Freight

Route Utilisation Strategy
Draft for Consultation

Network Rail

Foreword

The first railways in Great Britain were developed primarily to carry freight traffic. Since that time freight has always formed a key part of the overall “business case” for the railway.

Today, rail freight is a real, and growing, success story. Over the last ten years, the rail freight industry has grown rapidly, and more growth is forecast for the next ten years.

This Route Utilisation Strategy looks at the entire network, and considers how the rail network should develop to cater for the growing demand for rail freight. As it is a draft for consultation, it considers options rather than drawing final conclusions, and has been developed with the full involvement of the freight operating companies and other key industry players.

The strategy looks at five main areas – the level and pattern of future demand, the preferred routes of the freight operators, gauging policy, key capacity constraints, and capability constraints. In relation to demand, the greatest levels of growth over the next ten years are expected in intermodal, construction and coal traffic.

This strategy is a vital document in the future of rail freight in Britain, and Network Rail is absolutely committed to supporting our freight operating customers as they seek to grow and develop their businesses. The strategy is now open for consultation and we look forward to receiving responses from a wide range of interested parties and stakeholders. We anticipate the final RUS will be ready for publication in spring 2007.

John Armitt
Chief Executive

Correct at time of going to print

Executive summary

In many parts of Britain, economic growth is leading to increasing demands on the rail network. Development of rail capacity to meet the growing demand is a central element of the Government's transport policy. It aims to provide well performing services that accommodate the aspirations of both freight and passenger operators to increase their services, in a way that maximises overall value for money and is affordable.

The Freight Route Utilisation Strategy (Freight RUS) presents a view of the freight growth that could reasonably be expected to occur on the network by 2015 and considers the key issues that arise when addressing what would be required to accommodate that growth.

Unlike the individual 'geographical' RUSs which concentrate on resolving the changing demands on fairly self-contained parts of the network, the Freight RUS considers the role of freight across the entire network. This is important because freight movements cross operational and political geographical boundaries. A network wide approach ensures that the freight demand forecasts used within each of the geographical RUSs are consistent. Importantly, it also ensures that key enhancements to capacity to meet freight's requirements to move across the network are highlighted for further consideration in the geographical RUSs alongside the changing demands of the passenger railway.

Despite the unique role of the Freight RUS in the RUS programme, the process followed is consistent with that taken throughout the RUS programme. It has involved a detailed understanding of the freight network, forecasting freight on the network up to 2015, assessing and agreeing the key gaps with industry stakeholders and optioneering to understand what action can be taken to bridge the gaps. As with all RUSs a range of solutions are considered in a hierarchical manner starting with non-infrastructure solutions such as amendments to timetables and operating longer trains and progressing to consideration of infrastructure solutions if required. The Freight RUS has been overseen by a Stakeholder Management Group consisting of Network Rail, English Welsh and Scottish Railways, Freightliner, GB Railfreight, the Association of Train Operating Companies, the Department for Transport, Transport Scotland, the Welsh Assembly Government, Transport for London, the Rail Freight Group and the Freight Transport Association. Passenger Focus has been consulted at regular intervals during its development.

A 30 per cent growth in freight tonnes lifted is forecast over the study period (the 10 years to 2014/15) which equates to an additional 120 trains per day compared to the base year of 2004/05. Whilst growth is predicted in the volumes of almost all commodities carried, the greatest levels of growth are expected in electricity supply industry (ESI) coal and deep sea (intercontinental) intermodal traffic. Accordingly, the majority of the key capacity issues identified by the study are driven by significant changes in the pattern of demand in these two key commodities.

Each of the schemes identified to address the capacity issues will be subject to an appraisal demonstrating value for money. The funding of enhancements will be dealt with outside the RUS process. The RUS will give the Office of Rail Regulation the opportunity to consider the key options to meet freight growth when considering expenditure on the network. Similarly it will enable the Department for Transport and Transport Scotland to understand freight's needs whilst developing their High Level Output Specifications for the future railway and provide the strategic context for Transport Innovation Fund decisions. The decisions will be made in the light of any changes which result from the current review of the structure of charges.

Importantly, it will provide third party investors with an indication of enhancements that would be required to meet their aspirations.

ESI Coal

The medium to long term demand for rail based ESI coal movements is dependent on the future role of coal in the UK's energy supply mix. There is currently uncertainty surrounding this role and the final RUS will contain scenario testing to ensure the findings are robust against alternative assumptions. The majority of the industry's projected changes to rail supply patterns are focused on the transport of coal to the Aire Valley and Trent Valley power stations which are likely to have at the least a medium term future. Two alternative scenarios were examined reflecting uncertainty surrounding the balance of coal imports through competing ports.

ESI Coal: East Coast Ports to the Aire and Trent Valleys

This first scenario involves increases in imports through the east coast ports (Immingham, Hull, Redcar, Tyne Dock and Blyth) supplanting some current English domestic mined supply, and a proportion of current Anglo –Scottish traffic.

The RUS highlights resulting capacity constraints and solutions as follows:

- Immingham imports: The key section of constraint is identified as the route from the port through Wrawby junction and Scunthorpe, both in terms of pathing and maintenance access. The solutions proposed include a range of small scale schemes including some train lengthening plus the upgrading of the Brigg line.

- Hull imports: The key section of constraint is identified as the Hull docks branch. The solutions proposed include partial re-doubling of the branch, with possible further enhancements on the main line between Hessle Road junction and Selby and some train lengthening.

A set of further minor schemes are outlined in relation to access to the other east coast import facilities.

ESI Coal: Anglo-Scottish Coal route

This second scenario involves the continuation of growth in imported coal into Hunterston and opencast sites in Ayrshire, supplanting current English deep mined production. Under this scenario there will be further increases in Anglo-Scottish coal flows.

The RUS highlights the capacity of the Glasgow and South Western and Settle & Carlisle lines as constraints to further significant growth under this scenario. Key solutions involve installation of a number of additional signals on the Settle & Carlisle line, doubling all or part of Gretna – Annan (and some additional signals) on the Glasgow and South Western, and a set of possible smaller scale measures in the Carlisle area.

The need for further large scale renewals on the Settle & Carlisle line is also examined under this scenario.

Deep sea intermodal

The Freight RUS forecasts a 64% growth in deep sea intermodal trains by 2014/15 compared with 2004/05, based on continued year on year growth in deep sea container throughput at UK ports, and some further improvements in rail market share. The majority of growth is projected to be from the established deep sea ports in the South East (Felixstowe, Southampton, Tilbury and Thamesport), and the planned facilities at Bathside Bay and/or Shell Haven. Key inland destinations are projected to continue to be terminals in the West Midlands, the North West, the North East and Scotland.

The RUS highlights resulting key capacity constraints on the Great Eastern and Cross London routes and on several sections of the East and West Coast Main Lines.

The proposed solution to the constraints highlighted on the Great Eastern, cross London and on the southern end of the West Coast Main Line is the development by 2014/15 of a W10 gauge cleared Felixstowe – Nuneaton route with incremental capacity enhancements to allow routeing of some Felixstowe/ Bathside Bay traffic via Ely, Peterborough and Leicester to the West Coast Main Line.

Some smaller schemes are also proposed to handle further growth on the northern end of the West Coast mainline including possible train lengthening and loop enhancement options.

Gauge clearance

The RUS identifies a number of major gauge clearance issues. Again, each of the issues requires further development and their recommendation will be subject to a positive business case.

Southampton to West Coast Main Line

- Clearance of the core route from Southampton to the West Coast Main Line (via Winchester and Reading) to at least W10 to meet forecast growth in larger container sizes from the Port of Southampton
- Further evaluation of diversionary routes for this flow to provide operational flexibility

South East ports to West Midlands/North West

- Clearance to W10 of the 'Felixstowe – Nuneaton route' from the Haven ports to the West Coast Main Line as described above to provide additional capacity and shorter journey time for intermodal traffic.

Stakeholders have also expressed aspirations for clearance of key parts of the network to the larger W12 and European gauges in order to tap into a larger market.

Consultation

Consultation with stakeholders is an important part of the RUS process and we would welcome comments on the contents of this document. Details of how to contact us can be found in the final chapter.

Contents

1. Background

1.1 Introduction

1.1.1

Following the Rail Review in 2004 and the *Railways Act 2005*, the Office of Rail Regulation (ORR) modified Network Rail's network licence in June 2005 to require the establishment of RUSs across the network. Simultaneously, ORR published guidelines on RUSs. A RUS is defined in Condition 7 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. The route utilisation objective is defined as:

> "the effective and efficient use and development of the capacity available, consistent with funding that is, or is reasonably 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, June 2005

[1] The definition of network in Condition 7 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.

The "duty" referred to in the objective is Network Rail's general duty under Licence Condition 7 in relation to the operation, maintenance, renewal and development of the network. The ORR guidelines also identify two purposes of RUSs, and state that Network Rail should balance the need for predictability with the need to enable innovation. Such strategies should:

> "enable Network Rail and persons providing services relating to railways better to plan their businesses, and funders better to plan their activities; and set out feasible options for network capacity, timetable outputs and network capability, and funding implications of those options for persons providing services to railways and funders."

Extract from ORR Guidelines on Route Utilisation Strategies, June 2005

The guidelines also set out principles for RUS development and explain how Network Rail should consider the position of the railway funding authorities, the likely changes in demand and the potential for changes in supply. Network Rail has developed a RUS Manual which consists of a consultation guide and a technical guide. These explain the processes we will use 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 our website at www.networkrail.co.uk.

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. There is also extensive informal consultation outside the rail industry by means of a Wider Stakeholder Group.

The ORR guidelines require options to be appraised. This is initially undertaken using the DfT's appraisal criteria and, in Scotland, the Scottish Executive's STAG appraisal criteria. To support this appraisal work RUSs seek to capture implications for all industry parties and wider societal implications in order to understand which options maximise net industry and societal benefit, rather than that of any individual organisation or affected group.

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 Wales Rail Planning Assessment, and Transport Scotland's Scottish Planning Assessment. The recommendations of a RUS and the evidence of relationships and dependencies revealed in the work to reach them in turn form an input to decisions made by industry funders and suppliers on issues such as franchise specifications, investment plans or the High Level Output Specifications.

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

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

1.2 Consultation paper

The South West Main Line (SWML) RUS was the first RUS undertaken by Network Rail and served as a pilot for the new process established following the Rail Review. The consultation document for this RUS was published in October 2005 with the final RUS published in March 2006. In December 2005 the consultation document for the Cross London RUS was published with the final RUS published in August 2006. The consultation document for the Scotland RUS was published in August 2006.

This is therefore the fourth RUS consultation published by Network Rail. The document starts by describing, in Chapter 2, the role of the Freight RUS within the RUS programme, its geographical scope, the time horizon which it addresses, and the key issues which it will consider. Current freight usage of the network is summarised in Chapter 3. Chapter 4 considers estimates of future demand on the network both in terms of the number of trains expected and the associated tonnage which will be carried.

Consideration of the future demand highlights a number of 'gaps' between the existing network and the network that would be required to meet the future demand. These gaps are presented in Chapter 5 which considers both capacity and capability issues which would arise if the expected growth materialises. Chapter 6 outlines gauge issues. Chapter 7 presents the options which have been proposed, in conjunction with our Stakeholder Management Group to bridge the potential gaps in network provision. Recommendations are made for further work to develop the options prior to final publication.

The responses from stakeholders to this consultation document will shape the final Freight RUS and Network Rail would accordingly welcome your feedback on it. The key dates and contact details for the consultation process are outlined in Chapter 8.

2. Scope and planning context

2.1 The role of the freight RUS within the RUS programme

The Freight RUS is central to the RUS programme and complements the role of the individual ‘geographical’ RUSs (i.e. RUSs that concentrate on a particular rail corridor or geographical area). It is required for a number of reasons. The primary driver is a requirement for clarity on the treatment of freight to ensure that it is considered appropriately within each individual geographical RUS and consistently across the RUS programme as a whole.

To ensure consistency of treatment, the RUS has a network-wide scope. By its very nature, freight does not observe route or even regional boundaries. Many freight flows are long by passenger service standards and cross a number of geographical RUS route areas.

A key role is to provide consistent freight forecasts for input into the geographical RUSs, based on the routeings (and diversionary routeings) preferred by freight operators. The network-wide scope of the Freight RUS ensures that forecasts of flows which cross geographical RUS boundaries are treated similarly in each RUS they cross.

The Freight RUS will seek to identify key network capacity constraints to carrying the expected freight flows over the preferred routeings, when considered alongside existing commitments to passenger operators. As such it will bring together, in one document, the key strategic capacity issues of concern to freight.

To complement this high level consideration, the individual geographical RUSs will propose solutions to the important capacity issues which are triggered when additional passenger growth is considered alongside freight growth. On some routes, even small levels of freight or passenger growth may trigger the requirement for consideration of the capacity available. The geographical RUSs will have the benefit of detailed passenger growth projections (produced within their own work programme) and detailed freight growth projections (produced within the Freight RUS). Taken together, the projections can be used to ensure that the appropriate timetable and/or infrastructure solutions are recommended.

The Freight RUS will also play an important role in providing an ‘early warning’ of where capacity issues are likely to arise on those parts of the network that do not currently have an ongoing geographical RUS. This will aid the development of RUS scope documents.

The provision of the appropriate physical network capability to enable projected traffic to operate is clearly as important as provision of the appropriate level of operational capacity. Consequently the Freight RUS examines the key capability requirements that exist today or would be triggered by the expected changes to traffic. Careful consideration will be given to the gauge requirements of the predicted traffic.

Unlike the geographical RUSs, the Freight RUS does not consider performance or engineering access issues. Clearly both sets of issues are of prime importance to the freight operators and are central to the RUS programme. In each case, an understanding of the detail of local operations is key to understanding the issues. To reflect this they are considered in the geographical RUSs where passenger and freight movements can be examined together and local circumstances can be taken into account.

Network Rail is also carrying out a study to investigate the potential for efficient engineering access, in conjunction with our customers.

2.2 Time horizon

The Freight RUS primarily considers a time period of ten years, although a longer time horizon is taken to identify any major factors that would influence strategy.

2.3 Planning context

One of the prime objectives of the RUS is to provide the Office of Rail Regulation with the opportunity to consider the key options recommended for meeting anticipated freight growth when considering future expenditure on the network.

As mentioned in Chapter 1, the RUS outcome will help to inform the Department for Transport (DfT) and Scottish Executive’s High Level Output Specifications and to provide an understanding of freight growth to feed into the Train Operating Company (TOC) franchise specification process.

The RUS takes into account the findings of the programme of planning assessments produced for the DfT and the Scottish Executive to develop understanding of the priorities for development of transport over the next 5-20 years in the wider context of planning policy and strategy. It is informed by the North East England and East of England Regional Planning Assessments, Part 1 of the Scottish Planning Assessment, the relevant transport strategies of the Mayor of London, Welsh Assembly Government and the English regions.

3. Current demand and the baseline network

3.1 Freight operators

The following Freight Operating Companies (FOCs) are currently licensed to run services on the network. All are open access operators which means that each operator can bid to run services on any part of the network. These include:

- English Welsh and Scottish Railway (EWS) which is the largest freight operator in the UK and also has a licence to operate European services. EWS runs services for a wide range of markets. It is organised into four market-based groups, each led by their own Managing Director. 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 services[1] and express parcels services).
- Freightliner which has two divisions: Freightliner Limited is the largest rail haulier of containerised traffic, predominantly in the deep sea market. Freightliner Heavy Haul is a significant conveyor of bulk goods, predominantly coal, construction materials and petroleum and operates infrastructure services.
- GB Railfreight which is a significant operator of deep sea container trains and infrastructure services and also runs a number of services for bulk market customers.
- Direct Rail Services (DRS) which transports a variety of commodities. In the last few years the company has expanded into running services for the domestic intermodal and short sea intermodal markets.

Other operators include Advenza Freight Limited, Fastline Freight Limited, FM Rail Limited and the West Coast Railway Company are also licensed FOCs.

3.2 Profile of the freight market

The overall size of the surface land freight market (rail and HGV) in the UK grew by 8 per cent over the ten years to 2004 to 1,933 million tonnes lifted. Railfreight has a 5 per cent share of the market in terms of tonnes lifted which has been fairly static over the last ten years. Railfreight has a 12 per cent share in terms of tonne kilometres (weight of freight multiplied by the distance carried) which has increased from approximately ten per cent in 1994 reflecting an increase in the average distance of railfreight movements whilst the average distance of road hauls has declined.

A static share of tonnes lifted of an increasing total market leads to an increase in the absolute volume of freight carried by rail. Table 3.1 shows the volume of rail freight lifted identified by key commodities. The total grew from 96 million net tonnes lifted in 2000/01 to 105 million net tonnes lifted in 2004/05. The profile of the freight market is assessed up to 2004/05 as this is the base year for the Freight RUS ten year forecasts discussed in Chapter 4. Data for 2005/06 is now available and the way in which this relates to the ten year forecasts is commented on in Chapter 4.

The growth has not been uniform across all commodities. There have been considerable increases in the haulage of coal (20 per cent over five years) and construction products (17 per cent) while some commodities have declined or shown little change.

[1]Services used as part of railway infrastructure renewals and enhancements work.

The trends in tonne kilometres or freight moved (weight of freight lifted multiplied by the distance carried) are shown for the same period in Table 3.2. These trends are similar to those for freight lifted, shown in Table 3.1, but show more pronounced increases in coal movement. This reflects the recent trend of coal for the electricity supply industry (ESI coal) being carried over greater distances. This is the result of a move away from burning deep mined coal from England towards burning imported coal which arrives in the

Table 3.1: Rail freight lifted

Millions of net tonnes lifted	2000/01	2001/02	2002/03	2003/04	2004/05
Coal	37.9	40.4	42.9	45.1	45.5
Metals[2]	20.2	16.6	16.9	18.0	17.4
Construction	19.4	20.9	19.3	21.1	22.8
Petroleum[3]	7.0	7.1	7.0	7.3	7.6
Channel Tunnel[4]	1.2	1.0	0.8	1.1	1.2
Intermodal	9.4	8.2	7.9	8.0	8.7
Other[5]	0.8	0.9	1.2	1.8	1.8
Total	**95.9**	**95.1**	**96.0**	**102.4**	**105.0**

Source: EWS; Freightliner; Network Rail estimates of DRS and GB Railfreight tonnages from billing data.

Table 3.2: Rail freight moved

Billions of net tonne km moved	2000/01	2001/02	2002/03	2003/04	2004/05
Coal	4.8	6.2	5.7	5.8	7.0
Metals	2.1	2.4	2.7	2.4	2.6
Construction	2.4	2.8	2.6	2.7	2.8
Petroleum	1.4	1.2	1.1	1.2	1.2
Channel Tunnel	1.0	0.6	0.4	0.5	0.5
Intermodal	3.8	3.5	3.4	3.5	4.0
Other	2.6	2.6	2.7	2.8	2.5
Total	**18.1**	**19.4**	**18.7**	**18.9**	**20.7**

Source: National Rail Trends, Yearbook 2004-2005; SRA June 2005.

[2]Includes ore

[3]Includes oil

[4]Includes all commodities which have originated at or are destined for the Channel Tunnel.

[5]Includes automotive and waste services. Excludes railway engineering trains so overall total is lower than freight definitions including these services.

UK through deep water ports and coal from opencast sites in south west Scotland which are generally further from the power stations than the English pits. ESI coal accounts for 90 per cent of the total tonnes lifted of coal carried by rail with industrial coal making up the remainder. Industrial coal is used in the production of steel and construction products and has not experienced the same level of growth over the last five years.

Strong growth in the commodity sectors outlined above has led to the present network being more heavily used by freight services than at any time since the de-industrialisation of the 1970s and early 1980s. That period saw large decreases in the demand for transport of bulk products by rail such as iron ore, industrial and domestic coal, metals and, as the pipeline network developed, petroleum.

Tables 3.1 and 3.2 illustrate that the railfreight business has been based upon bulk commodity markets. Coal, metals and construction constitute 82 per cent of rail freight lifted and 60 per cent of rail freight moved. Petroleum constitutes seven per cent of tonnes lifted and six per cent of freight moved.

Intermodal traffic (predominantly deep sea containers at present) is also now established as a major market. In 2004/05 it accounted for eight per cent of rail freight lifted and 19 per cent of rail freight moved reflecting the significant distances over which it is transported.

Given that, the ESI coal and intermodal markets have been subject to fundamental shifts in the last decade. The next part of this section includes more information about recent trends in these key rail freight sectors.

3.2.1 ESI coal

The increase in the price of gas combined with relatively low prices for coal has resulted in a shift for electricity generation from gas to coal burn. This has produced a three per cent increase in coal burn for electricity generation over the last five years to 51.1 million tonnes in 2004/05.

Despite this modest increase in market size, the volume of ESI coal carried by rail has increased by more than a quarter over five years to 41 million tonnes in 2004/05. This growth trend is shown in Table 3.3. This is a result of a switch towards more electricity being generated at rail served power stations and rail's competitive position improving as the average distance between coal supply points and power stations increases.

Table 3.4 shows how the balance between domestically produced and imported coal has changed over the last five years. The volume of coal mined in the UK has fallen by around a quarter over the period. The decline of deep mined coal has been particularly pronounced, falling by a third. There has been a shift by electricity generators to burning more low

Table 3.3: GB coal lifted by rail for electricity supply since 2000/01

	2000/01	2001/02	2002/03	2003/04	2004/05
Tonnes (thousands)	31,900	34,400	36,900	40,600	40,996
Indexed to FY2001=100	100	108	116	127	129

Source: EWS; Freightliner.

sulphur coal (which is primarily imported) in order to meet emissions targets and so reduce costs. Coal imports have increased by more than 35 per cent since 2000/01.

The rail market share of ESI coal haulage in the UK has increased by 18 per cent between 2000/01 and 2004/05. Around 90 per cent of all ESI coal is now hauled by rail.

3.2.2 Maritime intermodal container market

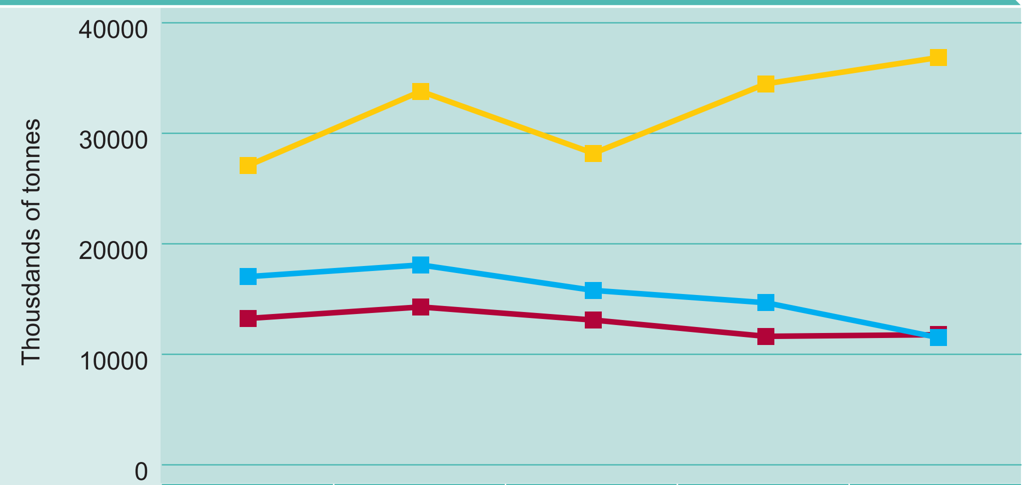
The number of maritime containers arriving at UK ports has increased at an average rate of around 5 per cent a year since 2001 reaching 7.7 million twenty foot equivalent units (TEU) in 2004. TEU is the standard measurement in the container market for quantum of boxes taking into account variations in length (a 20ft length box is one TEU, a 40ft length box is two TEUs). Table 3.5 shows that around two thirds of the growth occurred between 2003 and 2004.

These volumes can be separated into two categories: short sea (intra European routes only) and deep sea (intercontinental). Rail has less than a five per cent market share of onward transportation of short sea container movements. This is because there is a large number of small ports served and most lack sufficient volumes to make rail competitive against road haulage.

