key locations on the route. The aspiration for increased access to the network in the late evenings and especially on Sundays to operate an enhanced timetable has also been considered.

This section of the East Midlands Route Utilisation Strategy (RUS) discusses the conclusions which can be drawn from the analysis and details the strategy for the route. The gaps are grouped together as in **Chapter 5** and the measures necessary to deliver the strategy in the short and medium term are described.

7.1.1 Short term

In July 2007, the High Level Output Specification (HLOS) was published. The HLOS set out the improvements in the safety, reliability and capacity of the railway system which the Secretary of State for Transport wishes to secure during Control Period 4 (CP4), the period 2009 – 2014.

In March 2009, Network Rail published its CP4 Delivery Plan which details how these outputs will be delivered. Much of the short-term strategy for the East Midlands is contained in the Plan. It consists of measures to increase capacity on peak services; remodel Nottingham station to improve performance; enhance the capability of the infrastructure between London and Sheffield on the Midland Main Line (MML) to provide faster journey times; and improve freight capability. It also includes significant programmes such as Thameslink which will deliver 12-car trains on the Bedford – Brighton corridor progressively from the end of 2011 as part of Key Output 1, with new fixed-formation rolling stock from 2013 onwards. This will ultimately provide an enhanced peak service of 16 trains per hour (tph) and off-peak service of 12tph on the Midland route.

The growth targets for peak hour services into London St Pancras International are therefore expected to be met through the train service proposals contained in the East Midlands Trains franchise; longer Thameslink services upon completion of Key Output 1 of the Thameslink Programme; and the introduction of services from Kent via High Speed One.

At Nottingham and Leicester, the targets for peak services are expected to be met by a combination of lengthening some of the existing Norwich – Liverpool services, subject

to the conclusion of negotiations between East Midlands Trains (EMT) and the Department for Transport (DfT), and some of the existing Birmingham New Street to Stansted Airport services.

A strategic solution to the provision of adequate rolling stock facilities is a network-wide issue and will be considered as part of the Network RUS. However, so far as the additional HLOS vehicles for East Midlands RUS area are concerned, it is anticipated that these can be accommodated within the existing depots and stabling facilities. The only new build rolling stock proposed for the East Midlands RUS area is that to be provided as part of the Thameslink Programme. The DfT is managing procurement of the future Thameslink rolling stock fleet and the contract will include provision of new maintenance depots. The Thameslink Programme will be responsible for the connections to the new depot buildings and for altering existing or creating new stabling and berthing facilities as required. Some of the latter facilities are expected to be classified as Light Maintenance Depots.

National initiatives such as the Seven Day Railway Programme and the Strategic Freight Network (SFN) also form part of the CP4 deliverables, and where relevant these are incorporated in the strategy for the East Midlands described in the remainder of this chapter.

7.1.2 Medium term

The conclusions which can be drawn from the analysis of the gaps between levels of forecast demand and the current capacity, capability and performance of the route generally represent the medium-term strategy. The strategy aims to inform the development of the HLOS targets for Control Period 5 (CP5) and represents the majority of the interventions recommended in the previous chapter.

7.1.3 Longer term

Beyond that, the Government's White Paper, published in July 2007, challenged the industry to plan for a doubling of demand in the subsequent 30 years. The section on the 30-year vision sets out the implications of this level of growth for the East Midlands RUS area and the potential scope of the interventions that would be required to achieve it.

7.2 Peak crowding and growth

Crowding pressures and the impact of further growth have been described in **Chapter 4**. Options to address peak crowding and growth into London, Leicester and Nottingham, and on the Matlock – Derby line are detailed in **Chapter 5** and the strategy is set out below.

7.2.1 Short term

On the MML, crowding already exists on some services into London. At the southern end of the route, peak crowding on commuter services into London St Pancras International will be addressed by the introduction of 12-car rolling stock as part of the Thameslink Programme included in the CP4 Delivery Plan.

The benefits will be delivered in two increments. The first involves the provision of the capability for 12-car operations through the core London section and via the MML towards Bedford. The second increment involves the connection of the Great Northern services into the route; operation of 12-car trains on the Peterborough and Cambridge routes; and an increased frequency on the MML to 16tph in the peak. This increment is planned to be delivered by the middle of the decade. The overall programme involves large scale infrastructure works which will be undertaken

by Network Rail, as well as the acquisition of new trains and the revision of relevant franchises. The necessary infrastructure works are included in the HLOS and Network Rail's CP4 Delivery Plan.

However, crowding on the MML during the peak extends further north along the route and this will require further interventions. The East Midlands RUS therefore recommends that in addition to the Thameslink Programme, the staged introduction of longer trains on the Long Distance High Speed (LDHS) services is necessary, requiring 13 additional vehicles for London peak growth.

Overall sufficient capacity is provided at both Leicester and Nottingham across the three-hour peak to address increased demand in the medium term. However, crowding on some individual trains at Leicester and Nottingham in the peak is expected to exceed capacity by 2019 on five corridors, as described in **Chapter 5**.

Most of the extra capacity will be provided by lengthening of some of the London peak services described above and further LDHS services such that the overall requirement will be 21 additional LDHS vehicles over the short and medium term. It is recommended that some lengthening should commence as soon as additional rolling stock becomes available.

Infrastructure enhancements to expand existing depots and lengthen platforms (although the latter would not be necessary at some stations assuming Selective Door Opening (SDO) is used where appropriate) would be required to support LDHS train lengthening. Any future decision about the use of SDO would need to consider the potential performance disbenefits of longer station dwell times. The RUS has also considered the impact of two fully loaded peak trains arriving on adjacent platforms at London St Pancras International. Both the existing signalling arrangements (which limit the ability for simultaneous arrivals) and alternative exit strategies already operated at the station, are sufficient to mitigate any additional crowding issues. In addition, two extra vehicles are required for local peak services in the East Midlands.

EMT has already altered some train formations which has increased carrying capacity and reduced crowding on some services into Leicester and London. To take full advantage of these changes the option of lengthening two of the platforms at Loughborough station is included as part of the East Midlands package of platform extensions included in the CP4 Delivery Plan.

Improvements to the frequency of the train service on the Matlock – Derby – Nottingham corridor from December 2008 has resulted in crowding on the Matlock – Derby section of the journey for short periods of time (less than 20 minutes) in the high peak. EMT has already strengthened some trains from December 2009.

RUS analysis has demonstrated that a case could not be found for further lengthening due to the costs associated with operating and leasing the additional vehicles. However, it is noted that severe crowding will be experienced for short distances on these services by 2019. Therefore, the RUS recommends that opportunities to strengthen the high-peak services between Matlock and Derby within the existing resource base are examined and introduced as soon as practicable.

7.2.2 Medium term

The strategy for progressive train lengthening described above will continue such that by 2019, all of the additional 21 vehicles will be deployed on LDHS services on the MML. This will result in the majority of LDHS trains running with 11-cars in the London peaks by 2019. This will alleviate most of the crowding at London St Pancras International across the three hour peak. The removal of crowding on every London peak train would require large scale infrastructure changes which are unlikely to be justified by the level of benefits achieved.

As fleet changes occur in the future, the opportunity to reconfigure the relative proportions of standard class and first class seats, using commercial mechanisms available to the train operator, may further reduce crowding.

A number of schemes have been identified which will improve access to stations through the provision of improved facilities and enhanced interchanges, and these have been discussed in **Chapter 3**. Analysis carried out by Passenger Focus has identified stations where facilities for parking cars, motorbikes and bicycles is limited after 9am and this is also detailed in **Chapter 3**. It is recommended that as schemes are brought forward to improve parking facilities at stations, those locations where capacity is already constrained are examined as a priority. There will be a continuing need to work with train operators, local authorities and other stakeholders to maximise access opportunities both within the Network Rail property portfolio and beyond it.

7.3 All day crowding and growth

Evidence of all day crowding (including that on peak services) has been detailed in **Chapter 3** and the options to provide additional capacity to address current demand and forecast growth are set out in **Chapter 5**. The strategy is discussed below and is focused on the following corridors:

- Liverpool – Norwich
- Birmingham – Stansted Airport
- Birmingham – Derby – Sheffield.

7.3.1 Short term

EMT is currently in discussions with the DfT to provide additional capacity on the Liverpool Lime Street – Norwich service which will reduce crowding along the route and at other urban centres outside the RUS area. The majority of the crowding occurs between Liverpool and Nottingham and the additional capacity provided will relieve crowding at Nottingham in the peaks. Generally, there is sufficient capacity on existing services to address future growth between Nottingham and Norwich. Therefore, the intention is to operate mostly with four-car trains between Liverpool Lime Street and Nottingham, with two cars continuing to Norwich.