In theory the transportation of deep sea containers is well suited to rail. A large number of containers arrive at a small number of UK ports for long distance onward shipment to inland distribution centres, making rail transport viable. Rail is a competitive mode for the inland journeys to population centres outside the South East (where the major deep sea ports themselves are presently located), enabling a modal share of nearly 25 per cent in 2005/06. The main inland destinations are located near Birmingham, Manchester, Leeds and Glasgow. Road haulage is dominant for short-distance movements. The deep sea shipping market growth has been driven by a continuing trend of migration of manufacturing activity from Europe to Asia coupled with strong domestic demand. The volume of deep sea traffic carried on rail has increased greatly since 1995/96 the year of privatisation of rail freight, when market share was only 17 per cent.

The container volumes at the largest GB ports are shown in Table 3.6. Volumes fell slightly at Felixstowe before returning in 2004

Table 3.4: UK coal supply since 2000



	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005
Deep Mined	17031	18089	15785	14669	11513
Opencast	13249	14285	13101	11629	11778
Imported	27084	33799	28194	34482	36863

Source: DTI digest of Energy Statistics and Energy Trends, 2005.

whilst Southampton has experienced steady increases, totalling 24 per cent over three years. The next largest ports (in terms of TEU throughput) have all experienced growth in excess of the national average since 2001.

Table 3.7 shows rail modal share at Britain's two largest deep sea ports of Felixstowe and Southampton. About 80 per cent of maritime container trains serve these two main ports, which themselves handled 74 per cent of the total deep sea throughput in the UK in 2004/05.

A growing proportion of the deep sea traffic is transported in High Cube containers which are 9'6" high. The recent growth is shown in Table 3.8.

This is significant as these containers require W10 gauge clearance to be moved on conventional wagons. Gauge clearance is discussed in Chapter 6.

3.2.3 Other key markets

Construction

The construction market has been the other key driver of growth in the last five years, having seen approximately 17 per cent growth in both tonnes lifted and tonne kilometres. Growth has occurred nationwide, but rail has a particularly strong share of the market for the movement of products to London and the South East with approximately 40 per cent market share of aggregates destined within the M25 ring. Long distance flows include those

Table 3.5: Container volumes at GB Ports since 2001 (Twenty foot equivalent units), Index 2001=100

	2001	2002	2003	2003
TEU (thousands)	6,770	7,004	7,074	7,744
Indexed to FY2001=100	100	103	104	114

Source: Maritime Statistics 2004, Department for Transport.

Table 3.6: Largest GB ports by TEU throughput

TEU (thousands)	2001		2002		2003		2004	
	TEU	Deep sea share	TEU	Deep sea share	TEU	Deep sea share	TEU	Deep sea share
Felixstowe*	2,839	56%	2,683	59%	2,482	63%	2,717	63%
Southampton	1,170	87%	1,275	87%	1,374	90%	1,446	93%
London ports	752	32%	873	28%	911	20%	979	35%
Seaforth (Liverpool)	512	45%	487	45%	566	47%	603	43%
Medway	493	84%	530	84%	518	86%	632	83%
ALL GB PORTS	6,770	52%	7,004	52%	7,074	53%	7,744	55%

Source: Maritime Statistics 2001-04, Department for Transport. Deep sea percentage reflects proportion of total TEU throughput at port.
**Felixstowe Port estimates that deep sea share of total TEU throughout is approximately 7 per cent higher than statistics indicate due to assignment of empty containers for export.*

originating from quarries in the South West, East Midlands and the Peak District to a large number of unloading terminals where onward local transportation is usually by road. Very large construction projects such as Heathrow Terminal 5 and the CTRL have contributed to the overall demand in recent years.

Metals

Volumes of metals have remained broadly static over the last five years. The metals market includes large volumes of steel transported within South Wales and the North East/South Humberside and also between these regions.

Petroleum

Petroleum and oil traffic hauled by rail has also remained broadly constant. In addition to road haulage, rail competes with an underground pipeline network. Rail flows are predominately between refineries located at deep sea ports and major inland distribution centres including sites in the Midlands and along the M4 corridor. The most significant of the refineries is Lindsey near the Port of Immingham which accounts for approximately 55 per cent of all rail hauled petroleum traffic.

The recent fire at the major petroleum storage and distribution facility at Buncefield (near Hemel Hempstead) has led to a growth in petroleum traffic on rail since the base year 2004/05 statistics (see Table B8). It is possible that some of this growth will be retained long term as customers seek to keep a range of transport options open.

Infastructure

Infrastructure services include all trains on the network conveying materials for/or engaged in the maintenance and renewal of the railway. These services currently account for approximately seven per cent of all freight gross tonnes on the network. Services in this category are not confined to specific route corridors and operate across the entire network. There are however particularly heavy flows between key infrastructure materials depots. Trends in this traffic sector are intrinsically linked to maintenance and renewal activity on the network.

Table 3.7: Rail modal share at the largest deep sea ports

	2004
Felixstowe	
TEU on rail (thousands)	652
Rail modal share at port	24%
Southampton	
TEU on rail (thousands)	448
Rail modal share at port	31%

Source: Maritime Statistics 2004; Network Rail.

Table 3.8: High Cube (9'6") containers as proportion of all deep sea containers arriving at GB ports

	2002	2003	2004
High cube deep sea containers	28%	31%	35%

Source: Maritime Statistics 2004.

Channel Tunnel
Freight volumes through the Channel Tunnel declined sharply in 2001/02 when there were security problems which disrupted traffic. Volumes have struggled to recover (particularly long-distance flows) and are yet to exceed the pre-security crisis levels.

Domestic intermodal
Domestic intermodal and general distribution traffic has shown some growth in recent years. In particular domestic intermodal services between the West Midlands and Scotland have grown significantly with a number of major supermarket chains now making regular use rail services.

3.3 Summary of base year freight demand: Actual trains

Figure 3.1 displays average actual weekday usage of the network by freight trains in financial year 2004/05. 2004/05 is selected as it is the base year for the ten year forecasts detailed later in this document.

The busiest sections of the network for freight are set out in red. These sections see in excess of 50 trains per day in each direction. The following table summarises the busiest freight route sections on the network.

As shown in Table 3.9, the South Humberside Main Line at Barnetby is the busiest in the country, providing a vital artery for coal, iron ore, petroleum and steel movements between the port of Immingham and Scunthorpe steelworks. The route also plays an increasing role in the supply of imported coal to the Aire and Trent Valley power stations[7].

The WCML experiences heavy freight usage throughout its length with the section between Warrington and Nuneaton via the Trent Valley the heaviest used. This route is a key corridor for intercontinental and domestic intermodal traffic, much of it to/from the major deep sea ports in the South East, in particular Felixstowe.

Other key routes for freight include the North East – South West axis linking the heavy industry of Teesside and the north east ports with the Midlands and South West/ South Wales via York, Moorthorpe, Chesterfield, Burton, Water Orton, Barnt Green and Gloucester.

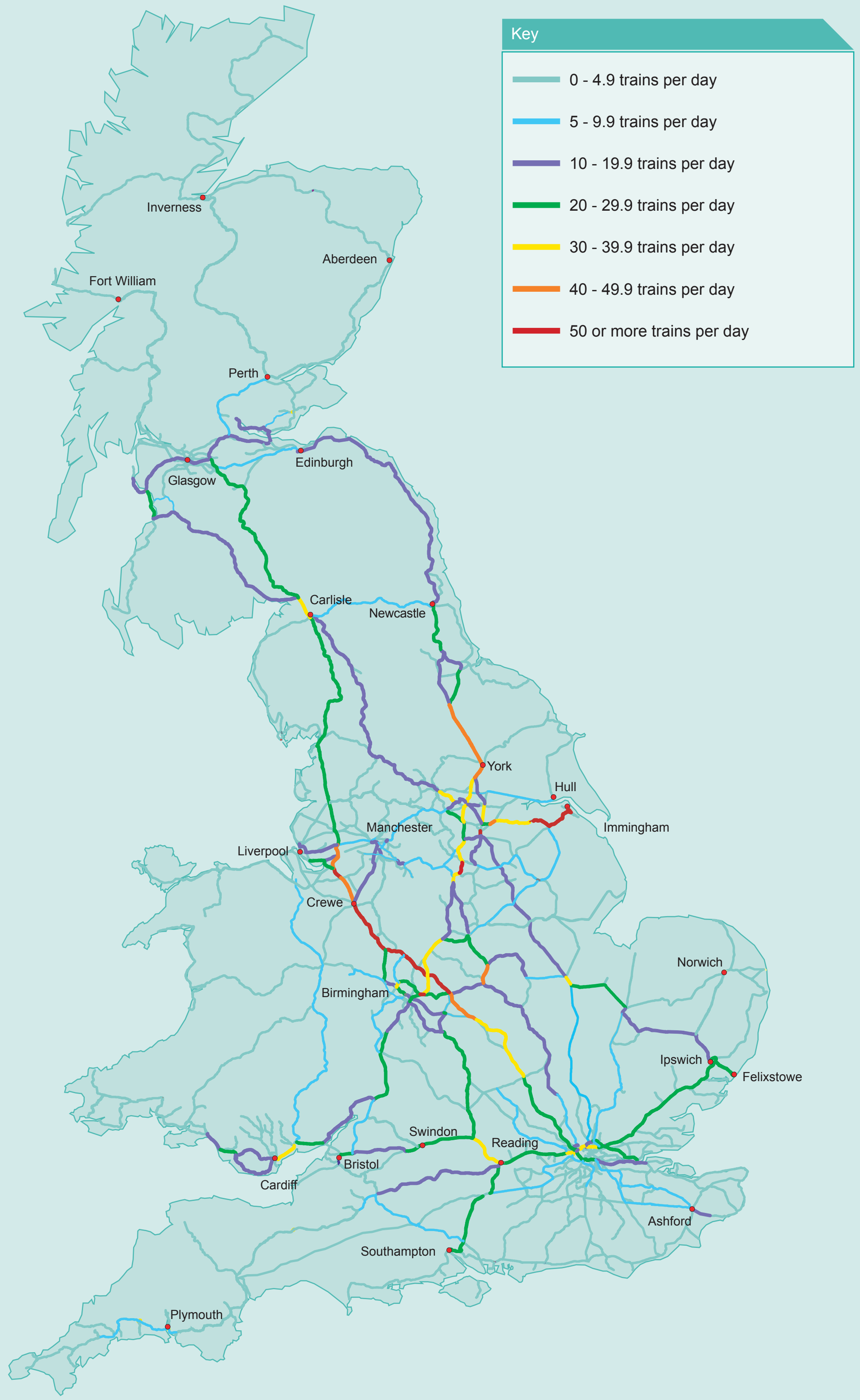
Table 3.9: Freight hotspots

Route section	Area	Average	Maximum	Main commodities
Immingham – Barnetby	South Humberside	54	70	Metals, petroleum, coal
Stafford – Crewe	West Coast	52	67	Intermodal
Water Orton	West Midlands	51	65	Intermodal, metals, coal
Doncaster	East Coast	50	86	Coal, metals
Colton Jn – Holgate	East Coast	44	55	Coal, metals
Rugby – Brinklow	West Coast	42	52	Intermodal
Thorne Jn – Scunthorpe	Trans-Pennine	40	57	Metals
Camden Road	North London	38	52	Intermodal
Gretna – Carlisle	West Coast	36	46	Coal, intermodal
Burton-on-Trent	Midland Main Line	36	51	Construction, metals, petroleum
Ealing	Great Western	36	52	Construction

Average and maximum are daily freight trains in busier direction on a Thursday in the base year (2004/05). Maximum is often much higher than the average due partly to additional traffic related to diversions. Source: ACTRAFF

[7] These are: Aire Valley: Eggborough, Ferrybridge, Drax. Trent Valley: West Burton, Cottam, West Burton, Ratcliffe.

Figure 3.1: Average daily freight trains in single direction 2004/05



Busiest weekday used (Thursday), highest direction shown. Source: ACTRAFF

The South Wales Main Line, particularly between Swansea and Newport remains a vital freight route, with metals and coal traffic predominating. The route between Southampton Port and the WCML via Reading and Oxford is the key route for deep sea container services from Southampton and has seen growing use in recent years.

Aggregates for the construction industry originating in the Mendips account for much of the freight traffic between the West Country and London on the Great Western Main Line.

The orbital routes around London are all heavily used with the North London Line (NLL) between Stratford and Camden Road having particularly significant volumes of freight traffic. These routes currently accommodate traffic from all of the south east ports and the Channel Tunnel destined nationwide in addition to traffic destined for London freight terminals.

Much of the freight traffic shares routes with high frequency passenger services including the main lines radiating out of London and many of the suburban networks around the major cities, including London and Birmingham.

Figures A1 to A4 in Appendix A set out in more detail the current routes by key commodities across the network.

3.4 Freight usage of network paths

Freight trains require more booked paths in the Working Timetable (WTT) than are actually used to provide operational flexibility. Table 3.10 summarises, by commodity, the proportion of booked WTT paths that are actually utilised.

Utilisation of paths can vary for a wide range of reasons. WTT paths need to be booked months in advance and for some commodities a range of supply scenarios have to be covered. For example paths for ESI coal will often be booked to a power station from a range of mines and ports to cover for fluctuations in the choice of coal supplier. Additional paths may also be booked to cover seasonal variations in demand for electricity.

Paths for a construction customer may be booked in the timetable for five days per week, but the customer may in reality require fluctuating volumes, with a five days per week service on occasions and a two or three days a week service at other times of the year.

In addition to the market driven fluctuations discussed above, paths for diversionary purposes allowing operational flexibility for the railway also drive low WTT path utilisation.

Unlike passenger trains, for most commodities, if there is little or no demand for a particular booked service on a particular day, the service is cancelled and does not run. Intermodal trains are an exception. They operate like passenger trains (i.e. to a fixed timetable) with services rarely cancelled due to demand fluctuations. Consequently, when there is less demand the train usually still operates but with lower utilisation of wagon space.

The quantum of Channel Tunnel WTT paths was set before the decline in international traffic in recent years. Consequently, there is currently a low utilisation of paths which has improved slightly as traffic has returned.

Table 3.10: Path take-up by key commodities

Commodity	Take-up
Intermodal	over 90%
Petroleum	56%
Metals	51%
Coal	45%
Construction	37%
Channel Tunnel	21%

Source: ACTRAFF for base year (2004/05)

Figure 3.2: Actual freight train utilisation of WTT paths on key freight sections

Ratio of average actual trains run on Thursdays throughout the 2004/05 against WTT booked paths (winter 2004/05 timetable). Duplicate paths have been excluded.

Figure 3.2 displays path utilisation by freight services in the base year for the industry forecasts of 2004/05.

Generally routes with the highest take-up of paths have high levels of intermodal traffic with other freight routes with lower take-up having more bulk product traffic. On mixed use routes with competing demands for limited spare capacity (e.g. the Great Eastern Main Line, parts of the East Coast Main Line (ECML) and the Manchester Piccadilly – Deansgate corridor) utilisation of freight paths tends to be higher than average, with limited ability to book a range of slots for an individual service.

3.5 Summary of base year freight demand: gross tonnage

Figure 3.3 highlights many of the same sections of network as the actual usage map displaying train numbers[8]. The heaviest trains operated on the network are aggregate trains from the Mendips to London via the Great Western Main Line which can exceed 3,000 tonnes each. Most bulk traffic is conveyed in heavier trains than other commodities with many coal trains hauling around 20 wagons weighing over 2000 tonnes in total when laden.

For information Figure A5 in Appendix A displays how tonnage levels have evolved in the last financial year (2005/06). The map displays the significant uplift in tonnage that has recently taken place on the key Anglo – Scottish coal route via the Glasgow and South Western (GSW) and Settle & Carlisle lines.

Net tonnage (the weight of the freight excluding locomotive and wagons) is normally in the range of 65 to 75 per cent of the gross tonnage in the loaded direction.

3.6 Summary of base year gauge and Route Availability (RA)

Figure A6 in Appendix A displays the kinetic envelope for the various freight gauges currently used on the network. This measurement represents the maximum size (both width and height) that could operate at normal speed through structures on the route such as tunnels, bridges and station platforms.

The UK network has a more constricted gauge than most European countries. This is partly due to the earlier development of railways in the UK with relatively few new lines built since the 19th Century.

The main drivers of schemes to increase gauge clearance in recent years have been the evolution of larger deep sea containers and to a lesser extent the opening of the Channel Tunnel in the early 1990s. These developments are discussed further in Chapter 6.

Figure A7 in Appendix A displays base year 2004/05 gauge clearance across the network.

The Route Availability (RA) measure used by Network Rail sets out the maximum axle weight permitted on a route. Dispensations to run heavier than published axle weights can be granted by Network Rail given specific asset and business conditions. Lower RA values are generally driven by condition of assets such as bridges where structural damage could be caused by a heavy freight train.

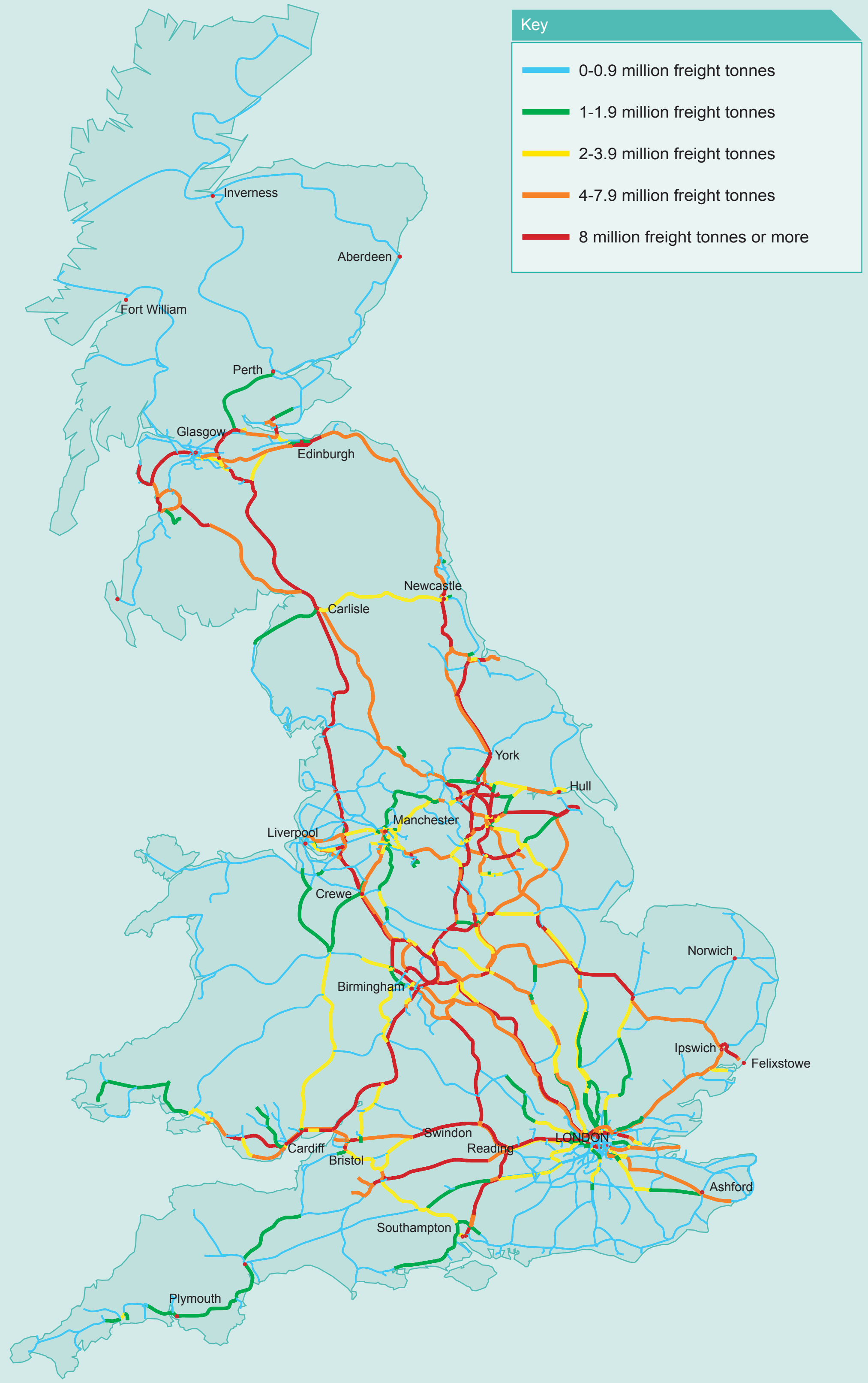
RA values for routes are primarily of concern to operators of bulk traffic which tend to be heavier per axle. For example, a typical loaded coal train requires routes of RA10[9] for the entire length of its journey. If the shortest route between supply point and end customer has insufficient RA rating then the train would need to be routed over a longer distance which could reduce productivity for the operator. In this example, it may be possible for the same train to make its return journey empty over the shortest route as its weight per axle would be significantly reduced when unloaded.

RA8 is generally required for non-bulk trains such as intermodal services.

[8] Table B8 in Appendix B provides an update on the 2004/05 base year, with 2005/06 actual freight tonne km growth statistics.

[9] Track and structures which permit in excess of 25.5 tonnes per axle

Figure 3.3: Gross freight tonnage on the network in the base year (2004/05)



4. Forecast of change – Industry demand forecasts trains and tonnage

4.1 Approach to forecasting

4.1.1 Introduction

This chapter provides a summary of the external drivers of change and the way in which they are expected to influence the demand for rail freight over a ten year period. As explained in Chapter 2, the forecasts will be used to inform the Freight RUS and throughout the RUS programme in each individual geographical RUS.

The forecasts have been developed in conjunction with the freight operators and other stakeholders. Both the Rail Freight Operators' Association (RFOA) who represent the FOCs and the Rail Freight Group and the Freight Transport Association (RFG/FTA) who represent the freight industry contributed forecasts to the process. The results have been peer reviewed by other stakeholders through the processes of the Stakeholder Management Group and its sub-groups.

Forecasting of future freight demand is a particularly complex process. Future traffic patterns are difficult to link to high level economic indicators. Demand is highly dependent on the decisions of a small number of decision makers who determine the mode used on the basis of a wide range of market specific information and commercial deals which do not lend themselves easily to economic modelling.

Whilst rail passenger forecasting exercises benefit from the accumulation of years of shared experience of practitioners reported in the widely accepted Passenger Demand Forecasting Handbook, equivalent guidance is not available for the development of freight demand.

Two alternative approaches to forecasting were adopted – each with its own merits. Interestingly, these two separate methods produced closely aligned projections.

The consistency between the forecasts exists both at a high level and, in most cases, when disaggregated down to route level. In addition they are broadly consistent with freight demand as described in the Scottish Planning Assessment and the Regional Planning Assessments covering England and Wales that have been published to date.

The methodology of each forecast is described in this chapter (in both cases the base year was 2004/05). An integrated set of growth scenarios on the network is subsequently produced to identify capacity gaps.

4.1.2 Methodology one: "Bottom Up"

The Rail Freight Operators' Association (RFOA) developed freight forecasts building on each operator's experience of its markets. The process tapped into a vast amount of industry experience and was carefully coordinated to ensure there was no double counting where two competing operators both identified the same market.

The approach followed was a two stage 'bottom up' process.

Stage 1 involved developing a matrix of all current rail freight services between each origin and destination in the 2004/05 base year. The resulting matrix was subsequently validated against Network Rail's data.

In Stage 2 the forecasting process was then carried out separately for those flows with specific current market intelligence and those without.

2A: Where specific market intelligence existed

This employed specific existing market intelligence from within the business units of the FOCs to predict the changes to the base year flows. For example, flows with known expiry dates, such as the movement of construction materials for Heathrow Terminal 5, were removed from the forecasts at specified future dates when the flows were expected to terminate. Flows with known changes in volume as a result of the winding down or expansion of a particular plant were amended from the expected date of change.

2B: Where no specific market intelligence existed

For each market sector there is usually a range of sub markets each with their own particular driver. Each current flow was therefore assigned to the correct sub market with growth factors applied accordingly.

For each sub market an appropriate driver or combination of drivers was then selected from the following options:

- Analysis of past trends.
- Company specific factors. Some markets are dominated by large customers, e.g. for metals; Corus. In these cases the internal policies of that company are crucial.
- Regional factors. Markets such as construction are driven primarily by regional factors, in particular the local rate of new housebuilding and general infrastructure development.
- General factors. GDP, RPI, balance of trade, industry output forecasts. Use of these general factors has been limited to only a few sub markets
- Specific forecasts. Publicly available market forecasts, from government, SRA, academic research, etc.

The growth factors applied are outlined in Appendix B. Table B1 sets out the growth factors resulting from this process for each of the key sub markets.

Table B2 sets out the high level background assumptions behind the bottom up forecasts in relation to GDP, HGV weights, lorry road user charging, rail productivity, rail network enhancements and Channel Tunnel access charges.

Finally Tables B3 and B4 cover further specific assumptions made in the key markets of coal and deep sea intermodal including overall market growth rates and assumptions on Company Neutral Revenue Support (CNRS) and Rail Environmental Benefit Procurement Schemes (REPS) grant rates.

4.1.3 Methodology two: "Top Down"

The RFG/FTA adopted a top down approach. They based their analysis on outputs from the GB Freight Model, an established modelling tool employed by the Department for Transport (and formerly the SRA) to forecast freight growth.

The GB Freight Model is designed to forecast freight moved within and in and out of Great Britain by mode, route and, where applicable, port. The model itself forecasts on the basis of relative transport costs (which are similar to those used for rail grant purposes), trends and econometric analysis of the drivers behind freight market growth.

The base year matrices of freight traffic by commodity, origin and destination, port and current mode are derived from a wide range of data sources including the Continuing Survey of Road Goods Transport, UK Maritime Statistics, Network Rail and HM Customs & Revenue.

This established model was updated to provide RFG and the FTA's input into the RUS. A revised base consisting of all freight train movements over a time period in 2004/05 was developed. Data was classified by origin and destination, route, commodity and net tonnes carried.

This process resulted in a 'base year' matrix and an assignment of traffic to routes which corresponded well with Network Rail data of what actually ran on the network. The model was then employed to forecast changes in the share of the future market for each commodity that rail would be expected to win by origin and destination county. A growth rate for each origin/destination/commodity combination was then applied by year to each corresponding train movement.

The resulting forecasts of number of trains on each section of the route therefore reflects realistic base year routeings and tonnes per train, increased by assumptions on the level of underlying growth.

The underlying market growth rates used in the model are based on econometric exercises using factors derived from market trends. The international cargo growth assumptions correspond with the UK port forecasts published by the DfT in their May 2006 Ports Policy consultation document.

RFG/FTA's consultants discussed the results of their models with a number of industry sector consultation groups, consisting of a range of companies and representatives of each sector of rail freight industry. Feedback from these groups was used to sense-check the assumptions and the resulting forecasts.

Table B2 in Appendix B sets out the high level assumptions behind the forecasts on GDP, HGV weights, lorry road user charging, rail productivity, rail network enhancements and Channel Tunnel access charges.

Table B3 in Appendix B covers further specific assumptions made in the deep sea intermodal market, including overall market growth rates and assumptions on CNRS/REPs.

4.2 Demand results: Rail freight growth to 2014/15

4.2.1 Overview

The two methodologies described led to broadly similar ten year forecasts. The high level figures are shown in Table 4.1 below. The bottom up approach gives a tonnage growth of 27 per cent whilst the top down approach gives 31 per cent. There is also a clear consensus on which commodities will be the key drivers of change.

Table 4.1 displays the 10 year projections for tonnes lifted in each commodity category.

The trends outlined are explored in detail in 4.2.4.

In addition to this high level tonnes lifted data, the bottom up forecasts contained the ultimate origins and destinations based breakdown of how demand is envisaged to translate onto the network in both tonnage and train numbers.

The RFOA has also provided a routeings preference statement, by exception, highlighting where they have aspirations to alter their existing traffic routeings. This statement was used to help map future flows to the network.

Forecast results were close for both methodologies even when mapped at a route by route level. Detailed route and origin to destination mapping from the bottom up approach has been used for further analysis. However, where significant differences do arise between the two methodologies at a route level, sensitivity tests have been presented to ensure the impact of both scenarios is fully considered.

In the case of ESI coal the RFOA offered two separate scenarios and these also have been presented as a base and sensitivity test as outlined below.

4.2.2 Demand forecasts: Additional trains mapped to the network: Base Case

Figure 4.1 sets out where the additional trains are projected to fall on the network in 2014/15 in the Base Case. All commodities are included. In all cases the preferred routeings of the FOCs have been applied unconstrained by capacity at this stage. Base Case assumptions on which routes are available for W10 traffic are applied.

Tables B3 and B4 in Appendix B display key assumptions for deep sea intermodal and ESI coal underpinning the Base Case.

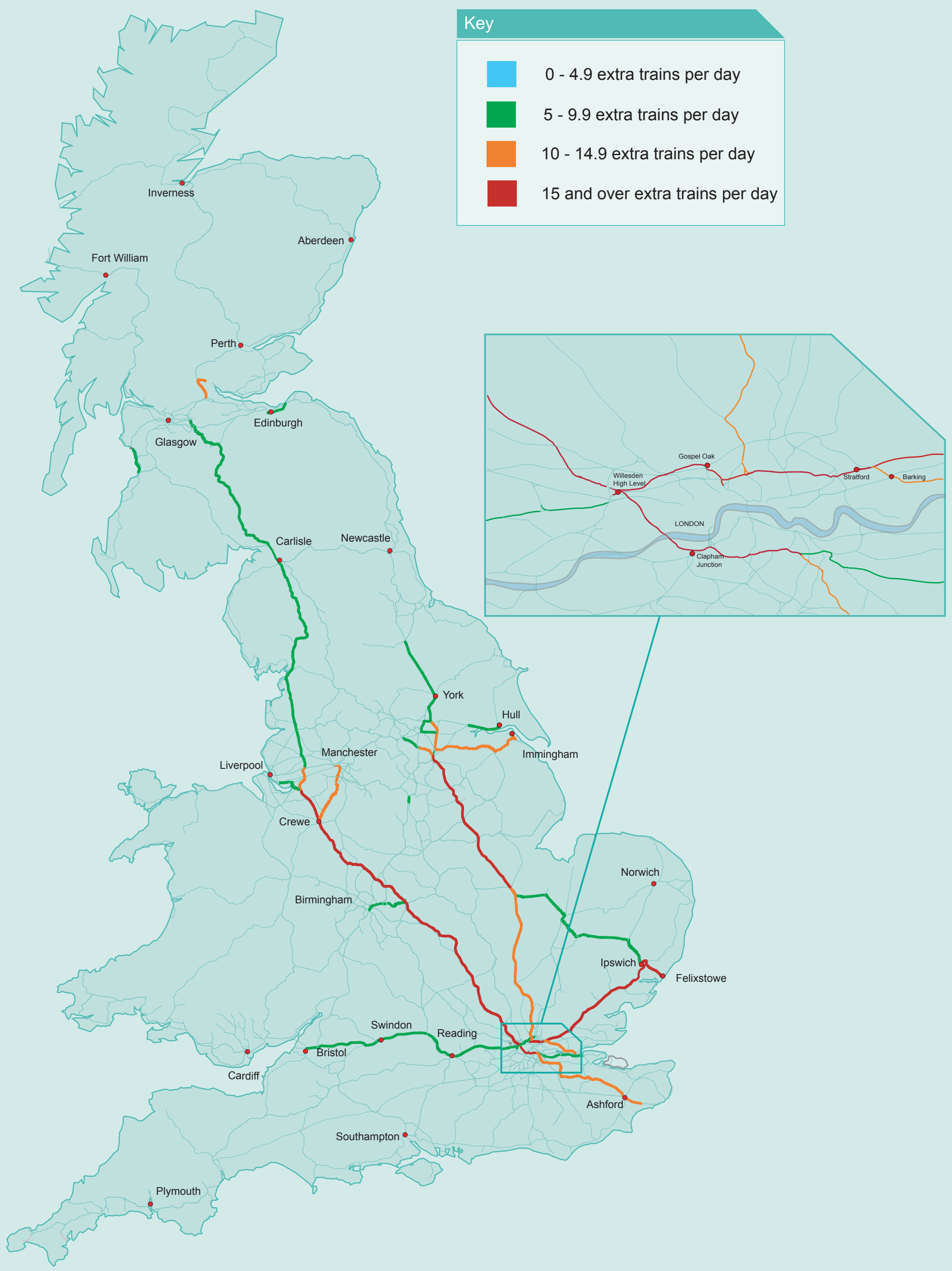
Table 4.1: Industry ten year forecast to 2014/15: Tonnes Lifted

Commodity	Bottom up forecast 2014/15 mt	Top down forecast 2014/15 mt	Rate of growth over 2004/05 base[2]
Coal[1]	50.5	52.9	+10 to 15%
Metals	14.6	12.1	+15 to 39%
Ore	5.9	5.7	-3 to -7%
Construction	23.6	24.9	+20 to 26%
Waste	1.8	2.0	-9 to -18%
Petroleum and chemicals	7.1	7.2	+4 to 6%
Channel Tunnel	6.0	7.2	+200 to 260%
Domestic Intermodal	2.5	4.7	+177 to 422%
Maritime Containers[2]	20.3	21.1	+82 to 90%
Auto	0.5	0.4	+0 to 25%
Total	**132.8**	**138.2**	**+27** to **31%**

[1] The top down forecasts have recently been revised to 43.1mt for coal

[2] The commodity categorisation used by the industry to produce the tonnes lifted 10 year forecasts was slightly more disaggregated than that set out for the historical tonnes lifted data in Table 3.1. The methodology used for calculating tonnes lifted for the base year was also slightly different. For example, tonnes lifted for intermodal traffic includes container as well as cargo weights.

Figure 4.1: Additional trains by 2014/15 compared to base year for Base Case



Additional trains are for a single direction.

The 'Other commodities' section within this chapter considers the geographical distribution of growth in more detail by commodity.

4.2.3 Sensitivity tests: ESI coal and deep sea intermodal markets

It became clear during the forecasting process, and in subsequent discussions of the forecasts with the Stakeholder Management Group, that there was scope to test three sensitivities specific to the markets of ESI coal and deep sea intermodal. The sensitivities are set out in Table 4.2 below:

Sensitivity 1 has been developed to explore the impact of further growth in Anglo – Scottish coal (imported and opencast) to the Aire and Trent Valley power stations. The Base Case scenario assumes the east coast ports of Immingham, Hull, Redcar, Tyne and Blyth pick up future shortfall in domestic English ESI coal production for the Aire and Trent Valley power stations. Section 4.2.4 details how additional trains are distributed on the network in the Base Case and Sensitivity 1.

Sensitivity 2 has been developed to display the impact of Shell Haven port opening and the abstraction from Haven Ports (Felixstowe and Bathside Bay) growth that would result.

Sensitivity 3 has been developed to display the impact of W10 enhancement between Southampton and the WCML. Section 4.2.4 details how additional trains fall on network in the Base Case and Sensitivity 2 and 3.

Figure 4.2 sets out where the additional trains are forecast on the network in 2014/15 with Sensitivities 1, 2 and 3 displayed. Each Sensitivity is independent, and has impacts independent of the other two. All commodities are displayed. Again in all cases the preferred routeings of the FOCs have been applied unconstrained by capacity at this stage.

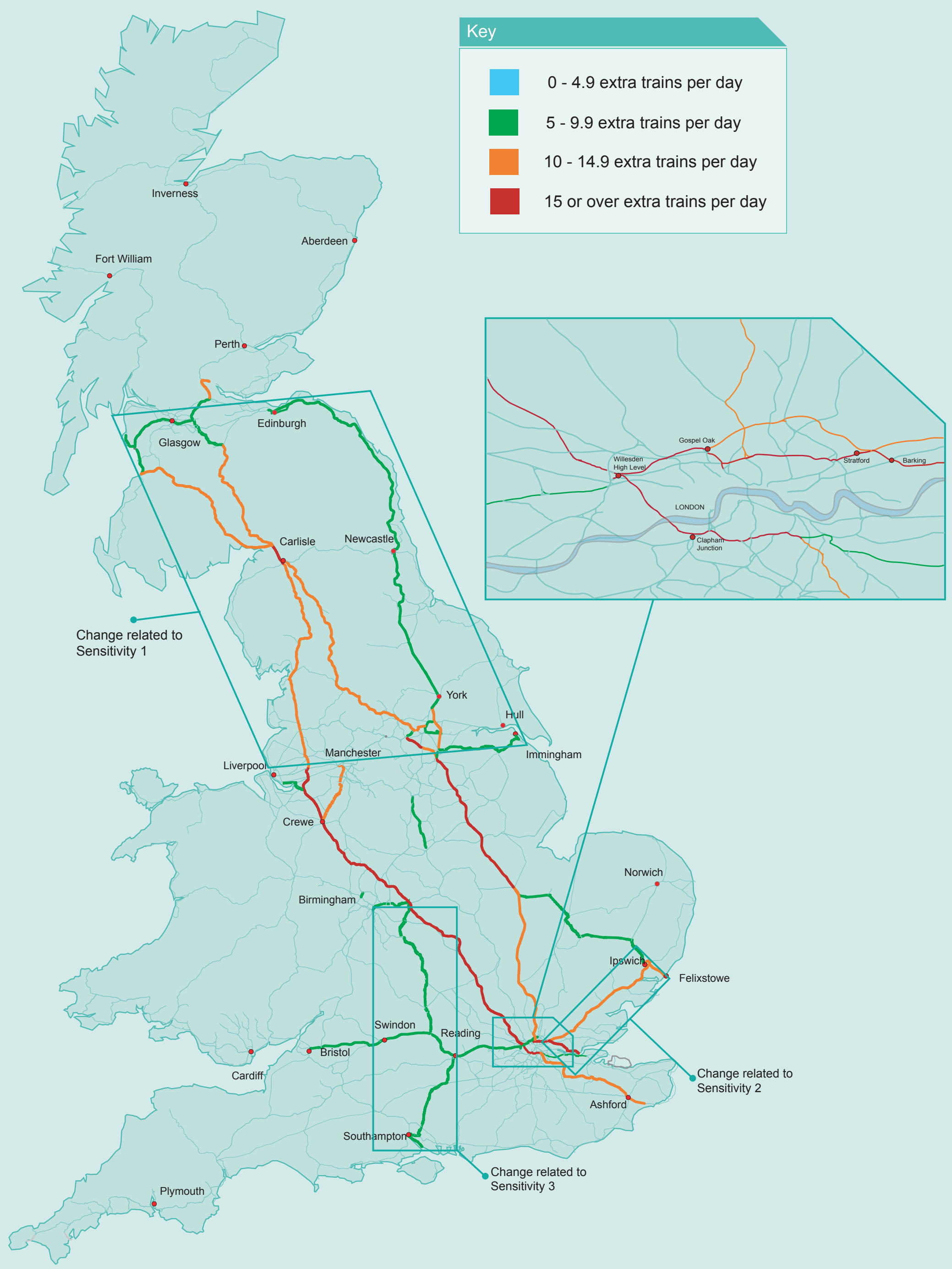
In both Figure 4.1 and Figure 4.2, the orange and red lines indicating growth of more than ten and more than 15 trains per day respectively are primarily driven by deep sea intermodal growth and changes in the supply sources of ESI coal. These factors are considered in more detail by market sector below.

The unconstrained forecasts are based on the current track access charging regime. If these charges change, for example using differential pricing based on commodity type, then a different demand profile would result.

Table 4.2: Sensitivity tests: ESI coal and deep sea intermodal

Sensitivity 1	ESI coal: The predicted further decline in domestic ESI coal production serving Aire and Trent Valley power stations is met by further Anglo Scottish growth from Hunterston and Ayrshire opencast sites at the expense of Base Case east coast ports import growth
Sensitivity 2	Deep sea intermodal: Shell Haven opens in 2011. 8 trains per day (tpd) run in each direction by 2014/15. Growth replaces 8 tpd of growth from Felixstowe and Bathside Bay in Base Case
Sensitivity 3	W10 gauge clearance is delivered by 2011 between Southampton and the WCML. Clearance generates an extra 6 internodal trains per day by 2014/15 over Base Case

Figure 4.2: Additional trains by 2014/15 compared to base year for Sensitivities 1, 2 and 3



Additional trains are for a single direction

4.2.4 Commodity summary: ESI Coal

Figure B1 in Appendix B sets out all current ESI coal import facilities, domestic pits and power stations in the UK along with the key routes used for coal transport by rail. The main routes where additional trains are projected on the network in both the Base Case and Sensitivity test 1 are marked.

Tables B1 and B4 in Appendix B set out the Base Case assumptions for ESI coal within the forecasts.

Both the Base Case and Sensitivity 1 assume that ESI coal at least maintains its existing share of the electricity market. They also assume that there will be further increases in rail market share of ESI coal business, driven primarily by the closure of the two water only served power stations and the trend toward longer distance hauls from coal source to power station. They also assume the trend of ESI coal supply away from domestic production toward imports will continue over the ten year study period.

Table B5 in Appendix B sets out the RFOA ESI coal lifted by rail forecast in 2014/15 alongside the most recent projections from the DTI for total ESI coal burn.

The industry is taking a slightly more optimistic view of ESI coal demand than the DTI studies at present. Demand for ESI coal in 2014/15 will be heavily influenced by the carbon trading arrangements in place and the market price of carbon credits at the time. Wholesale gas prices will also be key. The Government's recent Energy Review[4] confirms that reduction of CO_2 emissions in the energy sector remains a key target and cites the emissions trading regime as the means of achieving this. This Review may lead to new future predictions of coal traffic and these will need to be taken into account.

Network Rail is currently carrying out a review of the coal market. Although there is still work to be done, initial findings suggest that it may be sensible to include a lower coal growth sensitivity in the final version of the RUS.

What is clear from the range in forecasts presently available is that currently it is only possible to draw limited conclusions on the likely overall size of the ESI coal market in 2014/15.

Despite this some clear patterns are emerging that enable initial conclusions to be drawn. A further factor is EC Sulphur emissions regulations from 2008[5] which will effectively limit the volume of coal burned in power stations not fitted with Flue Gas Desulphurisation (FGD) equipment[6]. Table B6 in Appendix B sets out the current and expected position with regard to FGD fitment at UK power stations. Without such equipment, stations operating at full capacity will over time be in breach of EC Sulphur emissions regulations and hence will be granted only a limited volume of coal burn post 2008.

FGD equipment is therefore one of a number of key indicators in understanding which power stations are likely to be in operation up to and beyond the ten year horizon of the RUS and both the industry forecasts and the DTI assessments take this emerging picture into account.

The information in Table B6 in Appendix B on FGD is key to the demand and gaps exercise of the RUS, as all six major Aire and Trent Valley stations[7] are predicted to have FGD fitment by 2010. This suggests that regardless of projections for overall ESI coal burn, the key drivers of the Base Case and Sensitivity 1 routeing changes, (i.e. the continued operation of these six stations), are likely to remain in the medium term future.

The Base Case envisages that a post 2004/05 shortfall in domestic production and some increase in rail market share is met by growth

[4] Energy Review: DTI. July 2006.

[5] These are a part of the Large Combustion Plant Directive (LCPD), which takes effect in 2008.

[6] Flue gas desulphurisation equipment. Equipment designed to reduce emissions of noxious gases including nitrogen oxide and sulphur dioxide.

[7] 1 of these 6 stations, Eggborough, is currently expected to have only 1 its 2 GW of production capacity fitted with FGD equipment.

from a combination of import facilities on the east coast, namely Immingham, Hull, Redcar, Tyne Dock and Blyth, with Anglo Scottish volumes at 2004/05 levels[8]. This effectively results in a net gain of 18 trains per day from the east coast ports to the Aire and Trent Valley power stations over 2004/05 volumes. Table B7 in Appendix B sets out current capacity and proposed increases in handling capability at the key east coast ports for import coal.

The Base Case also drives additional trains on the South Humberside mainline, the ECML between Joan Croft Junction and Hambleton Juntion and the route from Hull docks to the Aire Valley via Selby and Milford. The route between Stainforth and Brancliffe East Junction (the South Yorkshire Joint line) is also projected to see further growth as a key route to the Trent Valley power stations from the Humber ports.

Sensitivity 1 envisages that the majority of the post 2004/05 shortfall in domestic production and some increase in rail market share will be made up by increased imports through the port of Hunterston allied with continued growth in Scottish opencast forwardings and some limited growth through the east coast ports. The principal destination of this traffic is the Aire and Trent Valley Power stations.

This scenario consequentially drives continued uplift in coal demand on the Glasgow and South Western and Settle & Carlisle (serving both the Aire and Trent Valley). This amounts to an additional 13 trunk services per day over the 2004/05 base, on the core Glasgow and South Western / Settle & Carlisle axis and some increased demand of approximately six or more trains per day on routes from Yorkshire to the Trent Valley as imported coal continues to supplant locally mined sources close to the Trent Valley.

The Freight RUS capacity gaps and optioneering exercise outlined in Chapters 5 and 7 clearly sets out the impact of both the Base Case and Sensitivity 1.

Deep sea intermodal

The industry predicts a 64 per cent growth in the number of intermodal trains on the network over the ten years in the Base Case. In Sensitivity 3 with W10 gauge from Southampton this climbs to a 74 per cent growth overall.

The level and distribution of this growth will be dependent on a number of factors including the timing and location of new port capacity, the level of REPS grant available and the annual growth rate of the deep sea business.

In the Base Case the highest levels of growth are projected to be to/from the proposed new deep sea developments at the Haven Ports of Felixstowe and Bathside Bay. This growth is the prime driver of the high levels of additional trains (shown by orange and red lines) on Figure 4.1 on the Great Eastern, WCML and ECML (between Peterborough – Doncaster).

The same network sections are affected in Sensitivity 2 displayed in Figure 4.2, though this sensitivity involves a proportion of growth coming through Shell Haven on North Thameside rather than the Haven Ports. The principal change the sensitivity drives is slightly fewer additional trains on the Great Eastern and cross country route between the Haven Ports and Peterborough.

One additional impact not displayed on the map is that the additional services from Shell Haven would be forced to make flat junction crossing movements at Forest Gate to access the W10 cleared North London Line, unless W10 clearance and routeing via the Tottenham and Hampstead line can be achieved (see Chapters 6 and 7).

In Sensitivity 3 an additional six trains per day from Southampton to the West Coast Main Line are predicted contingent on W10 clearance taking place. It is assumed that the preferred routeing of these trains is via Reading West, Leamington and Nuneaton (see Figure 4.2).

[8] 2005/06 has seen growth already on the Anglo – Scottish route via the GSW/ Settle & Carlisle (5tpd) and a similar level from east coast ports against 2004/05 volumes.

The Freight RUS gaps and optioneering exercise outlined in Chapters 6 and 7 takes account of the impacts of the Base Case and Sensitivities 1-3.

The forecasts have not included a scenario that involves major development of Hunterston, Teesport or Hull as ports handling large volumes of deep sea traffic or for example further development of a deep sea container facility in Wales. This is because the likely future market share of deep sea traffic at these ports is not yet clear. Developments at these ports, however, have been discussed with stakeholders in recent weeks and further reference is made in Chapter 5.

Other commodities

Figures 4.1 and 4.2 incorporate growth projected in all other commodities. Figures B2 – B4 in Appendix B show the additional trains projected on the network in 2014/15 by commodity for other key markets of construction, metals and petroleum traffic.

Construction traffic is expected to grow by 20% in tonnes lifted over the period, and approximately 25% in train numbers. The train numbers growth tends to be relatively incremental rather than delivering a step change in demand levels on any given route. Figure B2 in Appendix B displays this position.

The highest level of growth for construction services is projected to be on the heavily used routes from the west of England to Acton via the GWML. Three or four additional trunk services from South Wales and the Mendips are projected and consequentially additional trip workings from Acton to the receiving terminals in the London area are also expected.

The other key area of growth for construction traffic is projected to be the Hope Valley south trans-Pennine route, with approximately three to four additional trains daily. Limestone from the Buxton area to de-sulphurisation plants at power stations, cement from Hope and further general aggregates traffic from the Buxton/ Peak Forest area to various destinations are the components of the forecast.