In addition, the extension of the early afternoon Liverpool Lime Street – Nottingham service to Norwich and the strengthening of the early morning Norwich to Liverpool Lime Street service will provide further crowding relief at Nottingham and spread the passenger loading across the peak.

Crowding on the Birmingham to Stansted Airport corridor is anticipated to increase due to increasing commuting into Birmingham and Cambridge and leisure travel throughout the day. The anticipated growth in demand along the route, and options to address this are described in detail in **Chapter 5**. In the short term, CrossCountry plans to lengthen some interurban services operating between Birmingham New Street and Stansted Airport from two-car trains to three-car or four-car trains. It is believed that this can be achieved from the existing rolling stock fleet. This will require platform lengthening at Stansted Airport along with the fitment of SDO to some of the turbostar fleet.

Crowding on interurban services on the Birmingham – Derby – Sheffield corridor was analysed during the consultation period. The refurbishment of the rolling stock operating on the long distance interurban services, recently carried out by CrossCountry, will alleviate some of the crowding in the short term. However, further interventions will be required over the medium term and these are discussed below.

7.3.2 Medium term

Analysis in **Chapter 5** has identified that an additional 12 vehicles (including those proposed for introduction in CP4, described in the short-term section above) will alleviate crowding up to 2019 on the busiest section of the route between Liverpool and Nottingham. Options to address the remaining crowding between Manchester and Liverpool will be reviewed as part of the Northern RUS.

To address crowding levels, which are expected to reach 120 percent of seated capacity on average, across all Birmingham New Street – Stansted Airport services by

2019, a further increase in capacity is required, as set out in **Chapter 5**. This will necessitate additional strengthening of services along this corridor through a combination of the extension of existing services and train lengthening. The RUS recommends that some of the existing Birmingham New Street – Leicester services are extended to Cambridge from 2011, and train lengthening, requiring an additional six vehicles, is targeted at relieving the remaining crowding as soon as rolling stock becomes available. RUS analysis has demonstrated that there is a case for providing these strengthened services both during the week and at weekends.

Analysis in **Chapter 5** has demonstrated the case for the provision of additional capacity on the long distance interurban services operating on the Birmingham – Sheffield corridor, via Derby.

The RUS analysis was based on the current timetable, infrastructure capability and resource availability and requires the provision of up to nine additional vehicles. However, changes to any of these variables, including options being developed by other RUSs to address regional connectivity gaps, could alter the infrastructure and/or rolling stock requirement.

Therefore, it is recommended that the strategy for this corridor is finalised in the West Midlands and Chilterns RUS, which will bring together the gaps and options across the interurban network. This could provide further recommendations which may involve alterations to the routeing of services and calling patterns, as well as train lengthening. In this context it is important to note the additional long distance interurban service connecting the South West and the North East (as identified in the Yorkshire & Humber RUS) for the medium to long term.

7.4 Freight capability

Current freight capability has been described in **Chapter 3**. The SFN programme, which is included in the CP4 Delivery Plan, has produced a freight forecast to 2030 which has been agreed by the industry, and is developing a forecast for 2019.

A high level forecast of the additional train paths per day by 2030 has been produced and includes the proposed routeing of trains through the East Midlands based on an unconstrained network. This assumes that gauge enhancement of the infrastructure as proposed by the SFN has been carried out. Options likely to be required to address freight capability are described in **Chapter 5**. The strategy described below focuses on these options, plus those interventions required to support freight growth on the East Midlands by 2030, as some of these may be required in the medium term. As the 2019 forecast was not finalised prior to publication of this RUS, further work will be required to review the phasing of interventions as part of the development of the programme of works for CP5.

7.4.1 Short term

On the MML, current utilisation levels of approximately 60 percent of the paths available indicate that there is sufficient headroom to accommodate growth in the short term.

However, to accommodate aspirations for heavier southbound daytime freight trains on the MML (60mph with more than 2000 tonnes trailing load), predominantly for aggregates traffic, additional infrastructure is required south of Bedford. Based on the December 2008 timetable, this would necessitate the provision of a loop south of Bedford. Development work has commenced, as part of the Hope Valley – London train lengthening scheme, to examine the feasibility of this solution, along with alternative options such as the provision of a dynamic freight loop south of Bedford.

As work on the future Thameslink timetable progresses, an alternative location for some form of looping facility or alternative infrastructure solution may be identified and this would be evaluated if required. The RUS recommends that two daytime off-peak paths need to be maintained in each direction south of Bedford within the Thameslink timetable. If the necessary enhancements to operate heavier freight trains are funded, then the

provision for southbound daytime paths in the Thameslink timetable would need to be 60mph with 2500 tonnes trailing load.

RUS assessment of freight capacity south of Bedford also concluded that two of the extra Thameslink off-peak services must terminate south of Cricklewood in order to accommodate the above freight trains. This conclusion will need to be tested as part of the timetable development work led by the Thameslink Programme.

If a southbound 60mph train with more than 2000 tonnes trailing load is required to operate via Market Harborough during the day, an additional loop is also required between Leicester and Kettering. RUS analysis of the sites currently included in the MML Linespeed Improvement (LSI) project for CP4 has further demonstrated that the reduction in headways between Kettering and Wigston Jn may also drive the requirement for a loop in the northbound direction, at the same location, in order to maximise the benefits of the linespeed improvements. This will need to be assessed further as the LSI project is developed and the locations for infrastructure intervention are confirmed.

To allow more than one train per hour to operate at night when the fast lines between Bedford and Kettering are blocked for engineering works, RUS analysis has demonstrated that some enhanced infrastructure on the bi-directional slow line is required. Opportunities to provide an additional loop between Sharnbrook and Kettering are currently being examined as part of the Seven Day Railway Programme which would address this constraint.

A scheme is under development to enhance the gauge to W10/W12 on the corridor between Water Orton and Doncaster as part of the SFN programme of works for implementation in CP4. This will enable deep sea 9” 6’ height container traffic to be routed from Southampton via the West Midlands to Yorkshire without the need for special wagons and would generate significant intermodal growth on this corridor.

Gauge and capacity enhancements are also required between Helpston Jn and Nuneaton to accommodate the forecast growth in intermodal container traffic originating from the port of Felixstowe. In the short-term, the gauge will be increased to W10 as part of the Felixstowe to Nuneaton enhancement scheme funded through the Transport Innovation Fund.

7.4.2 Medium term

Demand for freight traffic in the medium term is currently being assessed as part of the SFN study. The 2030 forecast indicates only a modest growth in freight trains per day on the MML (20 train paths per day in total). Therefore, provided that northbound services still have low trailing loads (mainly comprising empty services) and an occasional train is routed via Corby, no additional infrastructure is required to accommodate these services. RUS analysis has confirmed that the two northbound paths per hour can accommodate 75mph intermodal trains with 1600 tonnes trailing load.

However, the train path requirement would be slightly lower if the maximum daytime southbound trailing load could be increased to 2500 tonnes. RUS analysis has demonstrated that provision of a third path per hour is not achievable within the constraints of the existing infrastructure.

On other routes, the 2030 forecasts have generated a number of additional interventions, when combined with anticipated additional passenger services. Where the 2030 forecasts cannot be accommodated by the existing infrastructure, RUS analysis has identified the level of path requirement beyond which it breaks down.

Between Water Orton Jn and Stenson Jn, 48 freight train paths per day are anticipated to be required by 2030, with an additional 20 freight train paths crossing the route between North Stafford Jn and Stenson Jn. RUS analysis has shown that the existing infrastructure will not support growth in freight traffic beyond four train paths per hour in each direction between North Stafford Jn and Stenson Jn. The number

of crossing moves at North Stafford Jn and particularly at Stenson Jn, amongst fast passenger services, is a major constraint together with the five minute signalling headways.

To accommodate three train paths per hour (comprising one Class 6 with 3000 tonnes trailing and one Class 4 with 1600 tonnes trailing via Sheet Stores Jn – Stenson Jn, and one Class 6 with 2500 tonnes trailing load via Derby, all hauled by a Class 66 locomotive) included in the 2030 freight growth forecast would necessitate the provision of:

- a northbound recess facility between Kingsbury and Burton-on-Trent
- a remodelled layout in the Stenson Jn area
- four aspect signalling to reduce the signalling headways.

To further accommodate the additional long distance interurban services identified in the Yorkshire and Humber RUS, the recess facility between Kingsbury and Burton-on-Trent would be replaced with the requirement to provide four tracks between Wichnor Jn and Clay Mills Jn and increased junction speeds at Clay Mills. This could be achieved by extending the existing goods loops at Burton-on-Trent. The optimum solution, which would also provide improved journey times for interurban services (see section 7.5 Regional Connectivity gap below), may involve the complete remodelling of the Burton-on-Trent station area.

Anticipated benefits include:

- increased capacity for freight services
- improved journey times for interurban services (see section 7.5, Regional Connectivity gap below)
- increased capacity for passenger services, increasing regional connectivity (see section 7.5 Regional Connectivity gap below)
- Seven Day Railway benefits on the Birmingham – Derby route (see section 7.7 Seven Day Railway gap below)
- better performance.

On the east – west corridor, between Helpston Jn and Wigston Jn, a scheme is in development for implementation in CP5 to provide capacity for a minimum of 24 trains per day in each direction on the Ipswich – Nuneaton route. The scheme includes the RUS recommendation to increase passenger services on this corridor to a maximum of two per hour in each direction.

However, RUS analysis has demonstrated that the scheme will need to be enhanced to include four tracking throughout between Syston Jn and Wigston Jn, and furthermore, works to reduce signalling headways between Ketton and Helpston Jn will be required to operate more than two freight trains per hour between Helpston Jn and Syston Jn. This will provide the capability for 45 freight train paths per day between Helpston Jn – Syston Jn and up to 40 train paths per day between Syston Jn – Wigston Jn, with the following characteristics:

- two Class 4 with 1600 tonnes trailing load and one Class 6 with 2500 tonnes trailing load between Helpston Jn – Syston Jn
- two Class 4 with 1600 tonnes trailing load and one Class 6 with 2500 tonnes trailing load between Syston Jn and Wigston Jn
- two passenger trains per hour between Leicester and Peterborough (with 25/35 minute service intervals)
- other existing passenger services in the Leicester area.

The RUS recommends that these requirements are incorporated into an integrated scheme for the Leicester area, including Leicester re-signalling, to be developed for delivery in early CP5. Both the existing scheme feasibility study and the RUS analysis concur that grade separation at Wigston is not required to deliver passenger and freight growth in the medium to long term.

The additional infrastructure associated with the above scheme would provide the following additional benefits:

- potential opportunities to reduce the journey time on the corridor and improve connectivity between the east of England, the East Midlands and the West Midlands
- performance improvements on the Helpston Jn to Nuneaton corridor
- additional operational flexibility which will improve the ability to run train services whilst maintaining and renewing the railway on this section of route.

By 2030, 23 freight train paths per day (Class 6 with up to 3000 tonnes trailing load) are anticipated to be required on the corridor between Nottingham and West Holmes Jn. RUS analysis has determined that the infrastructure is broadly sufficient for this quantum of trains.

However, once the corridor demand reaches 18 freight train paths per day, and more than one path per hour is required, capacity at Newark Crossing and at Nottingham will become major constraints. The existing infrastructure only provides for two paths per hour each way (one freight and one passenger path) along the east – west corridor over Newark Crossing. Only one freight path per hour can be accommodated in the remodelled layout proposed for Nottingham station area in 2012/13. Alongside the aspiration for additional passenger services (discussed in the Regional Connectivity section later in this chapter), future freight growth will drive the requirement for a flyover at Newark over the East Coast Main Line (ECML) and the provision of an additional through line at Nottingham station. The scheme to remodel Nottingham station in CP4 includes passive provision for an additional line, with or without a platform.

In the Lincoln area, the interaction between terminating passenger services and freight trains passing through the station area (on both the Immingham – Nottingham line and Great Northern/Great Eastern (GN/GE) Joint Line between Peterborough and Doncaster via Spalding) has been identified by this RUS as a constraint to future growth.

The ECML RUS assumed a standard pattern of passenger and freight services on the GN/GE Joint Line, including the Peterborough services running through Lincoln rather than terminating at the station. The SFN forecast anticipates up to 60 freight train paths per day by 2030 in the Lincoln area, including one Class 6 with 2000 tonnes trailing load and one Class 4 with 1600 tonnes trailing load via the GN/GE Joint Line.

The GN/GE Joint Line scheme, which is under development for delivery in CP4, will need to consider whether or not combining terminating services at Lincoln would free up sufficient capacity to accommodate short to medium-term growth and how much longer term growth can be accommodated with the revised infrastructure.

Whilst freight terminal capacity was not identified as a RUS gap, it should be noted that the East Midlands is one of the few regions without an intermodal terminal. East Midlands Development Agency (EMDA) has commissioned a study to examine potential sites for a terminal in the East Midlands. Network Rail will continue to work with EMDA, freight terminal developers and other interested parties to progress any schemes that emerge.

7.5 Regional connectivity

Chapter 3 has described the existing demand on passenger flows between urban centres within the RUS area and to other Regions such as London and the South East, West Midlands, Yorkshire and Humber, North West and East of England. Regional planning strategy continues to place emphasis on the development of these connections as a means to improve rail's competitive position against road and to support regional economic development both in terms of employment opportunities and housing growth. In terms of the provision of existing services, **Chapter 5** has identified the options to reduce journey times or increase service frequencies which would improve regional connectivity. The strategy for the short to medium term is described below.

Short to medium term

7.5.1 London from Leicester, Derby, Nottingham and Sheffield

At the southern end of the route, the completion of the second increment of the Thameslink Programme will deliver improved connections to a number of destinations south of the River Thames and also offer improved east – west connections by means of the new Crossrail interchange at Farringdon.

North of Bedford, the new timetable introduced in December 2008 provided many benefits such as the increased carrying capacity provided by altered rolling stock formations on the LDHS services and new journey opportunities to the recently opened East Midlands Parkway and Corby stations.

However, the restructured timetable has resulted in an uneven calling pattern for East Midlands Parkway station. Linespeed improvements completed in February 2010 on the slow lines between Leicester North Jn and Trent South Jn may enable the stopping pattern for East Midlands Parkway to be spread more evenly throughout the hour.

The MML linespeed improvement scheme is currently in development for implementation in CP4. The scheme aims to enhance the capability of the infrastructure, enabling the journey time on the MML between London St Pancras International and Sheffield to be reduced by a minimum of eight minutes for passenger services calling only at Leicester, Derby and Chesterfield. The project aims to increase linespeeds along the route where they are currently below the 125mph capability of the rolling stock which operates over the route. Any improvements north of Derby will also benefit the long distance services between Scotland, the North East, West Yorkshire, Birmingham and beyond.

Infrastructure works will be developed to maximise potential synergies with planned track renewals and with the resignalling scheme proposed at Leicester in late CP4/early CP5, which may offer further opportunities for linespeed increases.

7.5.2 Bedford, North Northamptonshire and the north

Connections from the Milton Keynes South Midlands (MKSM) growth towns of Kettering and Wellingborough to or from Leicester, Derby and the north have reduced as a result of alterations to the stopping patterns in the December 2008 timetable.

Various options were examined to improve connectivity between the MKSM area and Leicester, Derby and the north. These were further expanded, following consultation, to include Luton and Luton Airport Parkway to improve connections from the M25 catchment area. All options are discussed in detail in **Chapter 5**. Overall, an additional Kettering stop in the Sheffield semi-fast service still provides the optimal solution both in terms of addressing demand to the north and value for money. The next best option is provided by an additional stop at Luton, but it is anticipated that this will increase crowding into London.

The RUS recommends that an additional stop at Kettering is inserted into the Sheffield semi-fast service in the medium term. This would provide a direct service from the MKSM growth area to Derby, Chesterfield and South Yorkshire.

This proposal also provides a fast service between Kettering and London St Pancras International which will support economic regeneration in the MKSM area. The altered calling pattern of this service will improve the connectivity from stations south of Leicester to East Midlands Airport Parkway, Derby and South Yorkshire. It is anticipated that any journey time disbenefits to long distance passengers would be offset by the implementation of MML linespeed improvements described previously in section 7.5.1.

7.5.3 Birmingham New Street and Stansted Airport

Opportunities to improve the journey time between Birmingham New Street and Stansted Airport could be provided by the Ipswich to Nuneaton capacity improvement scheme described in **Chapter 5** and in section 7.4.2 above.

The provision of later/earlier trains on the Birmingham – Stansted Airport corridor to better align with airport departures/arrivals has also been examined in **Chapter 5**. The RUS recommends the provision of two additional services (in each direction) from Cambridge to Stansted Airport in the early morning and late evening, as soon as resources become available. A further option to provide an hourly or two-hourly overnight service to Peterborough is recommended subject to the demand for the additional Cambridge services demonstrating that there is likely to be a sufficient market for further services.