Most metals traffic is generated by a small number of very large customers so a few key decisions drive most changes of significance in this sector. The industry projects approximately 19 per cent growth in train numbers over the ten years. As with construction, the traffic does not represent step changes in demand on any given route section.

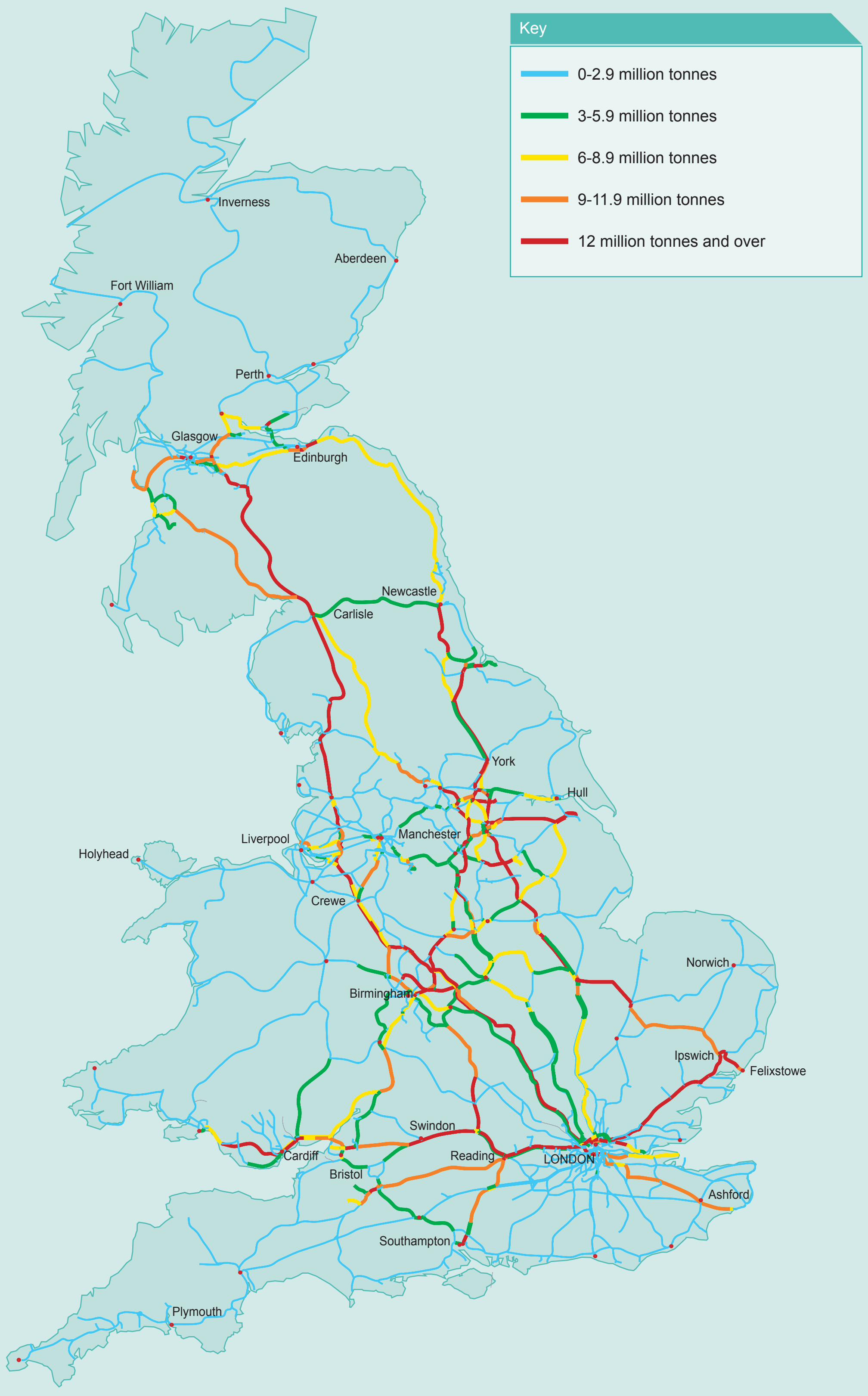
Figure B3 in Appendix B details this pattern nationwide. The biggest single change on any given route section for metals is actually a decrease of approximately 6 trains per day on the North East – South West axis between Teesside and South Wales. This traffic decrease is a result of changes to interworks movements for Corus resulting from a production upgrade at Port Talbot.

The largest increase on a single route section for metals is approximately two additional trains per day additional on the South Humberside mainline serving Scunthorpe steelworks. The Sutton Park line in Birmingham is also predicted to see an increase of around two trains per day.

Figure B4 in Appendix B details the changes projected in the petroleum market. The market is regarded to be largely stable and static with no routes in the country showing an increase of more than two trains per day over the ten years. The long term impact of the Buncefield fire on rail demand is yet to be clear, but as Chapter 3 highlights, presently rail is continuing to move increased volumes as a result of the incident.

Domestic intermodal traffic is predicted to see continued growth in line with the last few years, with supermarkets and other retail distributors increasingly making regular use of rail. The WCML London – Midlands – Scotland corridor is highlighted as the key route for this traffic, with traffic between Scottish terminals at Mossend, Coatbridge and Grangemouth and intermodal terminals in the Midlands projected to show further growth.

Figure 4.3: Tonnage on the network in 2014/15 for Base Case



Annual tonnage shown in both directions.

Figure 4.4: Tonnage on the network in 2014/15 for sensitivities 1, 2 and 3

Annual tonnage shown in both directions.

4.3 Industry 2014/15 demand results: gross tonnage

Gross tonnage forecasts are displayed in Figure 4.3 for the Base Case and Figure 4.4 for Sensitivity 1, 2 and 3. Sensitivities 2 and 3 do not drive any significant changes in gross tonnage on the network.

The tonnage maps illustrate a similar pattern to that displayed by Figures 4.1 and 4.2 showing additional trains in 2014/15 compared to the base year. The routes with a higher number of bulk services e.g. coal, aggregates and petroleum, will show a higher ratio of gross tonnage to additional trains projected. For example in Sensitivity 1, the Glasgow and South Western and Settle & Carlisle axis has considerably fewer additional services projected to run than most sections of the WCML, however the tonnage uplift on these lines is projected to be as high as that on many sections of the WCML where lighter intermodal growth tends to predominate.

4.4 Predicted growth compared to actual 2005/06 figures

Since the Freight RUS forecasts were produced based on 2004/05, information for the most recent financial year is now available. This has allowed a comparison between the ten year forecasts outlined in this chapter with actual freight train movements which occurred in 2005/06.

This first year of the forecasts has largely supported the overall growth over ten years explained in this chapter. Growth by commodity is shown in Table B8 in Appendix B.

5. Summary of gaps identified

5.1 Capacity gaps

5.1.1 Approach

One of the main objectives of the Freight RUS is to highlight the key capacity issues which would need to be addressed in order to accommodate the forecast growth in the rail freight market. As discussed in Chapter 2, capacity issues are best considered in geographical RUSs which benefit from detailed passenger growth estimates alongside the established freight forecasts from the Freight RUS. These RUSs will ensure that both freight and passenger traffic are considered when developing timetable and/or infrastructure solutions.

The Freight RUS complements this approach by bringing together the key strategic capacity constraints of concern to freight users in one document. By doing this, it enables operators and funders to understand the network-wide implications of constraints and looks at solutions for areas not covered by geographical RUSs.

This first Freight RUS also highlights some of the key constraints that will warrant further consideration in the forthcoming RUS programme, but could have been overlooked without a network-wide view of freight requirements.

5.1.2 Methodology

The analysis in the Freight RUS uses forecasts of trains/tonnage classified by origin to destination pairs (as detailed in Chapter 4) on a trains per day basis. A range of key indicators have then been assessed to determine the critical pinch points on the network against these projections. The results of this assessment have been consulted widely both internally at Network Rail and with the Stakeholder Management Group.

To do this, it has clearly been necessary to make some assumptions about passenger demand growth. The Government's Regional Planning Assessments and the RUS programme forecast widespread growth in passenger demand. However, for much of the network there are not yet firm commitments to translate this growth into amended timetables. In the absence of this, the Freight RUS has assumed that the passenger growth will be accommodated without reducing the working timetable (WTT) paths that are currently available to freight. On the WCML where the emerging picture on 2008 standard hour freight paths is available against the revised passenger specification, this has been adopted.

The capacity gaps which fall on a route section where major change in the passenger timetable is also likely are highlighted as eligible for further study within the designated geographical RUS which will also consider the passenger timetable implications. Table C1 in Appendix C shows which gaps are considered in the Freight RUS, and which gaps are considered in the geographical RUSs.

The methodology for identifying key freight capacity constraints follows a four stage process as described below.

A: Focus on high growth corridors

An initial 'sift A' identified corridors with high forecast growth. For this exercise, 'high growth' was defined as occurring on route sections where eight or more additional trains per day were projected (in the busiest direction). A variety of levels of demand were considered as hurdles for this test and it was concluded that eight trains per day growth picked up most of the strategic changes including those on key routes to and from major sea ports and coal import terminals.

This process was followed up by a review with stakeholders of further sections where there was difficulty in securing paths on today's railway where these had not been captured in the first sift. The further sections identified were: the Hope Valley line, the Sutton Park line, crossing moves at Coventry station and a number of route sections linking the north east ports with the Aire/Trent Valley power stations.

Routes in South Wales (such as Cwnbargoed to Aberthaw) were also highlighted as potential gaps not picked up by sift A. On consultation it was agreed that these were best examined further in the Wales RUS due to close linkages with changes in passenger service frequencies.

B: Analysis of current path take-up on high growth corridors

This stage involved detailed analysis of the utilisation of freight paths on the route sections selected following sift A to establish whether there were some sections of the network where high growth levels could be comfortably accommodated within the existing WTT path provision.

Care was taken to avoid a blanket assumption that a low path take-up means that spare capacity exists for growth within the current quantum of booked paths. This was because the existing quantum on any given section may contain spare paths for a particular operational reason. For example, spare paths may be included to cover for the particular supply arrangements of a power station, paths booked to cover operations of services with a less than daily pattern or paths booked for diversionary purposes. In all these cases assumptions that these slots could be used for new flows of traffic would be spurious.

Nonetheless, it has been possible to eliminate some route sections from the study at this stage. For example, the primary route for Channel Tunnel traffic between Dollands Moor and Wembley via Maidstone East is forecast to have high growth. However, the utilisation of booked WTT freight paths on the route over the last two years has never been higher than 40 per cent per day on any section, and the regularly unused paths available are suitable for the predicted future growth, in terms of sectional running times and the times of day they are available. In this, and similar cases, it was concluded that it was not necessary to identify the route as a potential capacity constraint to the forecasts.

C: Analysis of remaining available capacity over and above WTT provision
For the route sections sifted through processes A and B a further analysis was undertaken to assess likely available capacity for freight over and above that reserved in the current WTT. The peak and off peak Capacity Utilisation Index (CUI) measure for each section was reviewed.

The CUI is a measure of the usage of a route section against its capacity and consequently gives a broad indication of where additional capacity may be available, over and above that traffic which currently runs.

The CUI is not, however, always appropriate for indicating spare capacity likely to be available for freight. This is partly due to the complex nature of freight movements at many of the key points of constraint, particularly crossing moves at junctions.

Consequently, its use as an indicator of potentially available capacity was supplemented by a review of each individual route section and the service mix and routeing. CUI data was only used as a basis for removing route sections from the study if the nature of movements on the section in question did not involve conflicting movements at junctions or other known operational issues.

D: Full peer group review
The process and results of sifts A to C were shared at the Freight RUS Stakeholder Management Group (SMG) and subsequently reviewed in two separate working groups made up of attendees determined at the SMG.

5.1.3 Key gaps defined
Figure 5.1 illustrates the key capacity gaps against the 2014/15 forecasts as defined by the methodology and peer group review outlined above. The figure highlights those gaps driven by the sensitivities as well as the Base Case demand forecast.

Table C1 in Appendix C sets out further WTT, ACTRAFF and CUI data for each of the route sections highlighted. For the cases where the Freight RUS will not be taking analysis of the gap further, the relevant geographical RUS is also shown.

Figure 5.1: Key capacity gaps

Numbers 1 to 13 are capacity gaps considered within the Freight RUS.
Letters A to K are capacity gaps considered within the appropriate geographical RUS.
Sensitivity 2 does not drive any additional capacity gap route sections.

5.1.4 Drivers of capacity gaps

The key capacity gaps can be divided into two distinct groups.

Firstly there is a set of gaps arising from the forecast growth in imported coal and coal from opencast sites. The gaps include route sections between the east coast ports and the Aire and Trent Valley power stations in the Base Case, and between the Scottish port of Hunterston and Ayrshire opencast sites and the Aire and Trent Valley power stations in Sensitivity 1

The key coal growth flows in Sensitivity 1 and the Base Case and the key capacity gaps they drive are shown in Tables 5.1 and 5.4 covering the Anglo-Scottish route and the lines from the east coast ports respectively.

The group of gaps driven by deep sea intermodal growth in the base case and Sensitivities 2 and 3 are shown in Tables 5.2, 5.3, 5.5 and 5.6. In the Base Case these gaps include sections on the Great Eastern Main Line, the West Coast Main Line, the southern part of the East Coast Main Line and the cross country route between Ipswich and Peterborough.

Sensitivity 2 introduces an additional gap between Forest Gate and Stratford on the GEML, and in Sensitivity 3 there is a group of capacity gaps between Southampton and the WCML.

Table 5.1: Growth driver 1: Coal: Sensitivity 1: Hunterston/ Ayrshire – Aire Valley/Trent Valley

13 additional trains per day in busiest direction by 2014/15

Gap identifier	Resulting key gaps	Driver of gap
I	Glasgow South Western: (Mauchline Junction – Gretna Junction)	■ Single line section Gretna – Annan ■ Signalling headways in particular at Ardoch (between Thornhill and Kirkconnel) and Auchinleck (between New Cumnock and Mauchline)
1	WCML: (Gretna Junction – Petteril Bridge Junction)	■ Conflicting movements at Gretna Junction ■ Speed differentials freight – passenger, including entering/leaving loops ■ Conflicting movements south of Carlisle station
2	Settle & Carlisle: (Petteril Bridge Junction – Settle Junction)	■ Long signalling headways, in particular at Horton in Ribblesdale, Long Meg and Mallerstang.
3	Settle Junction – Milford	■ Insufficient paths across Whitehall Junction ■ Lack of regulating points in Whitehall Junction area.

Table 5.2: Growth driver 2: Intermodal base case: Haven Ports – Midlands, the North West, Scotland

Up to 19 additional trains per day in busiest direction by 2014/15

Gap number	Resulting key capacity gaps: (geographical)	Driver of gap
4	WCML: Lancaster – Carlisle	■ Speed differential between passenger services and diesel hauled freight services over Shap summit ■ Sub optimal positioning and length of some loops
5	WCML: Winsford –Weaver Junction	■ Speed differential between passenger services and freight services on two track section between Winsford South and Weaver ■ Slow entry/exit speeds to existing loops
6	WCML: Stafford	■ Conflicting movements at southern end of Stafford station between Down/Up slow and Down/Up Birmingham lines.
7	WCML: Daventry – Wembley	■ Available class 4 & 6 slots between off peak passenger service.
D	Stratford – Channelsea North Junction – Camden Road	■ Interface with access to / from the GEML at Stratford
E F	GE Main Line	■ Available class 4 & 6 slots between off peak passenger service ■ interface with access to/from the NLL at Stratford
K	Manchester Piccadilly – Deansgate	■ Available freight paths across Ardwick Junction, through platforms 13 & 14 at Manchester Piccadilly and along the Deansgate corridor.

Table 5.3: Growth driver 3: Intermodal Sensitivity 3: Southampton –WCML W10 cleared

Six additional trains per day in busiest direction by 2014/15 over base scenario

Gap number	Resulting key capacity gaps:	Driver of gap
8 9	Southampton – WCML: Basingstoke/Reading West Junction/Cherwell Valley, Leamington – Nuneaton	■ Conflicting freight and passenger movements at Reading West Junction ■ Up movements to Coventry at Nuneaton ■ Crossing movements at Coventry ■ Signalling headways Reading – Oxford.

Table 5.4: Growth driver 4: Coal: Base Case: East coast ports[1] – Aire/Trent Valley

18 additional trains per day[2] in busiest direction by 2014/15

Gap number	Resulting key gaps:	Driver of gap
10	Wrawby – Scunthorpe	■ Signalling headways Wrawby – Scunthorpe ■ Available time for maintenance access ■ Junction speeds at Wrawby.
11	Hull docks branch	■ Single line and signalling system on the Docks branch.
12	Tyne Yard – Tursdale Junction[3]	■ 2 track section of ECML: speed differential between freight and high speed passenger services.

Table 5.5: Growth driver 5: Intermodal Base Case: Haven Ports – Yorkshire/the North East

Eight additional trains per day in busiest direction by 2014/15

Gap number	Resulting key gaps:	Driver of gap
A	ECML: Hare Park Junction – South Kirby Junction	■ Conflicting freight crossing movements between Moorthorpe and Crofton Junction.
B	ECML: Joan Croft Junction – Hambleton Junction	■ Freight crossing movements to the Down line at Joan Croft Junction ■ Freight crossing movements to the Up line at Hambleton Junction.
C	ECML: Peterborough – Doncaster	■ Access from Up Slow and Peterborough Yard to Up March line ■ Speed differential freight to passenger on two track section Stoke Junction – Doncaster.
G H	Haughley Junction – Peterborough	■ Single lead junction at Haughley ■ Signalling headways at Kennett ■ Conflicting movements through Ely station.

[1] Immingham, Hull, Redcar, Tyne, Blyth
[2] This number reflects the total trains per day additional from all the east coast ports
[3] Likely to be a constraint only at times when coal diversions are also on this section away from the Settle & Carlisle

Table 5.6 shows the additional gap introduced by Sensitivity 2. The gaps shown in Table 5.2 would also apply.

Table 5.6: Growth driver 6: Intermodal Sensitivity 2: Shell Haven – Midlands/the North West/Scotland & Haven Ports – Midlands/the North West/Scotland

11 additional trains per day from Haven Ports and eight additional trains per day from Shell Haven, in busiest direction by 2014/15.

Gap number	Resulting additional key gaps:	Driver of gap
E	Forest Gate – Channelsea	■ Conflicting movements at Forest Gate with GE service on both Main and Electric lines.

Under Sensitivity 2 there are five additional trains per day from Haven Ports, and two additional trains per day from Shell Haven to Yorkshire/the North East in busiest direction by 2014/15. The gaps on the route to Yorkshire/the North East are the same as those in Table 5.4.

There are a small number of key constraints that are not driven by coal traffic pattern alterations or deep sea intermodal growth. The South Trans Pennine route is included as further growth is projected in aggregates and construction materials from terminals on the route. There are already difficulties in pathing slow moving freight services in-between passenger services on the route.

In addition to the deep sea growth highlighted above, the inclusion of the section of the WCML between Carlisle and Lancaster is partly driven by projected growth in domestic intermodal traffic between England and Scotland, as well as the predicted continuation of demand for Class 6 (60 mph) freight on the route, which can cause conflicts with passenger services on the steep gradients.

Capacity Gap 13: Hope Valley Line is primarily driven by existing freight capacity issues as opposed to being driven by the Freight RUS forecasts. Capacity Gap J: Larbert – Stirling is driven by the change to existing routeing of coal traffic from Hunterston/Ayrshire opencast sites to Longannet. This change is as a result of the reopening of the Stirling – Alloa line and will be considered as part of the Scotland RUS.

Table C1 in Appendix C sets out each of the route sections identified as representing a capacity gap above, alongside the geographical RUS that will take forward further analysis of the gap.

5.1.5 Potential constraints arising from developments outside the Freight RUS forecasts

As noted in Chapter 4, the industry forecasts do not include all possible future deep sea port developments. A number of port developments are currently under consideration. It will be necessary to look at implications for capacity when decisions on these developments are made.

Teesport is currently progressing plans for a deep sea berth. The projected volumes are approximately 1.5 million TEUs. There are no obvious capacity constraints to some additional rail traffic from the port.

It is possible that a large share of projected rail traffic would be to/from the North West. The trans Pennine route via Diggle which links the east coast ports with the North West could be a constraint to daytime freight pathing but only if a significant number of additional trains were projected.

In connection with these trans Pennine flows, there could be localised capacity implications between Ardwick Junction and Deansgate if there is a particular requirement to have multiple daytime services to/from the Trafford Park terminal in Manchester.

Clydeport have expressed an aspiration to develop their port at Hunterston as a deep sea container port. At present aspirations are for a 1 million TEU throughput by 2015, rising to 2 million TEU by 2020. For gauging reasons (see Chapter 6), initial routeing of container traffic between Hunterston and the WCML would probably be via Paisley and Rutherglen (in the Glasgow suburbs).

Should this development go ahead, an assessment of the likely number of container services generated will need to be made and considered alongside the forecast for coal services from Hunterston/Ayrshire – Longannet/Cockenzie and the plans of Transport Scotland for suburban services on the Ayr route.

An alternative routeing via the Glasgow and South Western line to the WCML at Gretna could be used, though this route would require substantial gauge clearance work, and also the signalling schemes and partial re-doubling of Gretna – Annan (as outlined in the Scotland RUS).

It is noteworthy that there are no significant capacity gaps identified in Wales and comparatively few in Scotland. No significant strategic issues were identified that might impede the growth currently expected by the operators in either country.

The Scotland RUS contains an analysis of those sections of route where freight and passenger growth necessitates capacity enhancement. Table 5.7 shows the issues which will be examined by the Wales RUS

The Welsh Assembly Government is currently carrying out a Wales Transport Strategy, looking at the possibility of development of a deep sea container facility in South Wales. Should these plans come to fruition any likely capacity gaps will need to be considered alongside Welsh Assembly plans for future passenger service changes.

5.2 Capability gaps

5.2.1 Gross tonnage

Figures 4.3 and 4.4 in Chapter 4 set out the expected demand profile in additional gross tonnes on the network in 2014/15. The maps highlight significant additional tonnage across a wide range of routes. Predominantly the growth falls on main lines such as the East and West Coast. However, significant uplift is also forecast on less heavily used routes including the Settle & Carlisle and the Glasgow and South Western. This continues the trend in freight growth on these lines in recent years.

Using a base year of 2004/05, Network Rail has reviewed the network to identify those sections of route which are most likely to have a near term requirement for significant volumes of track or structure renewals in the event of further additional tonnage.

Table 5.7: Freight issues to be dealt with in the Wales RUS

Route	Commodity
Cwnbargoed – Aberthaw	Coal
To and from Welsh ports	Intermodal (contains W12 gauge aspiration/WAG's Wales Transport strategy
Blaenau Ffestiniog – Llandudno Junction (Conwy Valley)	Slate waste
Machynlleth – Chirk	Timber

Table 5.8 sets out the projected additional gross tonnage on each of the route sections which falls into the category set out above where growth projected exceeds 1 million gross tonnes per annum. These are all regarded as key strategic route sections.

The route sections shown in bold are all on the Settle & Carlisle or Glasgow and South Western Lines, all see significant tonnage growth only in Sensitivity 1.

Both lines have already seen substantial tonnage growth in this flow up to, and indeed since the base year 2004/05. In 2005/06 around 2 million gross tonnes of the 2014/15 per annum projected growth (of 5.7 million tonnes) had already occurred.

All other route sections in the table are projected to see growth in the base case and Sensitivities 1-3. Growth projected on the Freight lines via the Crewe Independent line represents a whole range of traffic traversing the WCML but avoiding Crewe station. Growth projected through Woodgrange Park (on the Tottenham & Hampstead Line) is mostly intermodal and aggregates traffic to/from North Thameside. The additional tonnage projected on Larbert – Stirling is a result of the proposed re-routeing of Longannet coal traffic via the Sirling – Alloa line.

Chapter 7 (section 7.4) sets out indicative cost estimates for accommodating the tonnage projections set out in Table 5.7.

5.2.2 Route Availability (RA) and train length
Stakeholders have raised aspirations for specific increases axle weight limits (improved RA).

Where a capacity gap has been identified in this chapter, Chapter 7 considers options for relieving those gaps, including improvements to axle weight limits, where these improvements would be likely to constrain demand for train paths.