The extension of some Birmingham New Street – Leicester services to Cambridge will improve connectivity.

Opportunities to improve journey times between Nuneaton and Birmingham will be identified in the West Midlands and Chilterns RUS.

7.5.4 Birmingham – Derby – Nottingham/ Sheffield

Regional connectivity between the East Midlands and the West Midlands would be enhanced by improved journey times on the corridor between Birmingham and Nottingham via Derby and as noted in section 7.5.1 between Derby and Sheffield. Various infrastructure options are being considered against the potential journey time benefits that could be achieved and include:

- remodelling of Burton-on-Trent to improve speeds for non-stop services
- linespeed increases at various locations along the route to align with the maximum speed achievable with the existing rolling stock
- improvements to approach speeds at Derby station, in conjunction with signalling renewals currently planned for around CP6 (2019 – 2024).

Use of faster rolling stock on the services between Nottingham and Birmingham New Street or Cardiff Central would also provide an improved journey time. The RUS recommends that this is further developed by the West Midlands and Chilterns RUS to incorporate the additional benefits of improved journey times on services that cross Birmingham and reduced crowding into Birmingham New Street.

The overall benefit to passengers of improving journey times on this corridor is sufficiently high such that the RUS recommends that the route is upgraded in CP5, in conjunction with timetable restructuring.

7.5.5 East Midlands and the North West

Options to improve connectivity to the North West were examined but failed to generate a sufficient business case. Further analysis has demonstrated that provision of a direct service between the East Midlands and the North West would deliver a generalised journey time improvement of 15-20 percent which is not sufficient to justify the additional costs associated with operating the service. It is therefore not possible to recommend any of the options to improve existing journey times to the North West.

However, the introduction of the Nottingham to Leeds service in December 2008 and the more recent provision of an additional service per hour from Sheffield to London St Pancras International, significantly increase the connectional opportunities at Sheffield for the North West. It should be noted that the Manchester Hub study has recommended four Hope Valley fast services with one connecting the North West with the East Midlands, running via Dore South curve.

7.5.6 Nottingham and Leeds

Regional stakeholders have aspirations to improve the connectivity between Nottingham and Leeds and **Chapter 5** has described the option identified to reduce journey times on this corridor. The RUS recommends that further work is undertaken to develop the specific infrastructure changes necessary to deliver the linespeed improvements in CP5.

As noted in **Chapter 5**, the case would be further improved if the overall journey time

between Nottingham and Leeds could be improved sufficiently in each direction to enable resource levels to be reduced by one unit. One means of achieving this would be to route the service via Wakefield Westgate and Moorthorpe, rather than via Wakefield Kirkgate, but this would reduce the number of services operating between Sheffield, Barnsley and Leeds.

7.5.7 Derby and West Yorkshire

The Yorkshire and Humber RUS has examined the option of rerouting all CrossCountry franchise services between Newcastle and Reading via Leeds to alleviate the main connectivity and crowding gaps (Option YS2). The RUS concluded that whilst this option would normally be recommended for inclusion in the strategy it is heavily dependant on other industry processes, such as HLOS, the development of the ECML regular interval timetable, and the wider socio-economic impacts not assessed as part of the RUS process. As a result, the option will need to be developed in more detail through other industry processes.

Analysis carried out for the East Midlands RUS has demonstrated that additional infrastructure works will be required between Wichnor Jn and Clay Mills Jn and at Stenson Jn (described earlier in section 7.4 on Freight Capability) to accommodate the combined anticipated growth in passenger and freight services in the medium to long term.

Furthermore, whilst it has been possible to path the additional services via Derby, the timetable is extremely tight, particularly at the south end of the layout at Derby station which has already been demonstrated to suffer from poor performance. An improved layout in the Derby area and the provision of four aspect signalling, to reduce the signalling headways would help protect the reliability of trains along this corridor.

7.5.8 Nottingham and Lincoln

Along the east – west corridor between Lincoln and Nottingham, various options have been evaluated to improve journey times, including:

- linespeed increases
- faster rolling stock
- increased service frequency
- alternative service provision.

These options are explored in detail in **Chapter 5**. Analysis for the RUS has demonstrated that most benefit is derived from the combination of a faster service at an increased frequency. It is considered that the achievement of this option is likely to require the provision of a flyover over the ECML at Newark, due to the constraints on the number of paths available over the existing flat crossing as further LDHS services are introduced on the ECML. The option to provide the flyover is discussed in section 7.6.6. The RUS recommends that the option for a faster, more frequent service between Nottingham and Lincoln is progressed in conjunction with further development work on Newark flyover for potential implementation in CP5.

7.5.9 Peterborough and Lincoln

The upgrade of the GN/GE Joint Line between Peterborough and Lincoln via Spalding and Sleaford (and onwards to Doncaster) which is planned to be implemented in CP4 provides the opportunity to increase the number of passenger services between Peterborough and Lincoln. The option to provide a standard hourly pattern throughout the day has been evaluated and is detailed in **Chapter 5**. However, the benefits associated with an all day service do not currently justify the operational costs required to provide additional rolling stock and train crew. The provision of improved linespeeds as a result of the upgrade may provide an opportunity to utilise existing resources to increase the number of passenger services on this corridor.

7.5.10 Nottingham and Stoke-on-Trent

Two options were examined to improve the connectivity between Nottingham and Stoke-on-Trent, and these are described in more detail in **Chapter 5**. The options demonstrated medium to high value for money. However,

significant further work is required to evaluate the disbenefits associated with the interaction of the new service with existing and anticipated future services, particularly at the south end of Derby and between Sheet Stores Jn and Trent East Jn.

The RUS recommends that any future proposal to improve connectivity between Nottingham and Stoke-on-Trent must examine the pathing, performance and rolling stock implications of options to extend the existing Crewe – Stoke-on-Trent – Derby services through to Nottingham, to confirm that there is an overall net benefit.

7.5.11 Airports

Rail connectivity to East Midlands Airport may be improved by the recommendations in sections 7.5.4 and 7.5.5 above which will improve the spread of services at East Midlands Parkway station.

The recommendations in the RUS maintain the existing levels of rail service provision for Luton Airport.

Regional connectivity to Stansted Airport will also be improved by the options recommended in sections 7.3.2 and 7.5.3 above.

Improvements to connectivity between the East Midlands and Birmingham International Airport will be addressed through the West Midlands and Chilterns RUS.

7.6 Performance

Detailed analysis of the historical reactionary delays occurring along the route is included in **Chapter 3**. Options to address the locations with the worst congestion related performance delay are described in **Chapter 5**. The strategy to improve performance across the RUS area in the short to medium term on the route is outlined below.

7.6.1 Bedford to London

A number of planned and potential initiatives have been described in **Chapter 5** that would improve performance on the MML south of Bedford, including:

- a new crossover to the north of West Hampstead Thameslink station as part of the Thameslink Programme to better manage train performance at times of disruption within the core section
- flashing yellow signals at Harpenden Jn and Radlett Jn to improve the junction approach speeds
- a review of sectional running times between Farringdon and Kentish Town which should reduce reactionary delay in the West Hampstead area
- additional fast to slow line crossovers on the London side of Carlton Road Jn so that Thameslink services that cross from the fast lines to the slow lines can do so without conflicting with trains from the Tottenham and Hampstead Line
- any further infrastructure requirements which emerge as part of the performance assessment of the timetable being developed by the Thameslink Programme
- the provision of a southbound loop south of Bedford.

A revised layout for Bedford station is being developed as part of the Thameslink Programme. This would extend the bay platform through the existing station. Relocation of the station is being examined as part of a scheme in conjunction with Bedford Borough Council to redevelop the area around the station, and includes additional facilities on the west side of the station. The additional infrastructure proposed by the Thameslink programme would improve performance through Bedford station.

7.6.2 Kettering area

In the Kettering area, performance is constrained by the reduced capacity available where the four tracks reduce to three tracks from Sharnbrook Jn to Kettering South Jn and on the single line between Kettering and Corby. Capacity has recently improved through this section with the reinstatement of the third track

between Harrowden Jn and Kettering South Jn, providing three tracks throughout. However, options to provide additional infrastructure, as described in **Chapter 5**, cannot be justified in terms of performance benefits alone. The provision of loops between Sharnbrook Jn and Kettering is being developed as part of the Seven Day Railway Programme for possible delivery in CP4.

7.6.3 Wigston Jn – Helpston Jn

Performance in the Leicester area would be significantly improved with the infrastructure enhancements required to accommodate the combined passenger and freight growth forecast in the medium to long term (these interventions were described earlier in the section on Freight Capability in paragraph 7.4).

Various alternative layouts for Leicester have been outlined and these should be developed further in conjunction with any future plans to extend electrification beyond Bedford, or as part of resignalling in CP5.

7.6.4 Loughborough

The introduction of the December 2008 timetable has already improved performance at Loughborough by reducing the conflict between trains on the slow lines. An option to alter the layout at Loughborough was evaluated in **Chapter 5** but cannot be justified on performance benefits alone.

7.6.5 Mountsorrel

Access to the freight terminal at Mountsorrel has been identified in **Chapter 3** as a current performance issue, with the current arrangement of running Up freight trains along the Down fast line from Mountsorrel to Sileby Jn a particular constraint. A series of infrastructure options to improve performance in the Mountsorrel area were discussed in **Chapter 5**. None of the solutions tested delivered sufficient performance benefits to justify the infrastructure costs associated with them.

Charnwood Borough Council, in conjunction with other third parties, has undertaken a study into the provision of alternative access to Mountsorrel quarry and it is recommended that the industry benefits identified for the relocation option are considered as part of this or any future studies.

7.6.6 Newark

As described in **Chapter 3**, the current flat crossing at Newark is a capacity constraint which also results in performance delays for trains travelling on the east – west corridor and on the ECML. RUS analysis has demonstrated in **Chapter 5** that replacement of the at grade crossing with a flyover would provide the following benefits:

- improved journey times on both the east – west corridor and the ECML
- the capacity to operate more freight services
- performance benefits in the Newark area and at Loughborough as a result of the removal of the parallel move at Newark Crossing
- operational cost savings to ECML LDHS services (such as fuel and brake blocks)
- the ability to run additional services between Lincoln and Nottingham
- more flexible timetabling arrangements.

The RUS recommends that further development work is carried out to refine the capital costs and benefits associated with the provision of a flyover at Newark. It is recognised that the development of the ECML services beyond those proposed for the May 2011 timetable, combined with freight growth beyond 18 trains per day on the east – west corridor, may drive the requirement for a flyover in CP5.

7.6.7 Derby

Derby station area represents the location with the highest level of reactionary performance delay in the RUS area. Conflict analysis has demonstrated that the majority of the delay is attributable to the layout of the southern end of the station.

Various alternative layout options have been reviewed to improve performance in the Derby area and are described in **Chapter 5**. Performance benefits alone, are insufficient to justify the level of expenditure necessary for these infrastructure interventions. However, the case for a remodelled layout is significantly improved when combined with the journey time benefits generated by Option 5.4 d).

Therefore, the RUS recommends that the layout at Derby is remodelled to segregate services and improve entrance/exit speeds, and that this scheme is developed for implementation in conjunction with major signalling renewals planned in CP6 and 7. More detailed work is required to refine the potential performance and journey time benefits associated with the remodelled layout.

Where opportunities can be taken to derive early benefits from track renewals planned to occur in advance of the major works or small scale stand-alone enhancements, they must be shown to be compatible with the remodelled layout.

The timetable is being reviewed as part of service changes proposed for May 2010 and the opportunity to improve platform working at Derby station is being examined, which could result in performance improvements at this location.

7.6.8 Nottingham

The implementation of two major infrastructure schemes in CP4 will lead to considerable performance improvements in the Nottingham area:

- doubling of the single lead junction at Trent East, which was completed in January 2010
- remodelling of the layout of Nottingham station area planned for implementation in 2012/13.

The opportunity to restructure the timetable as a result of the provision of a flyover at Newark, considered in section 7.6.6, would further reduce delays at Nottingham.

7.6.9 Chesterfield

The Seven Day Railway Programme is currently implementing a scheme to provide an additional platform at Chesterfield that will improve operational flexibility at this location. This will also reduce delays at Chesterfield by allowing passenger services to utilise the new bi-directional Down Slow line during perturbations.

7.6.10 Nottingham – Worksop

A number of small scale infrastructure schemes are in development which would improve performance on the Nottingham – Worksop corridor by enabling more recovery time to be incorporated in the timetable. Infrastructure works to enable the linespeed at Mansfield Woodhouse and Sutton Forest to be increased from 40mph to 50mph were completed in December 2009. Other schemes include:

- signalling improvements at Bulwell
- doubling the track to reduce the length of the single line section between Bulwell and Kirkby South Jn
- linespeed improvements between Mansfield Woodhouse and Shireoaks East Jn.

It is unlikely that the level of performance benefits achievable on this route would be sufficient to justify any large scale infrastructure investment to further improve reliability on the route.

7.6.11 Sleaford

Options to improve performance at Sleaford are described in **Chapter 5** and include timetable restructuring to improve turnround times and double tracking parts of the single line sections between Sleaford and Skegness. However, a case could not be found for any option and therefore the RUS cannot make any recommendations to address this gap.

7.7 Seven Day Railway

Existing levels of engineering access across the RUS area are described in **Chapter 3**. In general, access for maintenance and renewal works is sufficient, particularly as there are

three or more tracks on most of the busiest sections of route.

A small number of key routes have been identified for special attention as part of the Seven Day Railway Programme. For passenger services the principle is that Network Rail and train operators will offer a rail journey in almost all circumstances between key stations on these routes. The principle for freight operators is the ability to deliver key freight traffic flows by means of a preferred route or 'fit for purpose' alternative route. The passenger routes and freight flows within the RUS area that are covered by these principles are:

- Birmingham – York (key stations: Derby, Sheffield, Leeds)
- Birmingham – Nottingham (key station: Derby)
- London St Pancras International – Nottingham (key stations: Luton, Leicester)
- London St Pancras International – Sheffield (key stations: Luton, Leicester, Derby)
- West Midlands – South Yorkshire (via Water Orton, Derby and Beighton).

The Programme team are developing a number of initiatives to enable an increased level of service to operate in the late evenings and especially on Sundays. These initiatives are at various stages of development and are described in **Chapter 5**. As they represent the strategy for improving network availability on the East Midlands they are further discussed below.

Additional infrastructure at London St Pancras International low level is being considered as part of the Thameslink Programme to facilitate trains turning back towards the north. This facility was already provided, in part, as a result of works carried out in December 2009.

North of Bedford a number of schemes are currently being developed as part of the Seven Day Railway Programme including:

- an additional platform at Chesterfield station
- a loop on the slow lines between Sharnbrook Jn and Kettering
- speed increase on the slow line between Wellingborough and Harrowden Jn.

These schemes must demonstrate that they will contribute to an improvement in the availability of the infrastructure for passenger services, and at least maintain the current level of availability for freight services. Furthermore, the schemes must not have an adverse material effect on capacity, performance or journey times for freight or passenger services.

Further initiatives aimed at improving the productivity and efficiency of maintenance and renewal activities so that engineering work can be undertaken with less disruption to train services include:

- adjacent line open initiatives including additional bi-directional signalling and fixed/mobile warning systems for engineering staff
- facilities to enable the increased use of mechanised track patrolling at night (such as lighting at key junctions and the use of trolleys)
- facilities to improve efficiency (such as safe refuges and, pedestrian and vehicle access points).

The Programme has considered options to improve the capacity and reduce the extended journey time incurred by services using the Corby diversionary route (an alternative to using the Midland Main Line via Market Harborough) during disruptions. However, development of an affordable option has been hampered by the extensive drainage problems along the route.

The aspiration to operate additional Saturday evening services from London St Pancras International is also proving problematic due to the level of reduction in the maintenance time between Leicester and Derby. These issues are currently being reviewed by the Programme.

Initiatives to achieve Seven Day Railway principles on the section of route between Birmingham and Derby are currently being

developed by the Programme. The diversionary route via Leicester adds considerable time to journeys and is not consistent with Seven Day Railway principles.

A number of the infrastructure schemes identified in this RUS will have Seven Day Railway benefits (see 7.4.2 above).

7.8 Safety

The Seven Day Railway schemes also contribute to improving staff safety. Whilst specific initiatives have not generally been identified to improve safety, a number of the recommendations included in the medium term strategy will contribute to enhancing the safety of the network. In particular, remodelling the layout at Derby and the provision of a flyover at Newark would significantly reduce the number of conflicting moves and reduce the potential risks inherent in the layouts.

7.9 30-year vision

The Government's 2007 White Paper suggests a general doubling of both passenger and freight traffic nationally over a 30-year period. However, it is recognised there may be wide variations on individual routes or parts of routes according to local circumstances. This is particularly the case for intermodal freight traffic which is anticipated to grow at the fastest rate in the future and could see a quadrupling of traffic by 2038.