By the same criteria, improvements in train length are also considered in Chapter 7 as options against a number of capacity gaps.

Table 5.8: Route sections with changes in tonnage over 1 million and likely to require accelerated renewals

Route section	Gross freight tonnes (m)		Growth tonnes (m)
	2004/05	2014/15	
Eastriggs – Bank Junction	2.0	5.1	3.1
Bank Junction – Mauchline	3.2	5.2	2.0
Mauchline – Bank Junction – Eastriggs	4.8	9.2	4.4
Gretna Junction – Carlisle	10.8	19.0	8.2
Carlisle – Gretna Junction	6.2	10.2	4.0
Carlisle – Kirkby Thore	3.5	9.2	5.7
Kirkby Thore – Carlisle	1.2	3.4	2.2
Kirkby Thore – Settle Junction	4.0	9.7	5.7
Settle Junction – Kirkby Thore	2.2	3.4	1.2
Larbert Junction – Stirling	0.8	2.2	1.4
Stirling – Larbert Junction	0.5	2.0	1.5
Crewe Independent Up	0.6	6.2	5.6
Crewe Independent Down	8.9	15.6	6.7
Woodgrange Park to Barking	5.3	6.6	1.3
Barking to Woodgrange Park	5.1	6.4	1.3

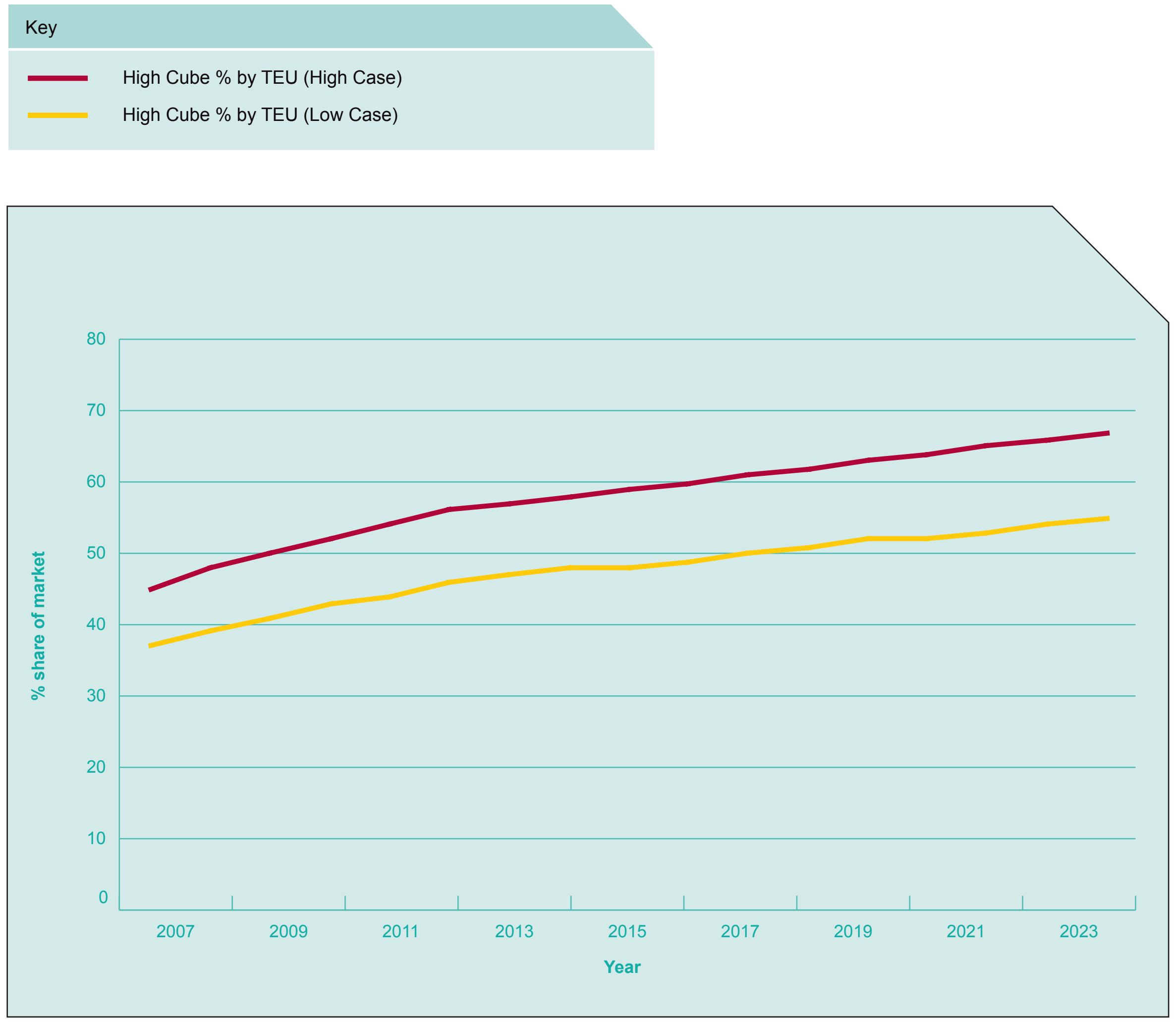
6. Gauge aspirations

6.1 Background

This chapter considers the gauge aspirations of the rail freight operators. It examines the aspirations which arise from the intermodal market (both deep sea and short sea) and Channel Tunnel traffic.

The recent trend towards larger containers in both the deep sea and short sea markets is forecast to continue over the next 10 years. The standard container sizes for deep sea and short sea differ and are considered separately below. Table A1 in Appendix A sets out the most common box dimensions in operation in both these markets. Rail freight operators have aspirations to increase their modal share of these markets.

Figure 6.1: Projected proportion of 40ft deep sea boxes at 9ft 6in



The market for the movement of continental gauge conventional wagons through the Channel Tunnel is currently constrained by UK gauges. This is explored in the European gauge section in this chapter.

Deep sea maritime intermodal

Productivity gains for intercontinental shipping lines of using taller boxes are driving a continuing rise in market share of High Cube containers (9'6" tall).

The future growth in 9ft 6in units was discussed at the planning inquiries for Bathside Bay and Felixstowe South in 2004. Figure 6.1 charts the anticipated growth as a proportion of the 40ft long deep sea box fleet projected between 2007 and 2023. Since these projections were published, the share of 9ft 6in high boxes within the deep sea container fleet has grown to 35% in mid 2004, up from 28% in 2002, suggesting that the 'high scenario' is likely to be closer to what would be forecast today. The estimates used to underpin the forecasts in Chapter 4 are closer to the 'high scenario' in Figure 6.1.

Whilst 8ft 6in containers can be accommodated on standard wagons within W8 gauge (see Appendix A for description of each gauge measurement), High Cube containers on standard wagons require W10 gauge.

Short sea (including maritime and Channel Tunnel intermodal)

There is greater diversity in the range of box dimensions for intra European containers. This is partly due to the wider range of methods of container transportation used for the shorter intra European hauls. Both container width and container height are constraints for handling some box types within the UK gauges.

Unlike deep sea boxes, which (with the exception of refrigerated 'reefers') are restricted to 2.5m in width, an increasing number of short sea units are of 2.55m and 2.6m width. These units if 9ft 6in high are not compatible with W10 on a standard wagon (1000mm platform) and can only be conveyed within W12 gauge (see Appendix A for gauge measurements).

6.2 Industry priority gauge aspirations 2014/15

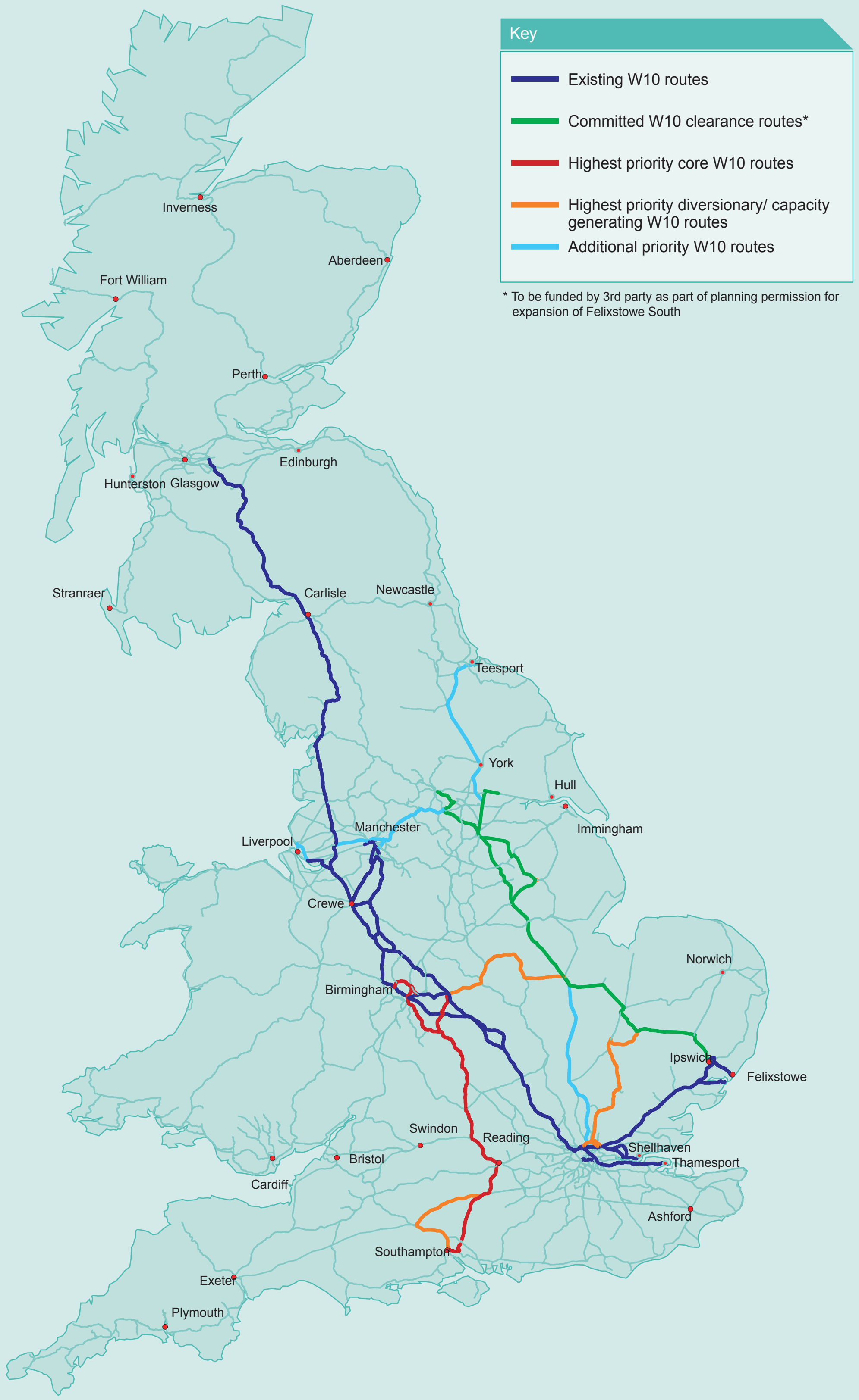
In the light of the trend towards larger container sizes in the intermodal market, the FOCs have proposed amendments to the SRA's Gauging Policy (published 2005) highest priority routes for future gauge enhancement schemes. The Base Case forecasts assumed no further gauge enhancements (except those already committed as part of port developments) with Sensitivity 3 being W10 clearance from Southampton to the West Coast via Winchester. Gauge clearance of the routes highlighted in Figure 6.2 would not be required to accommodate the 2014/15 forecasts (except Sensitivity 3), but would be expected to act as generators for additional demand.

Deep sea maritime intermodal priority routes

The Stakeholder Management Group discussed and proposed a priority network for W10. The priority routes for further W10 clearance are overlaid on the existing W10 network.

Figure 6.2 shows current W10 cleared routes consisting mainly of the Haven ports to London via the Great Eastern Main Line, North London Line and the entire West Coast Main Line including branches to freight terminals

Figure 6.2: W10 Gauge priorities



around Birmingham, Liverpool, Manchester and Glasgow. There already are some limited W10 diversionary routes around Birmingham and between the Midlands and Manchester.

The routes designated as the highest priority core routes represent optimum routeing from the largest deep sea container ports (by TEU throughput, see Table 3.2, Chapter 3) to depots in the West Midlands, the North West and the North East. These routes are supplemented with further capacity generating routes and diversionary routes for the same flows. The latter were viewed as important because a high proportion of intermodal traffic runs overnight when engineering possessions are normally taken. Also in some cases the diversionary routes can act as generators of additional regular capacity (for example the route between Peterborough and Nuneaton, although a duplication of the current core route from the Haven Ports to the WCML via the Great Eastern, would be a significant capacity generator as well as a diversionary route, if gauge works are combined with capacity schemes). Chapter 7 deals with this particular project in more detail. Whilst the existing W10 network is electrified, some of the diversionary routes would require operators to use diesel locomotives. Further analysis of the options in Chapter 7 takes this into account.

The additional priorities represent connections to smaller existing deep sea ports and alternative diversionary routeings. These routes are to be considered as an increment on the highest priority routes.

Stakeholders have provided information on potential further deep sea port developments over and above the committed developments assumed in the industry base case forecasts. A 1.5 million TEU per annum development of deep sea capacity at Teesport and a 1 million TEU per annum by 2015 (rising to 2 million TEU by 2020) development of deep sea capacity at the port of Hunterston would drive aspirations for W10 gauge clearance on routes linking the ports to ECML and WCML respectively.

On port size criteria it is not expected that these developments would supplant the routes to Southampton and the Haven Ports as the highest priority for W10 clearance. However the prioritisation set out in Figure 6.2 may need to be reviewed if either of these schemes or indeed any other new proposals for large deep sea facilities realise their full projected capacity.

In addition to these possible developments, the Welsh Assembly Government is currently producing a Wales Transport Strategy and the Scottish Executive intends to produce its own Ports Strategy. Any conclusions on new deep sea port capacity in Wales and Scotland or as an output of the National Ports Policy will be reflected in the final version of this document.

Low platform wagon options

High Cube containers can be accommodated within a smaller gauge such as W8 if transported on a well wagon (usually heavier) where the container is loaded into a 'well' located between the bogies, at a lower height than on a standard flat bed wagon. Although the wagons are approximately the same length, they can only carry 2 TEUs instead of the 3 TEUs which can be accommodated on standard wagons. This is because the loading area is limited to the space between the bogies as opposed to the full length of the wagon. Therefore fewer containers can be transported per train given the same train length.

Given a typical maximum train length of 24 wagons (governed by depot/ ports track lengths and maximum length that can be hauled by a single locomotive), using well wagons would reduce maximum load factors from 72 TEUs to 48 TEUs per train. This reduction in productivity efficiency explains why freight train operators have not invested in significant numbers of well wagons and favour gauge clearance on the busiest core routes to and from the biggest ports.

A fleet of small wheeled lowliner wagons exists that can convey 9ft 6in tall by 2.5m containers within W8 without the length penalties associated with well wagons. These wagons however tend to be more expensive to purchase and maintain.

Finally an intermediate platform height wagon design called a Megafret exists that allows 9ft 6in high units to be conveyed at a lower height but not in a ‘well’ although this solution requires W9 clearance (few existing routes are cleared to this gauge). These wagons consist of two 50ft long platforms so do not match the space efficiency of standard 60ft wagons when accommodating 20ft and 40ft containers.

Chapter 7 examines the trade off between gauge clearance and use of well wagons/ lowliners/Megafrets on a route specific basis. Wagons have a lifespan of around 20 years so any option which requires a change on FOCs’ wagon use can only be achieved over the long term.

Short sea maritime and Channel Tunnel intermodal

The freight industry has expressed a desire for W12 gauge clearance for sections of the network which could be used to transport short sea traffic. This gauge maintains the height of W10 (9ft 6in on a standard platform) but the increased width to 2.6m would accommodate additional containers sizes (eg refrigerated units).

Figure 6.3 shows the freight industry’s agreed W12 gauge clearance aspiration.

As explained in Chapter 3.2, rail’s market share of short sea boxes is relatively low so the industry’s W12 aspiration is focussed on the biggest short sea ports and onward routes from the Channel Tunnel. The routes highlighted link from the main short sea ports and the Channel Tunnel to a range of freight terminals in the North East, West Midlands and the North West and include diversionary routes. The main short sea ports are defined as those with the largest TEU throughput of domestic and intra-European traffic. These are shown in Table 6.1 which shows the volume of containerised traffic.

The Wales Transport Strategy assesses possible future container traffic through Holyhead, Milford Haven, Swansea and Port Talbot. If these ports are developed then potentially routes to these ports would be added to the industry gauge clearance aspirations.

Table 6.1: Largest short sea container ports in GB (thousand TEUs in 2004)

	Domestic	Intra-European	Total
Felixstowe	79	753	**832**
London (Purfleet/ Tilbury)	1	629	**630**
Hull	-	309	**309**
Teesport	3	128	**131**
Southampton	11	83	**94**

Source:Maritime Statistics 2004

It should also be noted that the Dover Straits ports have significant volumes of unitised Roll-on /Roll-off traffic.

Figure 6.3: W12 gauge clearance aspiration

European gauge

Whilst W12 is sufficient to accommodate all short sea containers that operate currently in the European container fleet[1], there is an aspiration for the much larger UIC GB+ European gauge. This clearance would allow transit of all variations of box sizes currently hauled by rail within Europe. As this is much larger than existing UK gauges, the incremental costs of clearance compared to clearing to W12 could be significant. Currently only the CTRL is cleared to this gauge on the network.

The industry's aspiration for UIC GB+ is highlighted in Figure 6.4.1. It is focussed on primary routes between the CTRL and the main freight depot locations near Birmingham, Manchester and Leeds.

6.3 Summary of gauge gaps

Demand likely to be generated by W10 clearance is closely linked to the increasing use of High Cube containers in the enlarging deep sea container market.

As Table 3.2 in Chapter 3 and Table 6.1 in this chapter display, it is at the largest deep sea ports where the critical mass of containers for inland transport is concentrated. These ports also have the highest rail market shares. For this reason the routes to and from the major deep sea ports represent the highest priority 'gaps' in gauge provision terms.

W12 accommodates all short sea boxes[1] in addition to deep sea boxes although costs are likely to be higher as additional work is usually required. The work usually relates to lineside equipment and arched structures (where the top corner restricts W12 but not W10) and also a greater number of structure rebuilds instead of track slewing solutions.

Any project to rebuild a structure will consider building to the largest available gauge subject to physical and financial considerations. For example, when developing a route to a W10 specification, consideration would be given to rebuilding those structures that require alterations to W12.

European gauge (GB+) is significantly larger than W12 and few existing structures outside the CTRL already meet the required dimensions. New build and rebuild to European gauge is considered for structures on TEN (Trans European Network) routes. Most of the routes identified shown in Figure 6.4 for clearance to this gauge are on TEN routes. Current structure rebuilds are therefore not neccessarily precluding future development of a European gauge route.

Outside of this, the costs for bespoke clearance compared to clearing to W10/ W12 could be significant particularly in the case of routes with tunnels.

[1] With the exception of a very small fleet of specialist 10ft 6in high equipment

Figure 6.4: European gauge aspirations

7. Assessment of options and recommendations for further analysis

7.1 Introduction

The final RUS will recommend options on the basis of their business case. The funding of enhancements will be dealt with outside the RUS process. The decisions will be made in the light of the outcome of the current review of the structure of charges. The RUS will give the Office of Rail Regulation the opportunity to consider key options to meet freight growth when considering expenditure on the network. Similarly it will enable the Department for Transport and Transport Scotland to understand freights' needs whilst developing their High Level Output Specifications for the future railway and provide the strategic context for Transport Innovation Fund decisions.

This section identifies options to meet each of the gaps outlined in Chapters 5 and 6. Recommendations on each option are then made based on available information. Those options which could usefully be taken forward into the formal appraisal process are highlighted. The full appraisal of the options agreed following the consultation will be reported in the final Freight RUS publication.

In a number of cases third party funders may be sponsoring development and/or implementation work on listed options. Except where implementation funding is already committed, no assumptions or comment is made about the source of funding.

7.2 Identifying options against gaps

The development of options has been undertaken with the following aims:

- to present potential solutions to resolving the capacity and gauge gaps identified from the 2014/15 forecasts of railfreight under the different demand sensitivities
- to deliver a strategy which provides optimum value for money and falls within the affordability criteria
- in doing so, to ensure that
  - the performance impact on all users is considered
  - the impact on engineering access is considered
  - the best use of existing capacity is considered before preferred options involving investment are proposed
  - opportunities for enhancements in conjunction with renewals are highlighted, where appropriate.

7.3 Capacity options

The principal gaps between the network's existing capacity and a) existing and projected demand and b) other stakeholder aspirations were identified and discussed in previous chapters.

To address these gaps, key stakeholders have produced a set of options for testing against each of the key gaps. The options fall into nine categories. It should be noted that these options are not mutually exclusive, and might therefore be considered in combination.

Option 1 – Optimising timetables
Alterations to existing timetables for freight and passenger services can often yield additional capacity without infrastructure enhancement. This may involve retiming of existing paths, changes to routeings (see Option 3), stopping patterns and flighting of services. Optimising timetables is managed through standard industry processes and may be initiated by geographical RUSs.

Option 2 – Haulage alternatives
Shorter journey times provide opportunities to increase the quantum of paths, and can be achieved by more powerful locomotives or double heading. Where the track is electrified, freight haulage has the option of using diesel or electric powered locomotives. Electric haulage provides shorter journey times, largely as a result of quicker acceleration and better performance, particularly on routes with significant gradients. However, there may be journey time penalties if a change to diesel power is required for part of the journey (i.e. a flow over both electrified and non electrified track). Option 9 covers new electrification of track.

Option 3 – Routeing alternatives
Changing the routeing of a train can free up capacity on the original route. Often this will increase the journey time with associated resource cost impact on the FOC.

Option 4 – Train lengthening
Train lengthening potentially enables hauling more freight per train without changing the weight per axle (see Option 7). This permits some growth in demand to be met without increasing capacity utilisation although infrastructure spend may be required (see Option 5). Significant train lengthening may require an increase in motive power in order to maintain sectional running times. This may have an operational cost impact on the FOC.

Option 5 – Provision of additional and/or longer loops
Loops provide additional capacity for traffic of varying speeds operating on a given route. If train lengthening is introduced, loops may need to be extended. Dynamic loops (with higher entry/exit speeds) often require increased length and/or renewal of associated switches and crossings.

Option 6 – Signalling headways
More signals or modernising existing equipment (e.g. increasing the signal aspect) would allow trains to operate closer together and therefore increase the capacity of the route. The cost of enhancing signalling can be reduced if combined with renewals.

Option 7 – Axle weight improvements
Hauling more tonnage per wagon would permit some growth in demand for bulk products to be met without increasing capacity utilisation. Infrastructure enhancement may be required if the increase in weight increased the RA requirement of the route.

Option 8 – Capacity generating gauge schemes
Increasing the loading gauge through tunnels, bridges, stations and other structures would allow larger wagons/containers (especially for the intermodal market) to operate on the route, thereby facilitating routeing alternatives and hence potentially additional capacity.

Option 9 – Bespoke infrastructure
If Options 1 to 8 do not produce sufficient capacity, it may be appropriate to consider larger infrastructure options such as new lines, doubling track and new electrification. Smaller bespoke infrastructure projects would include slewing the track layout or reinstating former lines.

Table 7.1 summarises the gaps and the option categories to address each one. It should be noted that some gaps may only be partially addressed by individual options, and conversely that some options may address more than one gap.