The recommendations included in the preceding sections of this chapter are based on analyses carried out in accordance with the DfT appraisal criteria. These criteria consider options on the basis of forecast demand across all modes, but do not actively seek to facilitate modal shift to rail.

It is possible that the modal shift strategy outlined in the "Delivering a Sustainable Railway" White Paper will become increasingly relevant. If further modal shift occurs at a faster rate than included in the RUS forecasts then it is possible that additional interventions will be required.

Specific initiatives which could drive greater or faster growth than anticipated across the East Midlands include:

- housing growth and economic regeneration particularly in North Northamptonshire, which is included in the MKSM area. Rail demand over the last five years has been higher than the national average in the MKSM area. When this is projected forward and includes the interventions already recommended in the RUS, passenger numbers by CP6 could exceed the capacity available
- the construction of an additional runway at Stansted Airport, which has recently received government approval, would lead to a step change in the level of airport related demand on the Birmingham – Stansted Airport corridor
- possible use of the MML as a Freight Priority Route which would absorb any additional growth in traffic between London and the north in the medium to long term to relieve pressures on the ECML and West Coast Main Line (WCML). This would see the MML providing a much enhanced role for freight services.

7.9.1 Accommodating freight growth up to 2030

As described earlier in this chapter, freight growth forecasts up to 2030, produced by the SFN workstream have been evaluated alongside the anticipated growth in passenger services and a series of infrastructure interventions have been identified (see Freight Capability gap in section 7.4 above).

Once the SFN workstream has produced a 2019 forecast for the East Midlands it will be possible to determine the phasing of these interventions. Any schemes which are not required in CP5, would form part of the long-term strategy up to 2030.

The SFN work stream has also examined freight growth on all routes between London and the north. This has included evaluation of the impact of growth on the ECML and WCML and the option of shifting more of this growth onto the MML. However, at this stage it is clear

that additional infrastructure would be required to support the use of the MML as a key intermodal freight route, including capacity enhancements and gauge clearance.

7.9.2 Accommodating passenger growth up to 2030

Beyond 2019, additional capacity is required to meet the growth projections for the MML shown in **Chapter 4**. The new rolling stock for use on LDHS services, such as that proposed by the IEP, would provide sufficient additional seating to manage growth over the longer term. However, longer trains will require some works at London St Pancras International, although the extent of the works has yet to be determined.

In the longer-term, further growth would be met by 12-car operation on all Thameslink services. This would require further platform extensions at a number of locations on the MML and south of London. Some of these would involve significant works to other infrastructure in order to provide this capability.

A doubling of passenger demand on other passenger services in the East Midlands could be met by progressive lengthening of services together with any associated platform extensions and/or additional services which would provide other benefits such as improved connectivity.

7.9.3 Accommodating combined passenger and freight growth up to 2030

There are a number of additional initiatives that could further affect longer-term capacity on the MML for both freight and passenger services. These are:

- the extension of electrification beyond Bedford to Corby, Derby, Sheffield and Nottingham on the MML
- further gauge enhancement to create a comprehensive network of core freight arteries in the northern half of the country which is capable of carrying deep sea containers on standard deck height wagons and swapbodies
- the construction of one or more new lines.

The impact of each of these initiatives on the longer term vision for the route is addressed below.

7.9.4 Extended electrification on the MML

The Government recently announced a £1.1billion electrification programme for the Great Western Main Line, the line from Liverpool to Manchester and, more recently, some additional lines in the North West. The Government is still considering the costs and benefits of electrifying the MML.

Network Rail has since published the Network RUS: Electrification in October 2009, following consultation, which has established a strategy for further electrification of the railway, subject to affordability. Gaps and options have been identified relating to current capability and the role that electrification may play in delivering an improved service. Appraisal of the options suggests that further electrification represents good value for money and that the MML potentially generates a net industry cost saving rather than a net cost over the 60-year appraisal period.

All LDHS services from London St Pancras International to Corby, Derby, Sheffield and Nottingham would be converted to electric traction. This would release a fleet of Class 222 diesel trains for use elsewhere on the network. The potential benefits of electric IEP services to improve capacity in the longer term have been outlined in section 7.8 above. As described previously in Option 1.4, the introduction of electric IEP services would provide 30 percent more seated capacity to accommodate further growth on the MML beyond 2019.

As set out in the strategy above, a programme of extending electrification on the MML would also present opportunities to remodel some of the major capacity constraints on the route around Leicester and Derby station areas.

The electrification of the short branch to Matlock currently has a marginal business case and its inclusion within the scope of the MML scheme will depend on the cost estimates as they are refined.

7.9.5 Further electrification opportunities on the RUS area

In addition to the MML, a number of routes in the East Midlands RUS area have also been recommended in the Network RUS: Electrification for further review to inform the decision point. These include:

- the three long distance interurban routes radiating from Birmingham, along with the section between Nuneaton and Water Orton, to enable these services to be operated by electric traction
- Newark Northgate – Lincoln which would enable the proposed London to Lincoln service to be operated by electric traction
- Felixstowe to Ipswich and Haughley Jn to Nuneaton which would provide an electric route for freight trains from the Haven ports to the ECML, the West Midlands and the WCML. It would also enable the Birmingham New Street to Stansted Airport services, which operate across this RUS area, to be operated by electric trains
- Corby – Manton Jn to complete an electrified diversionary route for the MML, avoiding Leicester.

7.9.6 Further gauge enhancement

The strategy in the electrification RUS further recommends that, subject to business case, the loading gauge of the MML is simultaneously enhanced. The Freight RUS has identified the MML as part of a future W12 network and the SFN is examining whether it would be feasible to clear the route to a European gauge if this can be achieved at acceptable incremental cost. This would provide the opportunity to utilise the route more fully to accommodate growth in intermodal traffic between London and the north. The increased demand would drive the need for further capacity enhancements and would likely require some of the major infrastructure work which cannot be justified in the strategy for the next 10 years such as:

- full four tracking of the section between Sharnbrook and Kettering
- doubling of the single line from Kettering to Corby (unless undertaken for Seven Day Railway purposes)
- loops between Syston Jn and Manton Jn
- doubling of the junction at Manton.

Extended electrification of the MML offers the opportunity to clear Syston Jn to Sheet Stores Jn for W10/12 or a European gauge. With further gauge enhancement to Stenson Jn this would provide an alternative route for container traffic to the WCML via Wichnor Jn, or with further clearances, via North Stafford Jn and Stoke-on-Trent. This would have the additional benefit of reducing the number of conflicting moves in the Leicester station area and may reduce the level of infrastructure change required at this location.

7.9.7 New lines/High Speed 2

Network Rail commissioned the New Lines Programme to investigate the case for building one or more new lines in addition to the national network. The focus of the New Lines Programme is to test the hypothesis that in the future, the existing rail lines from London to the north and west will be operating at full capacity and the conventional tools for increasing capacity will be exhausted. There will be the need for additional interventions, including the building of a new high speed line.

In August 2009, Network Rail published the Strategic Business Case for New Lines which concluded that capacity on the WCML will be exhausted by 2020; that there is a good business case for a new high speed line to increase capacity on this corridor; and that after this, the MML and ECML are likely to be the next routes that will need extra capacity in one form or another. The New Lines Programme is now considering the case for an additional high speed line connecting London to Leeds, the North East and the East Midlands.

In January 2009 the DfT announced the formation of High Speed Two (HS2), a company dedicated to examining, in more detail, the case for a new high speed line from London to the West Midlands.

The impact of any such new line on the East Midlands would ultimately depend upon the catchment areas through which it is routed. However, it would offer the following opportunities for some improved regional connectivity in parts of the RUS area:

- journey time reductions
- increased modal shift from car to rail
- economic regeneration.

7.9.8 Alternative growth scenarios

The demand forecasts used in this RUS are growth projections derived from the housing, population and employment forecasts contained in DfT's TEMPRO model, with some bespoke overlays. Longer-term demand forecasts are uncertain and extremely sensitive to economic conditions.

The RUS strategy is expected to cater adequately for forecast growth in passenger and freight demand in the next decade. In the event that growth in demand does not meet the RUS forecasts, then clearly it will be possible to delay or abandon interventions. It is essential that such decisions are made in time to avoid major expenditure commitments. Equally, if growth in demand exceeds the forecast over the next decade, then some of the measures for the longer term may have to be accelerated. Therefore, early planning for major infrastructure interventions, such as those described above, will be crucial and must be kept under review.


me Departures to Plat Comments
0:55 Nottingham 1 Boarding
1:00 Derby On time
1:25 Sheffield On time
3

8. Next steps

8.1 Introduction

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

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

8.2 Network Rail Route Plans

For planning purposes the Great Britain rail network is divided into 17 strategic routes. Network Rail publishes a plan for each strategic route, listing all significant planned investment on the route including the larger scheduled renewals as well as committed and aspirational enhancements. The plans for Strategic Route I (London and East Midlands) cover the scope of this RUS and the neighbouring routes which are referred to in this document. The recommendations of the RUS will be incorporated in these plans, as will the conclusions of work started by this RUS but to be completed through other industry processes. The Route Plans are updated regularly and support the Control Period 4 (CP4) Delivery Plan. The next edition (April 2010) will take into account the RUS conclusions as well as the Delivery Plan recommendations. The latest plans are available at **www.networkrail.co.uk**

8.3 Access charges review

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

8.4 Control Period 4

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

8.5 Control Period 5

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

8.6 Ongoing access to the network

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

8.7 Review

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

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

Appendices

Appendix A – Summary of aspirations

Aspiration	Progress
Cricklewood new station	Property agreement with Cricklewood Redevelopment Ltd to release Network Rail non-operational land for development which is expected to deliver economic benefit through the sale as well as enhancements to the railway.
Napsbury new station	Needs initial business case work undertaking by stakeholders. Requires more investigation – to be assumed that it would only be served by Thameslink inner services.
Harlington Parkway new station	A local aspiration. Would require analysis on the modal shift and needs to be assessed in relation to Luton Airport Parkway.
Elstow New Station	Also known as Wixams. Four platform station with new modular station building to provide local station facility to the Wixams development and south Bedford Park and Ride. The scheme is multi-funded (Third party and RAB[1] addition) and is completed to Grip[2] 4. The scheme is now on hold due to the economic climate and lack of third party funding.
Bedford North new station	Awaiting more detail from developers. Station would be served by East Midlands Trains and would require substitution for Bedford or other stops.
Desborough new station (north of Kettering)	Needs initial business case work undertaking by promoters and stakeholders. Case needs to be proved in value-for-money terms. Likely demand for rail services appears to be low and would need to be served by East Midlands Trains. There would be an adverse impact on journey times for existing services.
Kibworth New Station (north of Kettering)	Needs initial business case work undertaking by promoters and stakeholders. Case needs to be proved in value-for-money terms. Likely demand for rail services appears to be low and would need to be served by East Midlands Trains. There would be an adverse impact on journey times for existing services.
Wigston new station (south of Leicester)	Needs initial business case work undertaking by promoters and stakeholders. Case needs to be proved in value-for-money terms. Likely demand for rail services appears to be low and would need to be served by East Midlands Trains. There would be an adverse impact on journey times for existing services.
Other Leicestershire, Nottinghamshire and Derbyshire local new stations, including Blaby	Initial sites need business case work undertaking by promoters and stakeholders. Case needs to be proven in value-for-money terms on a station by station basis.

[1] Regulatory Asset Base
[2] Guide to Railway Investment Projects

Aspiration	Progress
Ilkeston new station	Feasibility study complete. Awaiting approval from Department for Transport. This station would be located on the Erewash Valley Line which is an important rail freight artery. Capacity and capability for existing freight traffic, and provision for future growth, would need to be considered in the development of the scheme.
North Wingfield new station	Needs initial business case work undertaking by promoters and stakeholders. Case needs to be proved in value-for-money terms. Likely demand for rail services appears to be low. There would be an impact on journey time for existing services.
Clay Cross new station	Needs initial business case work undertaking by promoters and stakeholders. Case needs to be proved in value-for-money terms. Likely demand for rail services appears to be low. There would be an impact on journey time for existing services.This station would be located on the Erewash Valley Line which is an important rail freight artery. Capacity and capability for existing freight traffic, and provision for future growth, would need to be considered in the development of the scheme.
Rushden new station	If this station were to be located on the up & down slow line there are serious concerns regarding the impact on freight capacity on the Midland Main Line.
Leicester – Coalville – Burton route reopening	Proposed link: 29 miles from Knighton Jn, Leicester to Leicester Jn, Burton. Using existing freight line upgraded for higher speed and with additional capacity provided through additional signal sections and an additional crossing loop on the single track sections. Just over half the route is double track. Existing freight capacity, especially at the east end for Bardon Hill/Stud farm quarries, needs to be protected, and provision made for future growth.
North Northamptonshire branches reopening	Needs initial business case work undertaking by stakeholders including an understanding of whether rail is best placed to serve the transport needs of this corridor. Unlikely to be justified.
Luton – Dunstable new/ reopened line	Previously rejected by Strategic Rail Authority (SRA) as a heavy rail scheme as there are significant operational and value-for-money challenges to make this scheme viable. Ongoing dialogue with Luton Borough Council with regards to Translink (the Luton to Dunstable guided busway) The SRA is supportive of the aims of the plan and will assist in future liaison between the borough and Network Rail in securing the transfer (and possible sale) of the former track bed between the two parties. The SRA will continue to liaise with the borough with regard to the associated development of a transport interchange close to the existing railway station and with regard to the transfer of parking facilities.

Aspiration	Progress
East – West Rail (Cambridge – Bedford-Milton Keynes – Oxford) new/reopened line	Business case work is being undertaken on certain sections of the route. Rail services on this route may have a synergy with some of the proposals in the Sustainable Communities Plan for the South Midlands area. SRA is participating in studies and awaits conclusions.
Matlock – Buxton reopening	Reinstatement would allow much of the eastbound aggregates traffic from the Peak District to be taken off the Hope Valley line.
Heathrow – St Pancras International	Previously rejected by SRA and other stakeholders. May be considered by Government as part of future airport rail access to Heathrow.
St Albans stops in East Midlands Trains services	Hertfordshire County Council.
Incorporate Ivanhoe services (Leicester – Loughborough stopping trains) into the longer distance network	Leicestershire County Council and Leicester City Council have proposed this. SRA did not favour this because of journey time impact on long-distance passengers. The journey time from Leicester to Nottingham would be approximately 20 minutes longer with the extra stops and running on the slow lines as far as Ratcliffe. A longer-term possibility could be to provide a Leicester – Matlock hourly service incorporating the Ivanhoe service. This is not being taken forward at present because of rolling stock and affordability constraints.
Provision of fast service from Sheffield – Leeds via Barnsley	Local authority and South Yorkshire Passenger Transport Executive aspiration.
Possible new terminals including Radlett	Radlett is awaiting planning approval.
Willington Station	Various developments have recently been undertaken in the area including a considerable housing development, the opening of a canal marina and opening of Derby College, suggesting a more frequent service could be beneficial.

Appendix B – Station facilities

Station Name	Category	Car Parking Available	Station Manager	Car Park Spaces	Disabled Spaces
Alfreton	E	Yes	East Midlands Trains	104	5
Ambergate	F	Yes	East Midlands Trains		
Ancaster	F	No	East Midlands Trains		
Aslockton	F	Yes	East Midlands Trains	11	0
Attenborough	F	No	East Midlands Trains		
Barrow Upon Soar	F	No	East Midlands Trains		
Bedford	C	Yes	FCC	614	9
Beeston	E	Yes	East Midlands Trains	23	1
Belper	F	No	East Midlands Trains		
Bingham	F	Yes	East Midlands Trains		0
Bleasby	F	No	East Midlands Trains		
Blythe Bridge	F	Yes	East Midlands Trains		
Boston	E	Yes	East Midlands Trains	30	0
Bottesford	F	Yes	East Midlands Trains	13	0
Bulwell	F	Yes	East Midlands Trains	70	0
Burton Joyce	F	Yes	East Midlands Trains		
Burton-on-Trent	D	Yes	East Midlands Trains		0
Carlton	F	Yes	East Midlands Trains	20	0
Chesterfield	C	Yes	East Midlands Trains	284	17
Collingham	F	No	East Midlands Trains		
Creswell	F	Yes	East Midlands Trains	15	0
Cricklewood	E	No	FCC		
Cromford	F	Yes	East Midlands Trains	13	2
Derby	C	Yes	East Midlands Trains	609	16
Duffield	F	Yes	East Midlands Trains		
Elstree & Borehamwood	F	Yes	FCC	211	
Elton & Orston	F	Yes	East Midlands Trains		0
Filtwick	D	Yes	FCC	271	5
Fiskerton	F	Yes	East Midlands Trains	15	0
Harlington	D	Yes	FCC	120	2
Harpenden	D	Yes	FCC	799	5
Havenhouse	F	No	East Midlands Trains		
Heckington	F	Yes	East Midlands Trains		
Hendon	E	Yes	FCC	42	2
Hinckley	E	Yes	East Midlands Trains	70	0
Hubberts Bridge	F	No	East Midlands Trains		
Hucknall	F	Yes	East Midlands Trains	125	0
Hykeham	F	Yes	East Midlands Trains	30	0
Kentish Town	F	No	London Underground (TfL)		