Table 7.1: Capacity gap/Option matrix

No.	Route/Route section	Option by which gap addressed
1	Gretna Junction – Carlisle station – Petteril Bridge Junction	Optimising timetables Train lengthening Loop enhancements Bespoke infrastructure
2	Petteril Bridge Junction – Settle Junction	Optimising timetables Train lengthening Signalling headways
3	Settle Junction – Skipton – Whitehall Junction	Optimising timetables Train lengthening
4	Carlisle – Lancaster	Haulage alternatives Train lengthening Routeing alternatives Loop enhancements
5	Winsford South Junction – Weaver Junction	Train lengthening Loop enhancements
6	Stafford Station	Train lengthening Routeing alternatives Bespoke infrastructure
7	Rugby – Wembley Central	Optimising timetables Train lengthening Capacity generating gauge schemes Bespoke infrastructure
8	Nuneaton – Coventry –Leamington	Routeing alternatives Loop enhancements Capacity generating gauge schemes Signalling headways
9	Leamington – Didcot East – Reading West – Basingstoke – Southampton	Routeing alternatives Signalling headways
10	Wrawby – Scunthorpe	Optimising timetables Train lengthening Routeing alternatives Signalling headways Axle weight improvements Bespoke infrastructure
11	Hull Hedon Road – Hessle Road Junction	Train lengthening Signalling headways Bespoke infrastructure
12	Tyne Yard – Tursdale Junction	Routeing alternatives
13	Hope Valley Line (Chinley East Junction – Dore West Junction)	Loop enhancements

Tables 7.2 to 7.14, take the analysis one step further by providing details of the potential options available for resolution and by recommending which options should be taken forward for further development. The tables are organised by the key routes where the capacity gaps are predicted. The options have been divided between short/medium term solutions which tend to comprise smaller scale schemes and those likely to be required only towards the end of the ten year period and beyond.

In each case a more detailed description of the options against each gap, the outputs of each of the options, and the links between each gap is set out in Table D1 in Appendix D. Table C1 in Appendix C lists further capacity gaps which were identified in Chapters 4 and 5, but will be considered in one of the geographical RUSs due to the critical interface with passenger timetables on the route in question. The table identifies which RUS is, or will be, considering the gap.

All cost indications set out below represent pre-feasibility estimates except where indicated. The costs are likely to be subject to change during scheme development.

7.3.1 Anglo – Scottish Coal Route (Ayrshire – Aire Valley/Trent Valley)

Capacity gaps on the Anglo - Scottish coal route (between Hunterston and Ayrshire opencast sites in south-west Scotland and the power stations in the Aire and Trent Valleys) are driven by the growth forecast in Sensitivity Test 1. The test predicts an additional 12 to 13 coal trains per day over the 2004/05 volumes in each direction between Hunterston/ Ayrshire opencast sites and the Aire/Trent Valley via Gretna Junction, Carlisle, Settle Junction and Whitehall Junction (Leeds).

In the first full year since the base year for the forecasts, approximately 40 per cent (an additional five trains per day) of this predicted growth has already taken place. Part of the business case for the options identified below depends on the ability of Hunterston imports and Ayrshire opencast coal to continue to grow market share to the Aire and Trent power stations in the face of competition from the east coast ports which have well advanced plans for additional capacity.

Tables 7.2 to 7.4 display options for key sections of the route and recommendations for consideration to accommodate the forecast demand. The Glasgow and South Western Line is not included as this is being covered in the Scotland RUS.

Table 7.2: Gap 1: Gretna Junction – Carlisle station – Petteril Bridge Junction

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
1.1: Optimise existing timetable to maximise through Anglo – Scottish paths	-	-	Option already delivered. 22 through paths per day available in the post December 2005 WTT. Sufficient to meet current demand but would not be sufficient to meet full ten year demand in Sensitivity 1.
1.2: Higher speeds on Up arrival line from Mossband (Mossband Junc – Kingmoor Up flyover)	Not yet available	Indicative costs to be confirmed	Option allows quicker clearance of slow moving freight services in the Up direction at Mossband Junction. To be taken forward subject to business case.
1.3: Higher exit speed on Down Goods lines at Kingmoor & Floriston	Dependent on timing of work: with renewals.	Appraisal to be undertaken as and when renewals schemes are taken forward	Consider delivery of options as and when renewals of associated loops and junctions are due.
1.4: Re-creation of route off the Kingmoor Up flyover to Kingmoor Up loops	Not yet available	Under development	This option is presently being assessed, and further information will be reported in the final RUS document.
1.5: Relocation of Caldew Junction to north end of Caldew viaduct to increase speeds	Dependent on timing of work: with renewals.	Appraisal is same as 1.3	Consider delivery of options as and when renewals of associated loops and junctions are due.
1.6:Improvements to signal acceptances in Gretna junc. area.	Being progressed under West Coast project	Not required	Improvements to go ahead in 2006/07
1.7: Doubling of single lead junction at London Road	Not yet available	Not at present	Further understanding required of benefits of scheme in isolation.
1.8: Train lengthening of coal trains up to 900m	N/A	Not required	900m option tested for diversions and being considered further. Incremental length increases to 21 – 27 HTAs (376 – 483m) will continue to be progressed with FOCs where practical.
2014/15 and beyond:			
1.9 Re-instatement of Carlisle avoiding lines	Not yet available	Not required at present	Not required to meet ten year forecasts, but may well be necessary at some point beyond 2014/15. Would have clear performance and capacity benefits.

Table 7.3: Gap 2: Settle & Carlisle: Petteril Bridge Junction – Settle Junction

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
2.1. Optimise existing timetable to maximise through Anglo – Scottish paths	-	-	Option delivered as part of the December 2005 timetable change. 22 through paths per day now available in the WTT. Sufficient to meet current demand. Would not be sufficient to meet full ten year demand in Sensitivity 1.
2.2. Six Intermediate Block Signals (IBS) installed on route	£3m (GRIP 1)	Scheme already under development to GRIP level 4 Appraisal in progress	Implementation of scheme would be sufficient to meet ten year demand on route section, although through pathing from Ayrshire requires partial/full doubling of Gretna – Annan also (See Scotland RUS). Dependent on timetabling work, improved ability to regulate the enabled additional trains at Whitehall Junction (Leeds) may also be necessary.
2.3: Train lengthening of Anglo - Scottish coal services to up to 900m	-	-	900m option tested for diversions and being considered further. Incremental length increases to 21 – 27 HTAs (376 – 483m) will continue to be progressed with FOCs where practical.

Table 7.4: Gap 3: Settle Junction – Skipton – Whitehall Junction

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
3.1: Optimise existing TT to maximise through Anglo – Scottish paths	-	-	Option delivered as part of the December 2005 timetable change. 22 through paths per day now available in the WTT. Sufficient to meet current demand. Would not be sufficient to meet full ten year demand in Sensitivity 1.
3.2. Train lengthening of Anglo - Scottish coal services to up to 900m	-	-	900m option tested for diversions and being considered further. Incremental length increases to 21 – 27 HTAs (376 – 483m) will continue to be progressed with FOCs where practical.

Network Rail made modifications to the December 2005 timetable on the Glasgow and South Western and Settle & Carlisle lines to increase the paths available for coal traffic to 22 paths per weekday from Ayrshire to the Aire Valley. The 2005/06 winter peak saw an upturn of around 30-40 per cent in coal traffic over average 2004/05 volumes to around 18 coal trains per day in each direction.

The industry has predicted in Sensitivity 1 that some further growth may occur from Scotland over the 10 year period, but in the Base Case volumes are predicted to drop back to just above 2004/05 averages (to about 9 – 12 through coal trains per day in each direction).

Currently the timetable recast of December 2005 is sufficient to meet demand. Some minor enhancements are likely to be sensible in the Carlisle area on the back of planned renewals to improve performance, subject to a value for money case. Network Rail is also committed to working with the FOCs to facilitate incremental increases in train lengths and loadings on the route, where this is practicable.

Network Rail is continuing a major programme of track and structures renewals works on the Settle & Carlisle line to ensure the line is fit to carry current volumes in the medium term. Section 7.4 sets out an initial assessment of further renewals that would be necessary to accommodate volumes in Sensitivity test 1.

7.3.2 WCML capacity gaps and options

The key flows driving the identified gaps on the West Coast Main Line are:

- northern end of the route (Table 7.5) – continued operation of class 6 services over the Lake District gradients plus some class 4 intermodal growth.
- further south (Tables 7.6 – 7.8) – the volume of the additional class 4 deep sea intermodal services projected (extra 18 trains per day in each direction on some sections).

Tables 7.5 to 7.8 show key sections of constraint and display options and recommendations for meeting the ten year forecast.

Table 7.5: Gap 4: Carlisle South Junction – Lancaster

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
4.1: Flighting of passenger services in WCML 2008 TT to optimise freight capacity.	-	Timetable under development at present.	This option would deliver sufficient provision for existing freight traffic with some limited room for Class 4 growth. If this can be achieved, provision of significant new infrastructure should not be necessary in the short term. The timetable is presently under development.
4.2: Looping strategy: Strategic extension and/or new loop between Penrith and Lancaster.	New/extended loop(s): £4 – 15m (dependent on option selection) Improvements to entry/ exit speeds on existing loops: £1 – 4m dependent on location.	4.2 Further work to be undertaken to identify favoured options.	The West Coast project is progressing, where appropriate, improvements to entry and exit speeds of existing loops. Considering freight growth alone and the emerging picture of the 2008 timetable, it is unlikely that new loops will be immediately required. However further developments in passenger demand post 2008 and freight growth projected to 2014/15 are likely to drive the need for at least one new loop and/or extensions to existing loops (allied with option 4.3) This option along with 4.3 will need to be assessed against alternative options 4.4 and 4.5 as and when required.
4.3: Lengthening intermodal services.	Not yet available.	Further work required on scope of works necessary.	As Option 4.2 above. To be developed in tandem. Full implications for loop lengths north of Carlisle and on other route sections, as well as terminal constraints, will need to be considered.
4.4: Electric haulage of remaining daytime Class 6 services/ diesel hauled class 4s.	Not yet available.	Trials conducted. Further development not required at this stage.	As 4.2/4.3, not likely to be initially required. If growth continues as predicted, however one of option 4.2/4.3 – 4.5 will be required by 2014/15. The resource cost impacts on operators will need to be considered alongside issues of electricity supply. To be appraised against options 4.1/4.2 and 4.5 as and when required.
4.5: Route 3-4 Up daytime Class 6 non container services via Settle & Carlisle and Hellifield – Clitheroe instead of over Shap summit.	Approx £0.5m per year extra maintenance costs on Hellifield – Clitheroe (plus operator costs and other possible structure/ formation items to be identified)	Better understanding of full costs of this option to be developed.	Again not likely to be initially required. This option may add a small additional journey time to daytime services and 19 additional miles. To be appraised against option 4.1/4.2 & 4.3, 4.4 as and when required. If Sensitivity test 1 for coal occurs, this option also requires option 2.3 to be delivered on the Settle & Carlisle Line.

Table 7.5: Gap 4: Carlisle South Junction – Lancaster (continued)

2014/15 and Beyond			
4.6 Further new/ extended loops as and when area signalling north of Preston takes place	Not yet available	No further development at present	Long term options to be considered at time of resignalling

Table 7.6: Gap 5: Winsford South Junction – Weaver Junction

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/ Medium term options:			
5.1 New loop at Hartford (>1000m) with higher entrance/exit speeds (60mph). Effectively replaces Winsford down loop.	Being progressed under West Coast project.	-	Enhancement is being implemented as part of WCML upgrade. Project to be completed in 2007/08. The 2008 WCML timetable is likely to provide three daytime standard hour paths per hour on this section. This should be sufficient for initial growth projected but by the end of the ten year period, demand as projected is likely to exceed capacity.
5.2 Lengthening of some intermodal services.	Not yet available.	Further work to be undertaken on scope and costs of option.	Further infrastructure improvements are likely to be expensive on this section, in particular four tracking throughout would be difficult to achieve. As the vast majority of growth projected on the section is deep sea intermodal traffic, a train lengthening programme between the Haven Ports and key inland terminals in the North West/ Scotland would be likely to be a cheaper option should capacity be reached.

Table 7.7: Gap 6: Stafford station

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
6.1 Diversion of up to 12 Manchester (Trafford park/ Euroterminal) services via Stoke	No new infrastructure required.	Impact on Stoke line renewals to be assessed. Clarification of looping strategy in the Stoke area required	A short term solution that should be implemented subject to the outcome of the West Coast 2008 timetable process. Further Up direction services not from Manchester which currently run via Crewe and Stafford could also be routed Crewe – Alsager – Stoke – Colwich.
6.2 Lengthening of some intermodal services	Not yet available	Further work required on scope to be undertaken, including impact at key terminals	As the vast majority of growth projected on the section is deep sea intermodal traffic, a train lengthening programme for this traffic would be beneficial for congestion in the Stafford area, but may not be necessary initially if 6.1 is implemented.
2014/15 and beyond:			
6.3 Enhanced route capacity in the Stafford area.	Not yet available	Specific options currently under development by DfT/ Network Rail	This would constitute a longer term solution. Unlikely to be justified on freight growth alone.

Table 7.8: Gap 7: Rugby – Wembley Central

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/ Medium term options:			
7.1: Deliver minimum three off peak standard paths per hour in WCML 2008 TT	-	N/A	Target result of the WCML 2008 timetable process. Sufficient to meet the majority of growth projected to 2014/15 on this section
7.2: Lengthening of some intermodal services	Not yet available	Further work to be undertaken on scope and costs including impact at key terminals	As the vast majority of growth projected on the section is deep sea intermodal traffic, a train lengthening programme for this traffic would be beneficial in reducing path demand.
7.3: Peterborough to Nuneaton W10 gauge clearance only.	Gauge: £40-50m (GRIP 1)	Not required 7.4 is being progressed as an alternative.	Delivers an alternative route for Haven Ports traffic to the WCML avoiding the GE and NLL as well as the southern end of the WCML. Gauge clearance in isolation however will not offer a significant number of paths on the Ipswich – Nuneaton route – WCML route, though some through paths to/from the West Midlands could be delivered.
7.4: Peterborough to Nuneaton W10 gauge and Felixstowe – Nuneaton incremental capacity.	£133.3m (includes gauge costs in 7.3) + Possible further infrastructure items to be developed on capacity	Appraisal currently under development to support TIF bid. Further work to be undertaken on infrastructure options and pathing in conjunction with Anglia RUS.	The option covers gauge and capacity works to deliver sufficient paths to handle projected intermodal growth from the Haven Ports by 2014/15 (an additional 9 tpd not accomodatable via London in base case). Minimum works in addition to gauge would include the Northern Chord at Nuneaton and improvements to signalling headways at Kennett. The extent of further works required depends partly on the future passenger timetable Nuneaton to Leicester and Ipswich to Peterborough. This option is preferable to a gauge only scheme (7.3), but does require further development of capacity options and an assessment of their impact on through pathing.
2014/15 and beyond:			
7.5: Peterborough to Nuneaton W10 gauge and Felixstowe to Nuneaton 'full capacity'.	Estimates not available at this stage	Further identification of infrastructure options required to deliver a step change in capacity. To be undertaken in conjunction with Anglia RUS.	This option covers capacity works to deliver a minimum hourly 'through' Ipswich to WCML path throughout the day. On Freight RUS projections this would not be required until post 2014/15, but will be required earlier if diversion of significant numbers of services away from GE and NLL to facilitate an improved passenger timetable is agreed by all parties. Significant further infrastructure enhancement (over and above option 7.4) could be required to deliver this step change in cross country capacity, including level crossing upgrades, and a range of loops and signalling improvements. A review of the capability of the route to handle large long term increases in gross tonnage would also be necessary.

Tables 7.5 to 7.8 show a range of route section specific solutions that are recommended for further development.

The key driver of growth on the WCML is the Freight RUS's deep sea intermodal projections. The need for infrastructure enhancements therefore is very closely linked to the development of that market over the next ten years and the precise timing of step changes in deep sea port capacity. As the precise timing is currently unknown, it is difficult to give firm recommendations at this stage. However, it would be sensible to progress work on certain options in particular increasing train lengths. Further work to establish the cost and scope of lengthening of deep sea intermodal services will be undertaken. It is recognised that aspirations will be influenced by feasible alterations at end terminals and optimal haulage arrangements for the freight operating companies.

Although not included as a gap in Tables 7.5 to 7.8, it is recognised that the three track route section between Brinklow and Attleborough (north of Rugby) could become a further constraint towards the end of the ten year period, if further passenger service growth post 2008 is combined with the projected freight growth.

Felixstowe – Nuneaton (F2N) via Ely & Leicester: Specific conclusions

Capacity constraints on the Great Eastern and Cross London routes (addressed in the Anglia and Cross London RUSs respectively) are likely to drive the need for freight capacity solutions for Haven Ports traffic earlier than constraints on the southern end of the WCML. Nevertheless the Freight RUS projections indicate that by 2014/15 it will be difficult to fit the demand into a three paths per hour specification between the Midlands and Wembley via the WCML.

A Peterborough to Nuneaton W10 gauge clearance only scheme[2] would provide a diversionary route for the Great Eastern/Cross London/ southern end of the WCML leg of services to and from the Haven Ports. It would also offer some new paths for regular scheduled services between the Haven Ports and Lawley Street/Hams Hall. Conflicts generated by the flat junction in the Down direction at Nuneaton mean that regular paths to/from the North West and Scottish terminals under a gauge only scheme will be hard to deliver during the daytime.

For this reason it is proposed that a gauge and incremental capacity scheme (Option 7.4) is assessed for implementation by 2014/15, in order to ensure sufficient paths can be found on the route to accommodate projected demand to 2014/15 and beyond. By 2014/15 Haven Ports demand via London is projected to be an additional 19 trains per day in the Base Case. In line with the Cross London RUS, it is assumed that the next ten 'growth' services from the Haven Ports can be accommodated via the Great Eastern and the North London Line, leaving up to nine services needing to be routed via the Felixstowe – Nuneaton route by 2014/15.

It is considered that a minimum incremental capacity scheme on the Felixstowe to Nuneaton route is likely to include the Northern Chord at Nuneaton and a number of other more minor schemes including improvement of signalling headways in the Kennett area on the Anglia route. Further operations planning work is required to confirm this and may highlight the need for further capacity works. This work will need to be co-ordinated with the new franchise specifications for passenger services on the route.

Option 7.5 to deliver a minimum additional hourly slot between the WCML and Ipswich is unlikely to be required to meet the forecast freight demand in the lifetime of the RUS. Despite this, the option will be required if existing London routed Haven Ports services were to be routed via the Felixstowe to Nuneaton route to free up additional capacity for further improvements to passenger

[1] Cost estimate includes + 66% optimism biase used in the appraisal process to reflect the early stage of development of some elements of the scheme.

[2] Felixstowe – Peterborough W10 gauge clearance is presently assumed as a committed enhancement funded by HPUK.

services on the NLL. The Cross London RUS examines this possibility in more detail.

Routeing of Haven Ports intermodal services via the Felixstowe – Nuneaton route in either Option 7.4 or 7.5 has implications for traction policy. At present many of the exsiting services via London use electric traction, but would have to use diesel traction to make use of the F2N route. This has some implications for Gap 4 (Lancaster – Carlisle) and its associated options.

7.3.3 Southampton – WCML

This route only becomes a potential constraint under Sensitivity 3, which assumes W10 gauge clearance of the route between the WCML and Southampton Port and resultant growth of six trains per day.

Tables 7.9 and 7.10 show constrained sections and display options and recommendations for meeting the ten year forecast.

Table 7.9: Gap 8: Leamington – Coventry – Nuneaton

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
8.1 Partial diversion of services via Solihull, Water Orton and Sutton Park.	Not yet available.	Indicative cost assessments for capacity improvements to the Sutton Park line to be developed.	This option removes crossing moves from Coventry station and in the Up direction at Nuneaton. If for example the full growth projected were diverted this way, it would drive the need for W10 clearance of the Sutton Park Line and some capacity improvements on that route section. (see further comment in 7.5 Gauge).
8.2 Extension of loop South of Coventry on Kenilworth Line	£4.94m (GRIP 7) Enhancement cost on the back of renewals.	N/A	Scheme being taken forward in 2007/08 under the NRDF fund. Aids regulation of existing and future Southampton services making crossing moves at Coventry.
2014/15 and beyond:			
8.3 Re-routeing of Up and possibly Down NW/Scotland to Southampton Container services via Bletchley Flyover – Claydon – Oxford	Not yet available.	No further development required at this stage.	Not required at this stage as 2008 WCML timetable will seek to accommodate up crossing moves for Southampton at Nuneaton. Option would constitute an additional benefit (in performance and capacity and engineering access terms) to be added to any future long term case for re-opening Claydon – Winslow – Bletchley for passengers, but would need to be assessed with FOCs to establish journey time and resource penalties.

The extension of a double track railway further south on the Coventry to Kenilworth line will improve performance for passenger and freight traffic as well as aiding the regulation of crossing moves at Coventry, critical to Southampton container flows. This option is being taken forward.

The Nuneaton – Coventry – Leamington section of the route between Southampton and the WCML has been identified as a priority for W10 gauge clearance. If this is to be progressed, a potential diversionary access via Dorridge and the Sutton Park Line should be considered alongside. This would address the capacity constraint which occurs when Up Southampton services (accessing the W10 route at Nuneaton) have to cross all four through lines to access the Coventry Line.

In addition to this an alternative route between Leamington and the WCML for W10 traffic is neccessary to retain the options for maintanance access.

Reading West Junction will continue to be a key constraint to significant growth from Southampton. The option of routeing some growth via Melksham is being assessed but this could have journey time and operating cost penalties.

In the longer term, though possibly outside the lifetime of the RUS, significant further alterations to the network at Reading West may be necessary.

Table 7.10: Gap 9: Leamington – Didcot – Reading West – Basingstoke – Southampton

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
9.1 Further improvements to the longest signalling headways between Didcot East and Leamington	Not yet available.	Indicative cost assessments to be developed	This option would relieve remaining constraints through the Cherwell Valley but, key constraint on route remains Reading West (see below). Not required unless W10 gauge clearance goes ahead. In this instance it would be a second order priority to constraints at Reading West.
9.2 Diversion of projected growth via Salisbury/ Melksham, Didcot West	Under development July 2006.	To be appraised on the basis of performance benefits and extra capacity.	This routeing strategy removes the projected growth from Reading West Junction. There is limited capacity for crossing movements on the GWML to/from Reading West Junction currently and present moves are causing some performance impacts. In some off peak hours the two paths per hour available for freight are already fully utilised. Future growth is likely to be accommodated only at particular times of day. Further analysis of this option is proposed but this will need to include consideration of any additional journey time and operating costs for the FOCs.

7.3.4: East coast ports – Aire/Trent Valley

Capacity gaps between the east coast ports and the Aire and Trent Valley are driven by the Base Case coal scenario. The Base Case predicts an additional 18 coal trains per day in each direction (over 2004/05 volumes) between the east coast ports of Immingham, Hull, Redcar, Tyne, Blyth and the Aire and Trent Valley power stations. The growth is generated by closure of domestic supply sources combined with some limited growth in demand and rail market share.

As discussed in Chapter 4 there are well advanced plans for increased capacity at a number of the east coast ports.

Tables 7.11 to 7.13 show key constraints to meeting the base ten year forecast.

Table 7.11: Gap 10: Wrawby Jn – Scunthorpe

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
10.1 Timetable recast Immingham Port – Wrawby – Scunthorpe	-	-	Network Rail has recently completed a recast of freight paths out of Immingham to deliver a standard hourly weekday path to/from the HIT 1 and 2 terminals at Immingham and Milford/ Gascoigne Wood. An additional eight paths per day remain to/from Immingham Pad. Network Rail are discussing bringing the timetable into operation shortly with stakeholders.
10.2 Brigg Line upgrade	£10m (GRIP 2)	Appraisal under development	Scheme to progress subject to business case and funding. Key outputs: 1.) Up to eight additional paths per day between Immingham and the Trent Valley power stations/ Doncaster, partially relieving Wrawby –Scunthorpe. 2.) Diversionary option to the SHML which will allow an improved maintenance window on this heavily used route.
10.3: Wrawby Junction linespeed increases. (involves potential third party funding)	£2m (GRIP 1)	Appraisal to be completed	Further analysis required. Potentially gives 1 – 1.5 minutes improvement in junction clearance times. Performance and timetabling benefits.
10.4: Further train lengthening Immingham – Aire Valley	-	Scope under development	An incremental approach is being taken.
10.5: Increase in permitted axle weights to 36 tonnes	Not yet available	High level assessment required	A better understanding needs to be developed of the number of affected structures and the impact on track renewals costs to properly assess this option

Table 7.12:Gap 11: Hull Hedon Road – Hessle Road Junction

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/ Medium term options:			
11.1: Hull docks branch partial double tracking	£14.7m (GRIP 2)	Appraisal underway	The Port of Hull has aspirations to handle a further growth in traffic, in particular coal. An upgrade of signalling and layout on the single line branch to the docks will provide enough paths to meet the projected growth. Options for improvements relating to onward pathing and capability between Hessle Road Junction and the Aire Valley require further assessment, including changes from three to four aspect signalling between Hull and Gilberdyke.
11.2: Incremental train length improvements	Not yet available	-	May require the extension of Barlby loops. 23 HTA coal trains already being investigated with FOCs.