Station Name	Category	Car Parking Available	Station Manager	Car Park Spaces	Disabled Spaces
Kettering	D	Yes	East Midlands Trains	500	7
Kirkby in Ashfield	F	No	East Midlands Trains		
Langley Mill	F	No	East Midlands Trains		
Langwith-Whaley Thorns	F	Yes	East Midlands Trains	10	0
Leagrave	D	Yes	FCC	362	0
Leicester	C	Yes	East Midlands Trains	515	7
London St Pancras Domestic	A	Yes	Network Rail	22	2
London St Pancras International	A		Eurostar		0
Long Eaton	D	No	East Midlands Trains	94	0
Longton	F	Yes	East Midlands Trains	30	0
Loughborough	C	Yes	East Midlands Trains	125	5
Lowdham	F	No	East Midlands Trains		
Luton	C	Yes	FCC	669	7
Luton Airport Parkway	B	Yes	FCC	670	12
Mansfield	F	Yes	East Midlands Trains	103	4
Mansfield Woodhouse	F	Yes	East Midlands Trains	40	0
Market Harborough	D	Yes	East Midlands Trains	219	5
Matlock	F	Yes	East Midlands Trains	35	2
Matlock Bath	F	No	East Midlands Trains		
Melton Mowbray	E	Yes	East Midlands Trains	64	0
Metheringham	F	Yes	East Midlands Trains	25	0
Mill Hill Broadway	D	Yes	FCC	42	1
Narborough	E	Yes	East Midlands Trains	45	0
Netherfield	F	No	East Midlands Trains		
Newark Castle	F	Yes	East Midlands Trains	80	2
Newstead	F	Yes	East Midlands Trains	20	0
Nottingham	B	Yes	East Midlands Trains	512	
Oakham	E	Yes	East Midlands Trains	28	0
Peartree	F	No	East Midlands Trains		
Radcliffe	F	Yes	East Midlands Trains		
Radlett	D	Yes	FCC	272	3
Rauceby	F	No	East Midlands Trains		
Rollerston	F	No	East Midlands Trains		
Ruskington	F	Yes	East Midlands Trains	30	0
Shirebrook	F	No	East Midlands Trains	20	0
Sileby	F	No	East Midlands Trains		
Skegness	D	No	East Midlands Trains		
Sleaford	E	Yes	East Midlands Trains	12	0
South Wigston	F	No	East Midlands Trains		
Spalding	E	Yes	East Midlands Trains	45	3

Station Name	Category	Car Parking Available	Station Manager	Car Park Spaces	Disabled Spaces
Spondon	F	No	East Midlands Trains		
St Albans	D	Yes	FCC	1784	2
Stamford	E	Yes	East Midlands Trains	79	2
Sutton Parkway	F	No	East Midlands Trains		
Swinderby	F	No	East Midlands Trains		
Swineshead	F	No	East Midlands Trains		
Syston	F	Yes	East Midlands Trains		5
Thorpe Culvert	F	Yes	East Midlands Trains		0
Thurgarton	F	No	East Midlands Trains		
Tutbury & Hatton	F	No	East Midlands Trains		
Uttoxeter	F	Yes	East Midlands Trains		
Wainfleet	F	Yes	East Midlands Trains	6	0
Wellingborough	D	Yes	East Midlands Trains	531	5
West Hampstead Thameslink	E	No	FCC		
Whatsandwell	F	Yes	East Midlands Trains		
Whitwell	F	No	East Midlands Trains		
Willington	F	Yes	London Midland		0

Station Categories

A: National Hub
B: Regional Hub
C: Important Feeder
D: Medium, staffed
E: Small, staffed
F: A small unstaffed station

Glossary

Term	Meaning
ATO	Automatic Train Operation
ATOC	Association of Train Operating Companies
BCR	Benefit Cost Ratio
Control Period 4, CP4	Period from April 2009 to March 2014
Control Period 5, CP5	Period from April 2014 to March 2019
Control Period 6, CP6	Period from April 2019 to March 2024
Control Period 7, CP7	Period from April 2024 to March 2029
CP4 Delivery Plan	Network Rail's plan to deliver the CP4 outputs that Goverments are funding
CUI	The capacity of a given piece of railway infrastructure is an assessment of the maximum number or mix of trains which would operate over it. This is quantified more formally through a Capacity Utilisation Index (CUI)
DBS	DB Schenker Rail (UK), a Freight Operating Company, formerly known as English Welsh and Scottish Railway (EWS)
DfT	Department for Transport
Down	Where referred to as a direction ie. Down direction, Down peak, Down line, Down train, this generally, but not always, refers to the direction that leads away from London
Dwell time	The time a train is stationary at a station
Dynamic freight loop	A loop of significant length to enable a freight train to keep running whilst being overtaken by another train
ECML	East Coast Main Line
EMT	East Midlands Trains, a Train Operating Company
ESI	Electricity Supply Industry
Evening Peak	16:00 – 18:59
FCC	First Capital Connect, a Train Operating Company
FGD	Flue Gas Desulphurisation
FOC	Freight Operating Company
GBRf	First GB Railfreight
GDP	Gross Domestic Product
Generalised journey time	Represents the timetable-related service quality attributes (journey time, frequency of service and interchange) in a single term and is expressed entirely in equivalent minutes of journey time
GN/GE Joint Line	The line between Peterborough and Doncaster via Spalding and Lincoln, avoiding the ECML
GRIP	Guide to Railway Investment Projects
GTM	Gross Tonnes Miles
Headway	The minimum interval possible between trains on a particular section of track

HLOS	The DfT's High Level Output Specification, which specifies the rail industry outputs that need to be delivered within a Control Period
HPUK	Hutchison Ports UK Ltd
HST	High Speed Train
HS1	High Speed 1 – the high speed rail link between London St Pancras International and the Channel Tunnel
IEP	Intercity Express Programme, the name given to the project to provide new Long Distance High Speed rolling stock
Intermodal trains	Freight trains which convey traffic which could be moved by road, rail or sea (eg. container trains)
Jn	Junction
JPIP	Joint Performance Improvement Plans
LDHS	Long Distance High Speed
LENNON	An industry database recording ticket sales
Load factor	The number of people on a train expressed as a percentage of total seats (or seats plus a standing allowance)
Morning Peak	07:00 – 09:59
MKSM	Milton Keynes South Midlands
MML	Midland Main Line
MOIRA	Industry standard rail demand forecasting model
mph	miles per hour
N/A	Not applicable
Network Code	The Network Code is a set of rules which is incorporated by reference into, and therefore forms part of, each bilateral access contract between Network Rail and a holder of access rights
NRDF	Network Rail Discretionary Fund
OEF	Oxford Economic Forecasting
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
PPM	Public Performance Measure expressed as a percentage of trains running on time compared to those scheduled to run
PR2008	Network Rail Periodic Review 2008
Route Availability (RA)	The system which determines which types of locomotive and rolling stock can travel over any particular route. The main criterion for establishing RA usually is the strength of underline bridges in relation to axle load and speed. A locomotive of RA8 is not permitted on a route of RA6, for example
RPA	Regional Planning Assessment

RPI	Retail Prices Index
RUS	Route Utilisation Strategy
SBP	Strategic Business Plan
SDO	Selective Door Opening – a means of providing that only selected doors open when a train is stopped at a station, leaving closed any doors which are beyond short platforms
SDR	Seven Day Railway – a Network Rail initiative implementing techniques which will minimise the impact on passengers and freight of engineering work
SFN	Strategic Freight Network
SMG	The RUS Stakeholder Management Group
SRA	Strategic Rail Authority (now dissolved)
TfL	Transport for London
TOC	Train Operating Company
tpd	trains per day
tph	trains per hour
Train path	A slot in a timetable for running an individual train
Up	Where referred to as a direction ie. Up direction, Up peak, Up line, Up train, this generally, but not always, refers to the direction that leads towards London
W10	The loading gauge which enables 9’ 6” containers to be conveyed on standard height flat wagons
WCML	West Coast Main Line
WSG	Wider Stakeholder Group
WTT	Working Timetable

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RUS136/February 2010