Table 7.13:Gap 12: Tyne Yard – Tursdale Junction

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/ Medium term options:			
12.1: Reactivation of Boldon East Curve	£7.25m (Grip 1)	Currently being developed further	Reactivation is likely by 2008/09. The reactivation would allow a small number of coal trains from Tyne dock to be routed via the Durham coast away from the two track bottleneck between Tyne yard and Tursdale on the ECML, which is a particular constraint when diversions are underway from the Settle & Carlisle to the ECML. The section is also increasingly becoming a constraint to pathing existing services particularly when matching paths are required across King Edward Bridge Junction in Newcastle.

In the first year (2005/06) since the base year for the ten year industry forecasts, substantial changes predicted in the baseline forecasts have already begun to take place at the key east coast ports. New coal handling capacity has come on line at Immingham (see Table B7, Appendix B), and additional volume is also being put through Hull, Tyne and potentially in the near future Blyth.

As set out in Appendix B, all six of the Aire and Trent Valley power stations, which are the key destinations of coal imported through the east coast ports, are due to receive FGD equipment. This suggests at least a medium term future for each of the plants, and therefore a reasonable degree of certainty regarding the ongoing demand for coal from the east coast ports over the lifetime of the RUS.

Network Rail has recently been through the process of optimising the existing number of slots to/from the coal handling facilities on Immingham dock. This has involved moving some existing freight paths and minor retiming of other services. Beyond this proposed re-cast it is unlikely further re-timings could deliver a significant number of additional slots, given other demands on capacity. In the Base Case of the Freight RUS forecasts, ESI coal volumes are forecast to reach a maximum of 27 trains per day out of Immingham exceeding the number of slots available from the recast, even before a realistic utilisation level is considered.

In this context it is recommended that a number of relatively small scale schemes highlighted above should be developed further to address the Immingham – Wrawby – Scunthorpe gap. Similarly, it is recommended that a scheme is progressed to address the shortage of capacity on the Hull docks branch as detailed above.

7.3.5 Hope Valley

Three to four additional daily trains are forecast to and from the Peak District quarries and cement works and various locations. In 2005/06 (the first year of the forecasts) most of this growth occurred driven by limestone movements from the Buxton area to de-sulphurisation plants at power stations. Cement from Hope and further general aggregates traffic from the Buxton/Peak Forest area have also shown some increases, suggesting that ten year growth is likely to exceed that originally outlined in the forecasts.

Heavy construction services on the route are difficult to path between local stopping services and the faster Trans Pennine Express trains with which there is a significant speed differential.

Depending on the outcome of further work on costs and appraisal, this scheme would be sensible to take forward in the short to medium term to meet an existing gap.

Table 7.14: Gap 13: Chinley East Junction – Dore West Junction

Option description	Indicative capital costs	Further work proposed (scope & appraisal)	Recommendations
Short/Medium term options:			
13.1 Introduction of one 450m length loop each on the Up & Down lines between Chinley East and Grindleford	Not yet available	Identification of sites to be confirmed, indicative costs to be updated, project to be appraised.	Further analysis. The performance and capacity benefits should be sufficient to accommodate projected growth without significant impact on passenger performance.

7.4 Capability options: Assessment and recommendations

7.4.1 Gross tonnage

Chapter 5, section 5.2.1 highlights the key route sections where, after initial assessment, Network Rail believes there is most likely to be a near term requirement for significant volumes of track or structure renewals in the event of additional tonnage. An assessment has not been made of the longer term impact on renewals requirements of the forecasts across the network.

Table 7.15 sets out the routes most likely to be significantly affected under the base case and sensitivity test scenarios and is limited to route sections where more than an additional one million tonnes per annum are expected to operate. The table highlights indicative costs that may be driven by the projected additional tonnage and also provides a brief summary of the nature of work required. Estimates refer to additional renewals that would be required during the period of the RUS and do not include those already underway or committed to meet present tonnages.

Table 7.15: Indicative costs structures and track

Route section (both directions)	Indicative costs of upgrading route section to meet 2014/15 forecast tonnage		Recommendations
	Structures	**Track**	
Glasgow and South Western (GSW) Mauchline Junction – Gretna Junction	£9.6m Arch bridge reconstructions and strengthening	£7 – 10m Re-ballasting sites with accelerated ballast degradation	Further work is being progressed to quantify costs.
Settle and Carlisle: Petteril Bridge Junction – Settle Junction – Whitehall Junction	£20.6m Arch bridge reconstructions and strengthening	£25 - £40m Renewal of remaining jointed track, renewal of scarified steel sleeper CWR, re-ballasting sites with accelerated ballast degradation. Renewal of 20 units of switches and crossings.	Further work is being progressed to quantify costs.
Crewe avoiding lines	-	Track and sleeper renewals Handled by speed restrictions at present – renewal estimate pending. £5 – 8m Renewal of all jointed plain line and switches and crossings	Further work is required to quantify cost. Track renewals would be co-ordinated with re-signalling proposals for economic delivery

Table 7.15: Indicative costs structures and track (continued)

Tottenham and Hampstead (Barking – Gospel Oak via Tottenham South)	£12m Strengthening or reconstruction of a large number of bridges. Earthwork strengthening at Harringay Green Lanes	£2 –3m Renewal of jointed track and upgrade at longitudinal timber bridges.	Further work is being progressed to quantify costs. Longitudinal timber bridge work would be co-ordinated with structure renewals plans.
Larbert – Stirling	-	No expenditure in addition to existing plans.	

The main costs highlighted are on the Glasgow and South Western (GSW) and Settle & Carlisle lines. These result from Sensitivity test 1 where significant further additional tonnage is projected between Hunterston/Ayrshire opencast sites and the Aire and Trent Valley power stations. In the Base Case where further growth in import coal volumes is focused through the east coast ports the additional costs will not apply on the GSW Settle & Carlisle.

7.5 Gauge options: Assessment and recommendations

As outlined in Chapter 6, there are aspirations to enlarge the loading gauge on key routes predominantly driven by larger containers being used on deep sea and short sea intermodal movements.

The aspiration for the much larger UIC GB+ (European Gauge) to accommodate possible future intra-European flows of very large conventional wagons is mentioned at the end of this chapter.

The following tables outline the principal gauge options on a route by route basis. Outlined is an assessment by each aspiration and a recommendation of options to take forward for further analysis at this stage. The tables highlight options which may need further consideration in the future and those which are unlikely to be taken further given the information available at this point.

Gauge clearance: Southampton – WCML

The intermodal market from Southampton is predominately deep sea (93 per cent) leading to a gauge aspiration of W10 with W12 only required for the relatively small amount of short sea containers. Currently the core and diversionary routes are cleared to W8/W9 depending on route section.

Gauge clearance to W10 for this route is considered as Sensitivity 3 within the Freight RUS forecasts. This sensitivity predicts an additional six intermodal trains per day to leave the Port of Southampton by 2014/15 over the Base Case. These additional trains are forecast to be destined for terminals in the West Midlands and the North West via the WCML (already cleared to at least W10). The FOCs are considering the level of growth which would be stimulated by W12 clearance above the W10 sensitivity predictions which the final Freight RUS strategy will take into account.

The route currently accommodates High Cube containers on well wagons or lowliners although the high volumes of TEUs moved means the additional paths that could be required in the future compared to using standard wagons leads to significant capacity issues around Reading.

Table 7.16: Gauge clearance options: Southampton – WCML

No	Option description	Indicative costs	Further work proposed	Recommendations
Core route				
1	Southampton to WCML via Winchester, Reading West, Coventry and Nuneaton	£52 million for W10	Already being appraised as part of SWML RUS	Implementation: Subject to appraisal: Potential W10 demand sufficient to merit further appraisal. W12 demand yet to be quantified.
Diversionary routes				
1.1	Route via Laverstock and Andover only	£30-40 million for W10	Already being appraised as part of SWML RUS	Further work: This option represents a valuable diversionary route avoiding the SWML south of Basingstoke.
1.2	Southampton to WCML via Melksham	Not yet available	To be appraised	Further work: This option represents a valuable diversionary route avoiding Reading West Junction which is a significant constraint of the route. Further work is required to quantify this benefit against the additional mileage compared to the core route.
1.3	Route via Leamington – Dorridge – Sutton Park Line – Bushbury – Stafford only	Not yet available	Dependent on Option 1 being implemented	Potentially provides useful W10 diversionary route if core route is also cleared. Avoids key capacity constraints in Up direction at Nuneaton, and allows improved maintenance access window to the Nuneaton - Coventry – Leamington route vs implementation of option 1 in isolation.

Gauge clearance: south east ports to West Midlands/the North West

The intermodal market from the south east ports is largely deep sea with some short sea traffic leading to gauge aspirations for both W10 and W12. Currently the core route (via the Great Eastern, NLL and WCML) is cleared to W10 with the diversionary routes cleared to W7/W8/W9 depending on route section.

The NLL is currently heavily utilised with large volumes of freight and a frequent passenger service leading to capacity issues relating to accommodating the significant growth forecast from the Haven Ports (see Chapter 5). The forecasts predict over 20 additional intermodal trains per day on the NLL. Options 7.3 to 7.5 in the capacity section of this chapter refer to this growth further.

A relatively small amount of work would be required to clear the Tottenham & Hampstead Line to W9 (at low speed) which would allow 9ft 6in containers to be operated on well wagons or Megafrets.

An option is also available to clear the route to W10 at linespeed.

Stratford to Chippenham Junction is suitable for well wagons (although not Megafrets) but Peterborough to Nuneaton is unsuitable for a wagon based gauge solution as parts are only W7. An alternative route from Peterborough to Nuneaton via Grantham and Nottingham (currently W8), would involve diverting significant numbers of services over the most capacity constrained section of the ECML between Peterborough and Doncaster.

Well wagons require additional paths for the same quantum of freight lifted and therefore are better suited to less constrained sections of the network. Both well wagons and Megafrets require operators to invest in specialist wagons which is more expensive for larger volumes of traffic as more wagons will be required. If only part of a route requires use of a wagon solution then sub-optimal use of capacity is made on the remainder of the journey which could have been completed using standard wagons.

Table 7.17: Gauge clearance options: south east ports to West Midlands/the North West (core route already cleared)

No	Option description	Indicative costs	Further work proposed	Recommendations
2.1	Tottenham and Hampstead Line[3]	£10.5m for W10	Appraisal underway	To go forward subject to business case: This the preferred routeing for freight trains for Tilbury to the WCML and a diversionary route away from the NLL (which is currently W10) for other Tilbury traffic. A significant part of the additional demand is dependant on the forecast growth from Shell Haven (Sensitivity 2) and Tilbury. Also this option provides a potential diversionary route away from NLL which is forecast to experience significant capacity constraints.
2.2	Peterborough to Nuneaton	£40-50m for W10	Appraisal underway	To go forward subject to business case. See references in capacity options 7.3 – 7.5. Infrastructure options to allow routeing of trains to the North West are being assessed (see Table 7.8).
2.3	Stratford to Chippenham Junction (via Cambridge)	£3m for W10	Full appraisal dependent on emerging costs associated with engineering access on GEML	Further work: this could provide a diversionary route for the core traffic avoiding the Great Eastern. Coupled with clearance of route 2.1, this could offer (with extended journey times) a W10 alternative to the NLL as well. This would be particularly valuable during major engineering works and the 2012 Olympics. W10 traffic would however be likely to be subject to speed restrictions and therefore this option should not supplant 2.2.

[3] As the T&H is not electrified, the route could only accommodate growth in diesel-hauled trains.

Table 7.18: Gauge clearance options: additional priorities

No	Option description	Indicative costs	Further work proposed	Recommendations
3	Canonbury West Junction to Peterborough	Not yet available	Not to be appraised	If gauge cleared, this line could provide the core route for traffic from Tilbury and Thameshaven to the North East (connecting with the committed W10 clearance routes). The Freight RUS forecasts 4 additional trains per day between these ports and the North East Unlikely to be sufficient demand of deep sea or short sea containers to merit gauge clearance. Use of wagon technology such as well wagons is recommended.
4	Seaforth to Garston	£15.5m for W10	Appraisal underway	Further work
5	Teesport/ Wilton to Doncaster	Not yet available	Appraisal underway	Further work
6	Earlestown – Manchester – Leeds (via Diggle)	Not yet available	Appraisal of value as a diversionary route to be considered alongside Newcastle – Carlisle ECML- WCML link.	Unlikely to be sufficient demand from deep sea or short sea services to merit gauge clearance at this stage. Use of wagon technology such as well wagons is recommended. Value would exist however in a diversionary W10 link between the ECML and WCML for existing traffic as no such route exists outside London. This should be considered further alongside the Carlisle – Newcastle link when assessing the possibility of developing a W9/ W10 link between the ECML and WCML (again to aid engineering access).

Table 7.19: Gauge clearance options: other potential short sea routes

No	Option description	Indicative costs	Further work proposed	Recommendations
6	All other potential short sea routes highlighted on Figure 6.3	To be assessed on a route by route basis once demand is established.	Dependent on demand being agreed	Detailed information on additional freight flows that would be generated by gauge clearing a route would be required before new gauge clearance schemes can be assessed. If the route is at least W8 then it is suitable for well wagons.

European Gauge

The additional traffic generated by clearing routes to European Gauge needs to be quantified further to enable further assessment of options and appraisal.

8. Stakeholder consultation

8.1 Introduction

8.1.1
Consultation with stakeholders within and outside the rail industry is essential to the successful development of a RUS. Close involvement of stakeholders helps to ensure that:

- the widest range of options is considered
- the resulting decision approaches optimality
- there is earlier delivery of the solution.

8.1.2
According to Network Rail's network licence:

> 3(a) the licence holder shall develop a draft route utilisation strategy in consultation with:
>
> (i) providers and potential providers of services relating to railways
>
> (ii) funders and potential funders of services relating to railways
>
> (iii) the Rail Passengers' Council or such other public body or bodies as may be performing the Council's duties, other representatives of persons using services for the carriage of passengers by railway, and representatives of persons using services for the carriage of goods by railway
>
> (iv) the Secretary of State [for Transport] and, in relation to a route utilisation strategy that involves Scotland-only services or cross-border services, the Scottish Minister.

Network Licence Condition 7 as modified 10 June 2005

In order to deliver this obligation in an effective and consistent manner, two consultative groups were established for the Freight RUS.

8.1.3 Industry Stakeholder Management Group (SMG)
The SMG consists of representatives from freight train operators, ATOC, Department for Transport, Transport Scotland, Welsh Assembly Government, Transport for London, the Rail Freight Group, the Freight Transport Association and the Office of Rail Regulation (as an observer).

This group meets regularly, acting as a steering group for the RUS. Although formal presentations are made to SMG of work done, the emphasis is openness in discussion and, wherever possible, issues were addressed by more informal working groups.

8.1.4 Wider Stakeholder Group (WSG)
The WSG is a larger, and hence necessarily more formal, group than the SMG. Representatives are invited from:

- Rail Freight Group members
- Regional Assembly members
- Regional Development Agencies
- Local authorities
- Elected members.

This group exists to ensure that stakeholders beyond the rail industry have the opportunity to contribute to the RUS process and are briefed and prepared to make best use of the formal consultation period. The first meetings were held in London in February and Scotland in March 2006. These were followed by meetings in York, Birmingham, Wales and a further meeting in London in June and July 2006.

8.1.5 Individual briefings
Meetings have also been held on an individual basis with a number of key stakeholders to understand their aspirations and concerns.

8.2 How you can contribute

8.2.1
We welcome contributions to assist us in developing this RUS.

8.2.2
Specific consultation questions have not been set as we would appreciate comments on the content of the document as a whole. Particular reference should, however, be made in responses to the options we have recommended as solutions for the identified gaps.

8.3 Response date

8.3.1
This RUS will have the standard formal consultation period of 12 weeks. The deadline for receiving responses is therefore 24 November 2006. Earlier responses would be very much appreciated in order to maximise the time available to us to react and respond in the final RUS document.

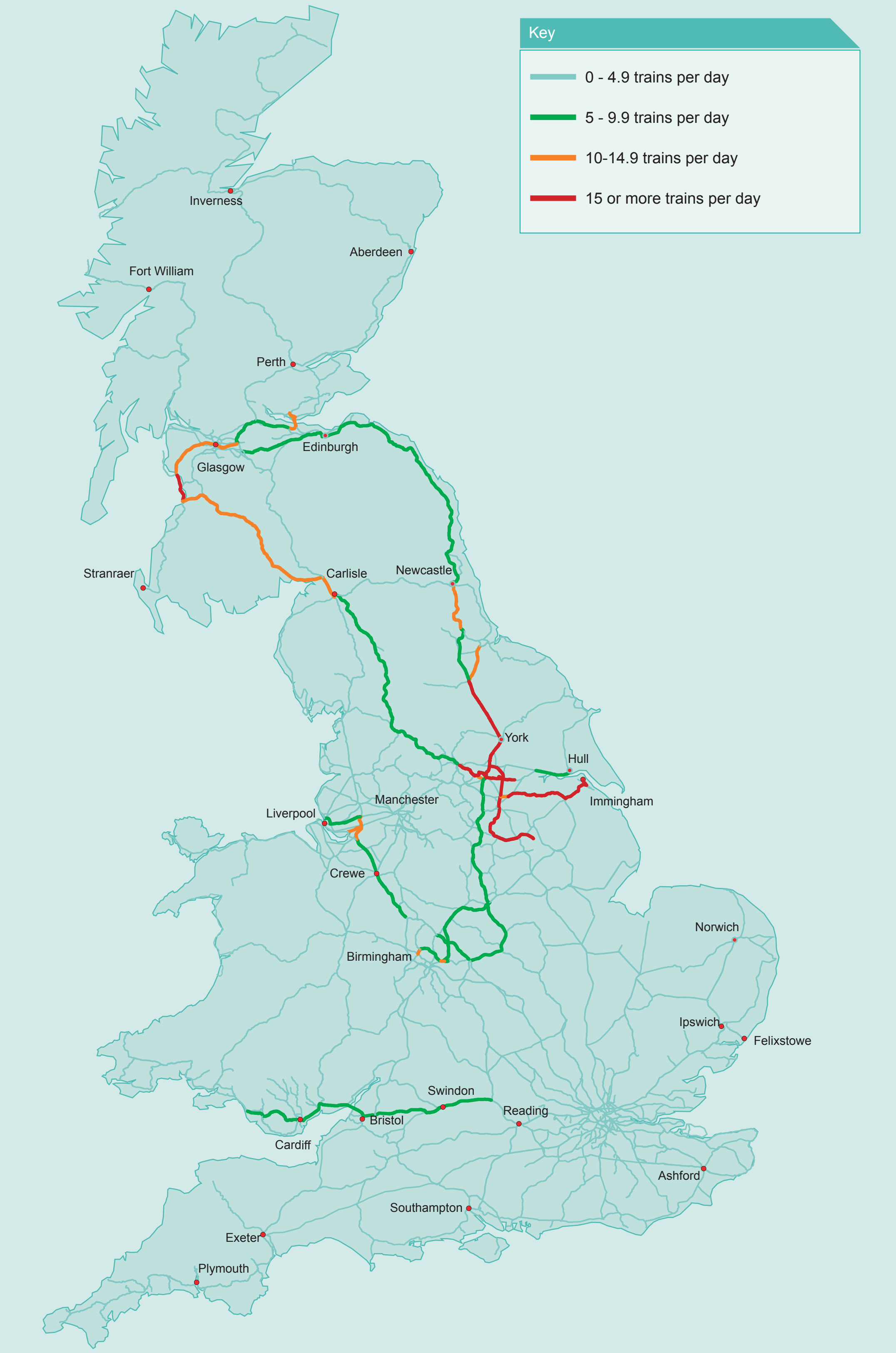
8.3.2
Consultation responses can be submitted either electronically or by post to the addresses below:

freight.rus@networkrail.co.uk

Freight RUS Consultation Response
National RUS Consultation Manager
Network Rail
40 Melton Street
London NW1 2EE

Appendix A: Demand in base year and existing network

Figure A1: Coal trains per day in 2004/05

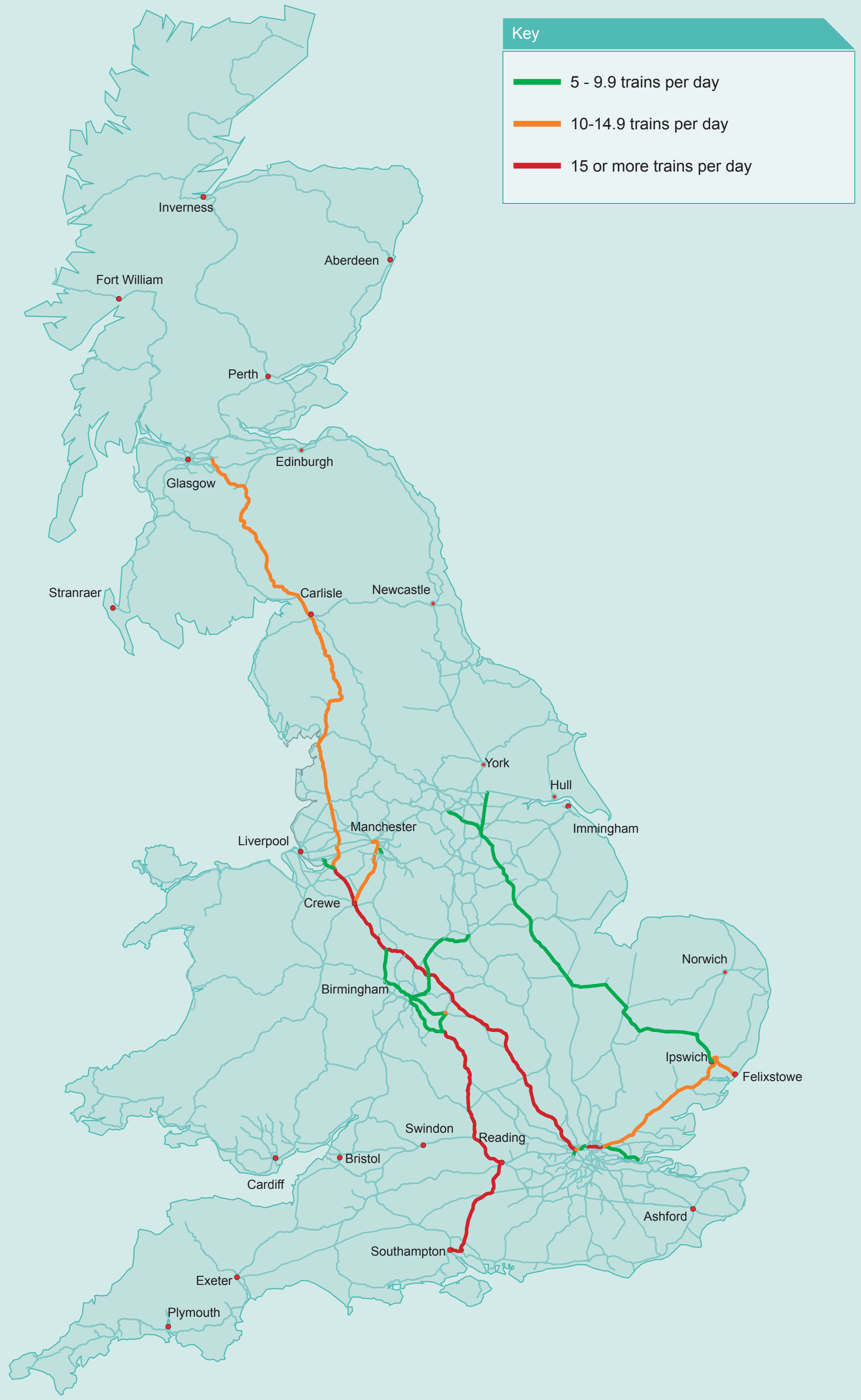


Trains in one direction.

Figure A2: Metals trains per day in 2004/05

Trains in one direction.

Figure A3: Intermodal trains per day in 2004/05

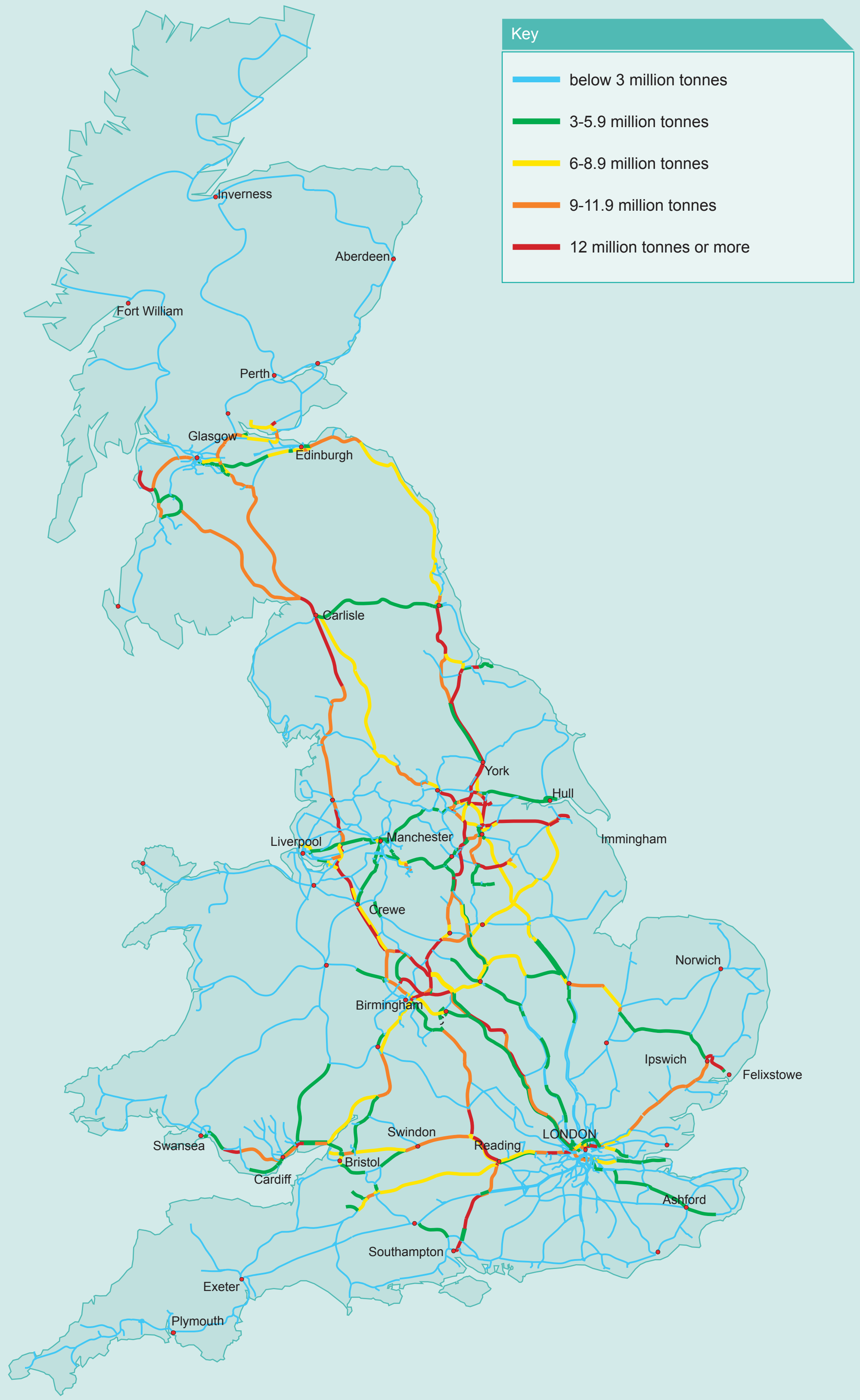


Trains in one direction.

Figure A4: Construction trains per day 2004/05

Trains in one direction.

Figure A5: Gross tonnage levels in 2005/06 (Freight only)



Annual tonnage shown in both directions

Figure A6: Gauge envelopes and container sizes

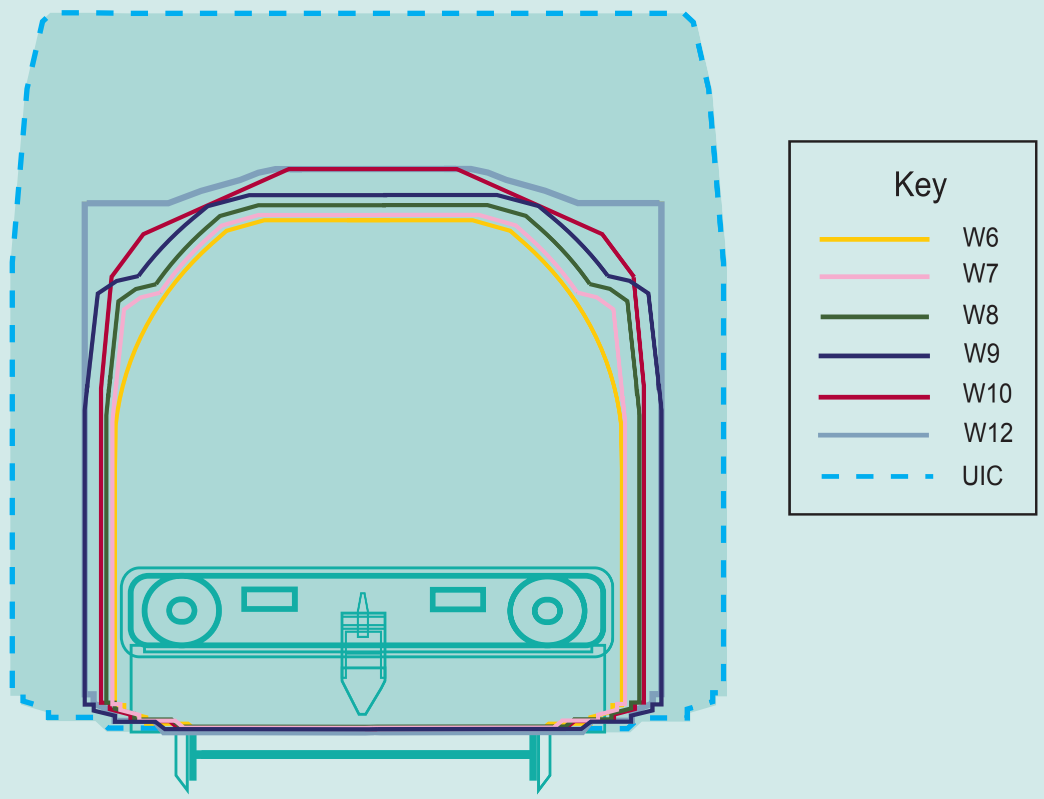
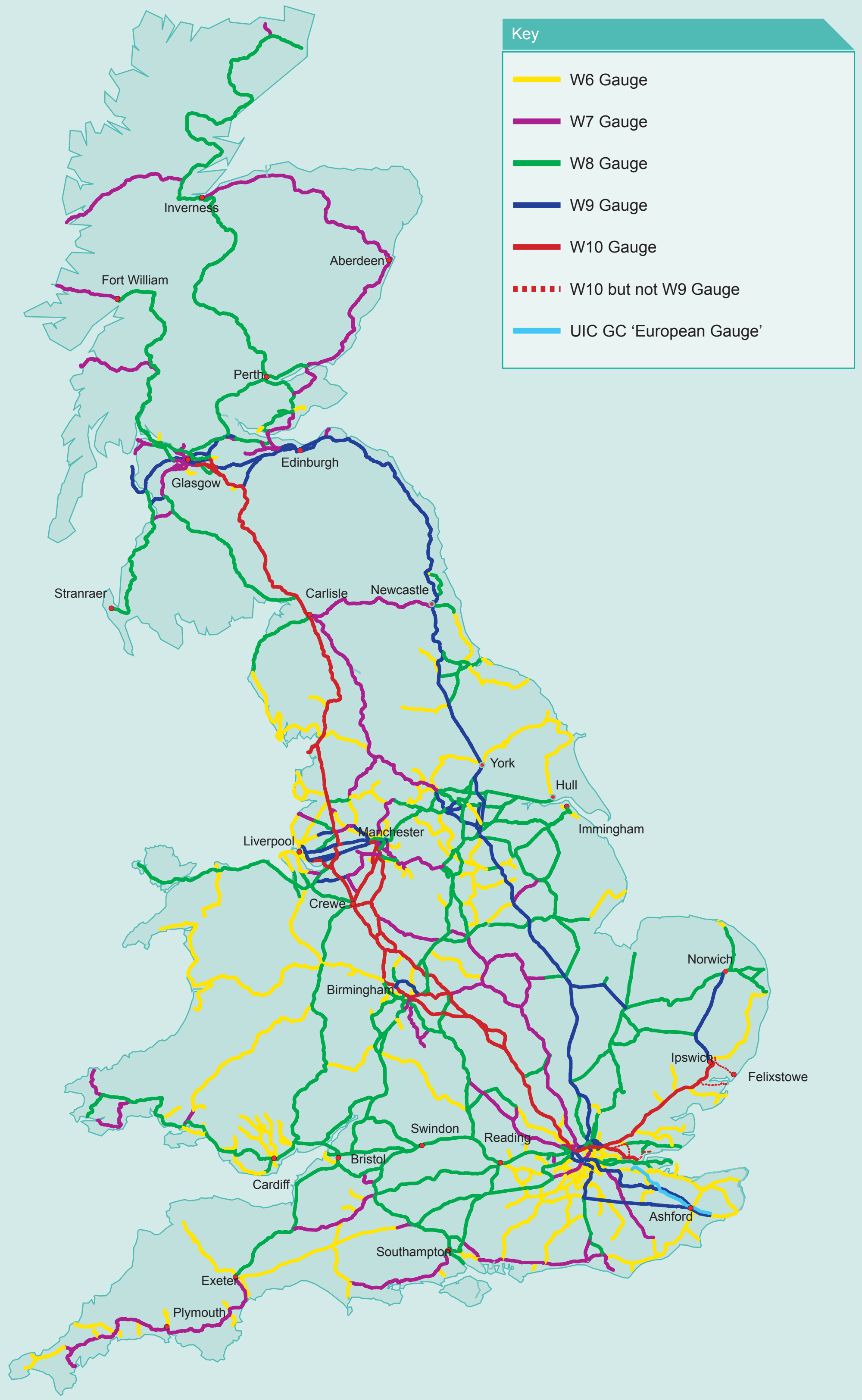


Table A1: Gauge requirements for container sizes

Length	Height	Width	Minimum gauge required on standard height wagon
Deep sea boxes			
20ft	8ft 6in (a handful of 8ft units exist)	2.44m	W8
40ft	8ft 6in	2.44 - 2.5m	W8
40ft	9ft 6in	2.44 - 2.5m	W10
Most common short sea boxes			
40ft or 45ft	9ft or 9ft 2in	2.5 - 2.55m	W10 - W12
40ft or 45ft	9ft 6in	2.5 - 2.55m	W10 - W12
40ft or 45ft	8ft 6in or 8ft 9in	2.5 - 2.55m	W8 - W9

Figure A7: 2004/05 gauge clearance map (indicative)



A review of gauge capability is being undertaken during this and next year. The programme which is agreed with the ORR, will verify the accuracy of published data for this measure.

Appendix B: Assumptions underlying forecast growth

Table B1: Bottom Up: Ten year demand forecasts to 2014/15: Sub market driver summary

Business	Driver	Assumption	Factor	Comments
ESI Coal	Electricity demand			
ESI Coal	Change in electricity supply			
ESI Coal	Carbon targets			
Domestic deep mined	Progressive closure years 1-5. Daw Mill, Harworth, Thoresby and Kellingley remain and pick up some of the volume shortfall			
Assumptions:	Power station closures Tilbury, Kingsnorth, Ironbridge			
Industrial Coal	Construction general			Used for manufacture of cement outside London
Industrial Coal	Chemicals			Coal for ICI chemical plants
Industrial Coal	General Industrial Coal			
Metals: interworks feedstock	Company factor			
Metals: UK home market	Domestic consumption			Cambridge Econometrics forecast 2002-2021 average used in SRA market study
Metals: rail	Special market			Network Rail Business Plan renewal rates
Metals: UK export	Trade trend			Consistent with export trend 1995-2004
Metals: UK import	Domestic consumption			
Metals: Scrap	Economic trend			Economic trend, reduced scrap metals due to generally lower manufacturing level
Primary Aluminium industry	Market judgement			Consistent with OEF forecast for DTI
Metals: raw materials ore	Production			
Metals: raw materials limestone	Production			
Metals: raw materials coal	Production			

Business	Driver	Assumption	Factor	Comments
Aggregates	National			Deputy Prime Minister's office average production of aggregates forecast 2001-2015
Aggregates	W. Mids			Exhaustion of locally produced stone leading to longer "railable journey". Strong regional economic activity
Aggregates	Northern			Very strong regional growth and construction activity in Manchester and Leeds continuing
Aggregates	London			Accounts for 30% national activity, out-grows the rest of the country too
Aggregates	Special Market			New EU road noise reduction leading to increasing demand for S. Wales gritstone for surfacing
Aggregates	Special Market			Demand for ballast from LUL
Aggregates	Housing			Various materials such as stone, blocks, sand and cement
Building Materials	Special/ Exceptional			Customer intelligence
Building Materials	Housing			Various materials such as stone, blocks, sand and cement
Building Materials	Construction general			Mainly commodities used for cement, or finished product
Business	Driver			Comments
Industrial Minerals	Construction General			Mainly commodities used for cement, or finished product; sand, lime, etc.
Industrial Minerals	Glass			Sand or glass
Industrial Minerals	Chemical market			Limestone used in Cheshire chemicals industry
Industrial Minerals	Lime			
Industrial Minerals	Special market			Clay used for pottery
Industrial Minerals	Special market			Clay used for paper
Waste	Domestic waste			Domestic waste reducing constantly as a result of land use planning and taxation
Waste	Spoil			Following general activity; project based jobs
Petroleum	Aggregates National			Bitumen for road surfacing
Petroleum	Railway Industry			Fuel for trains, including EWS
Petroleum	Aviation			Fuels for planes. White paper passenger numbers 2005-2015 mid scenario
Petroleum	Primary Products			
Petroleum	Crude Oil			Refinery capacity high none will close

To protect the commercial confidentiality of the FOCs, the 'Assumption' and 'Factor' colums are not shown.

Table B2: Freight forecast assumptions: Bottom up and top down assumptions

General Factors:		
Assumption	**Bottom Up**	**Top Down**
GDP forecast	Treasury GDP five year deflator projected forward	GB FM standard assumptions.
Changes in HGV maximum weight	Not Included	Not included
Lorry road user charging	Not Included	Not included
Significant reduction in Channel Tunnel access charges	Included	Included
No increase in mean train lengths/ other productivity gains	Included	Included
Additional rail-connected warehousing	Excluded	Additional 2.2 million m²
Railway infrastructure enhancements	2009: W10 Gauge clearance from Haven Ports to ECML/Yorkshire terminals	2009: W10 Gauge clearance from Haven ports to ECML/ Yorkshire terminals + W10 Southampton – WCML (Worked as Sensitivity 3)

Table B3: Deep sea intermodal: Base Case assumptions

Assumption	Bottom up	Top down
Overall market growth	5% per annum	3.75% per annum
Rail market share	10 year growth rate to match growth of 'last' 10 years 1996 to 2005. (17% in 1996 to 25% in 2005).	Output of model
Company Neutral Revenue Support (CNRS)/ Rail Environmental benefit Procurement Schemes (REPS)	Confidential	Total available budget reduced to £11 million per annum.
Committed enhancement schemes	2009: W10 Gauge clearance from Haven Ports to ECML/Yorkshire terminals	2009: W10 gauge clearance from Haven Ports to ECML/ Yorkshire terminals + W10 Southampton – WCML (worked as Sensitivity 3)
Start date of step changes in port capacity:		
Felixstowe South	2009	Before 2014
Bathside Bay	2010	Before 2014
Shell Haven	Not in base	Before 2014 (worked as Sensitivity 2)

Table B4: ESI coal key Base Case assumptions

	Bottom up only
Domestic deep mined	Progressive closure years 1-5. Daw Mill, Harworth, Thoresby and Kellingley remain and pick up some of volume shortfall
Aire & Trent Valley power station import sourcing.	Remaining shortfall in domestic ESI coal production picked up by east coast ports: Immingham/ Hull/ Redcar/ Tyne/ Blyth. Anglo –Scottish volumes from Ayrshire and Hunterston drop back to broadly 2004/05 levels, east coast ports pick up shortfall
Power station closures by 2014/15	Tilbury, Kingsnorth Ironbridge

Table B5: ESI coal burn estimates

Study/ Scenario	ESI Coal Burn 2014/15 (or nearest quote year)(mt)
DTI: UK energy and CO2 emissions projections: February 2006: Favourable to coal scenario. Total ESI market	42.9 (2015)
DTI: UK energy and CO2 emissions projections: February 2006: Favourable to gas scenario. Total ESI market	37.9 (2015)
DTI: Coal production outlook March 2004: High coal burn scenario. Total ESI market	56 (2012)
DTI: Coal production outlook March 2004: Low coal burn scenario. Total ESI market	30 (2012)
Bottom up base case: ESI coal tonnes lifted to rail only	46 (2014/15)
Bottom up Sensitivity 1: ESI coal tonnes lifted to rail only	48 (2014/15)

Context Note: Rail currently has a market share of the mainland UK ESI coal market of 90%.

Table B6: Flue gas desulphurisation equipment at UK power stations

Station	Owner	Capacity: GW	No. of units	Committed FGD: GW	FGD Status	Opt-in	Opt-outs
Aberthaw	RWE	1.5	3	1.5	Committed	1.5	
Cockenzie	Scottish Power	1.2	2		No		1.2
Cottam	EDF	2	2	2	Under construction	2	
Didcot A	RWE	2	4		No		2
Drax	Drax	4	6	4	Operating	4	
Eggborough	British Energy	2	4	1	Under construction	2	
Ferrybridge	SSE	1	2	1	Committed	1	
Ferrybridge	SSE	1	2		No		1
Fiddler's Ferry	SSE	2	4	1.5	Committed	2	
Fifoot Point	MBO	0.4	3	0.4	Operating	0.4	
Ironbridge	EON	1	2		No		1
Kingsnorth	EON	2	4		No		2
Longannet	Scottish Power	2.3	4	2.3	Committed	2.3	
Ratcliffe	EON	2	4	2	Operating	2	
Rugeley	International Power	1	2	1	Committed	1	
Tilbury	RWE	0.9	3		No		0.9
West Burton	EDF	2	4	2	Operating	2	
Total		**28.3**	**55**	**18.7**		**20.2**	**8.1**

Source: Mott MacDonald/McCloskey's for Network Rail.

Table B7: UK coal import facilities

Port	Max Vessel Dead weight tonnes (DWT)	Capacity Million tonnes 2005	Projected capacity increase.
Redcar	165,000	3	Projected increase in capacity for power station coal of 2m tonnes
Immingham HIT	120,000	6	Building of HIT 2 has increased current total capacity of HIT terminals to 10 million tonnes.
Immingham IBT	120,000	1	
Immingham Dock	30,000	2	
Blyth	25,000	0	Capacity to be increased by 2 million tonnes in 2007/08.
Tyne Dock	30,000	0.65	Capacity to be increased to 3mt per year by end of 2006/07, 4m by 2007/08, increasing max vessel Dwt to 50,000.
Hunterston	200,000	7	
Port Talbot	165,000	2	
Leith	100,000	2	Leith tonnages may increase by 1mt in 2006/07 but there could be short term growth as Cockenzie has opted out of FGD fitment.
Bristol Portbury	100,000	5.5	Plans in place to upgrade to 8 million tonne.
Liverpool	60,000	5	
Hull	30,000	2	Could rise to 5 million tonnes total capacity.
Newport	30,000	2	
Kingsnorth	25,000	5	
Tilbury	25,000	3.5	

Source: DTI Coal Production Outlook: 2004 – 16. Updated by Network Rail.

Figure B1: Key import coal routes and coal loading points

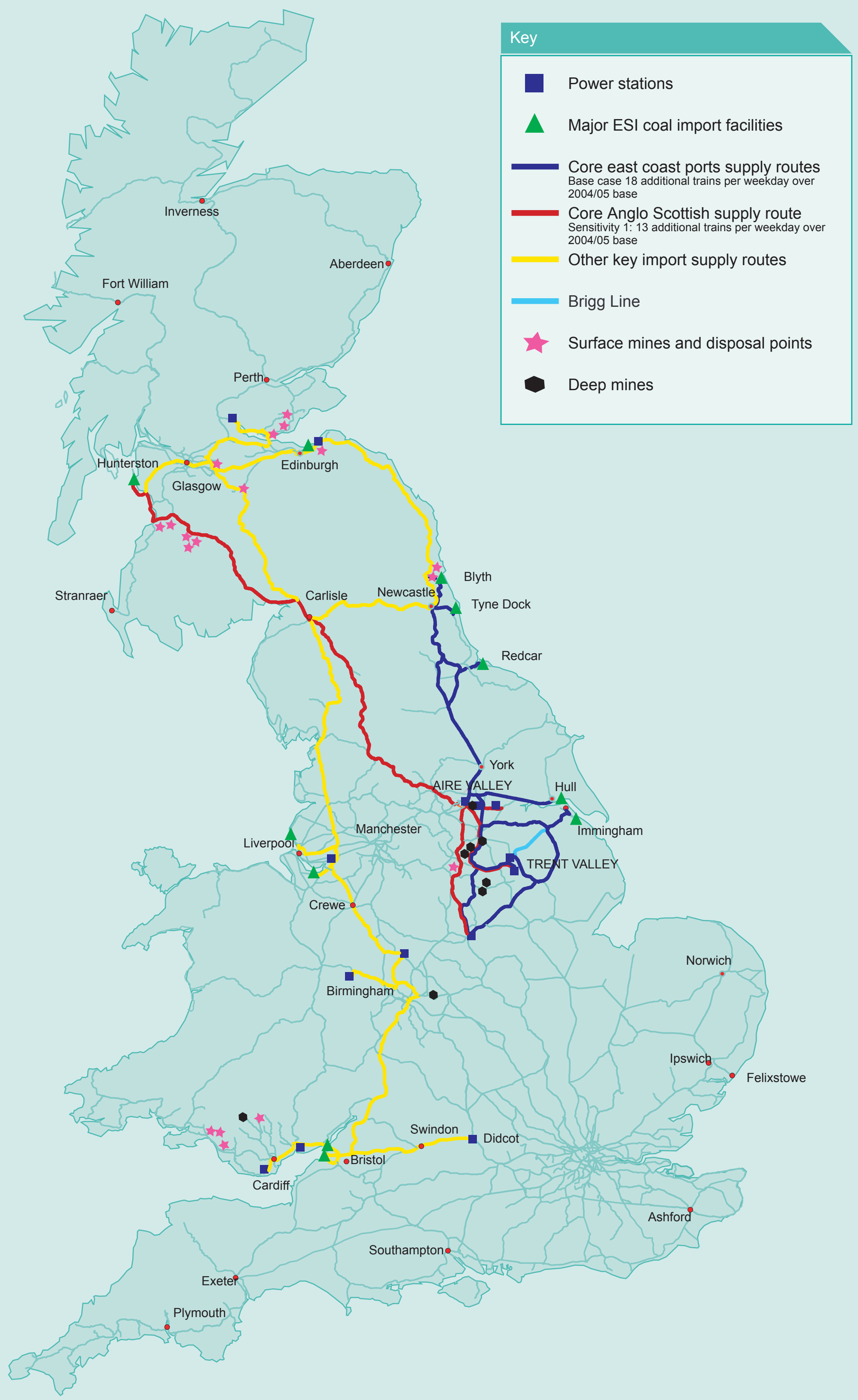
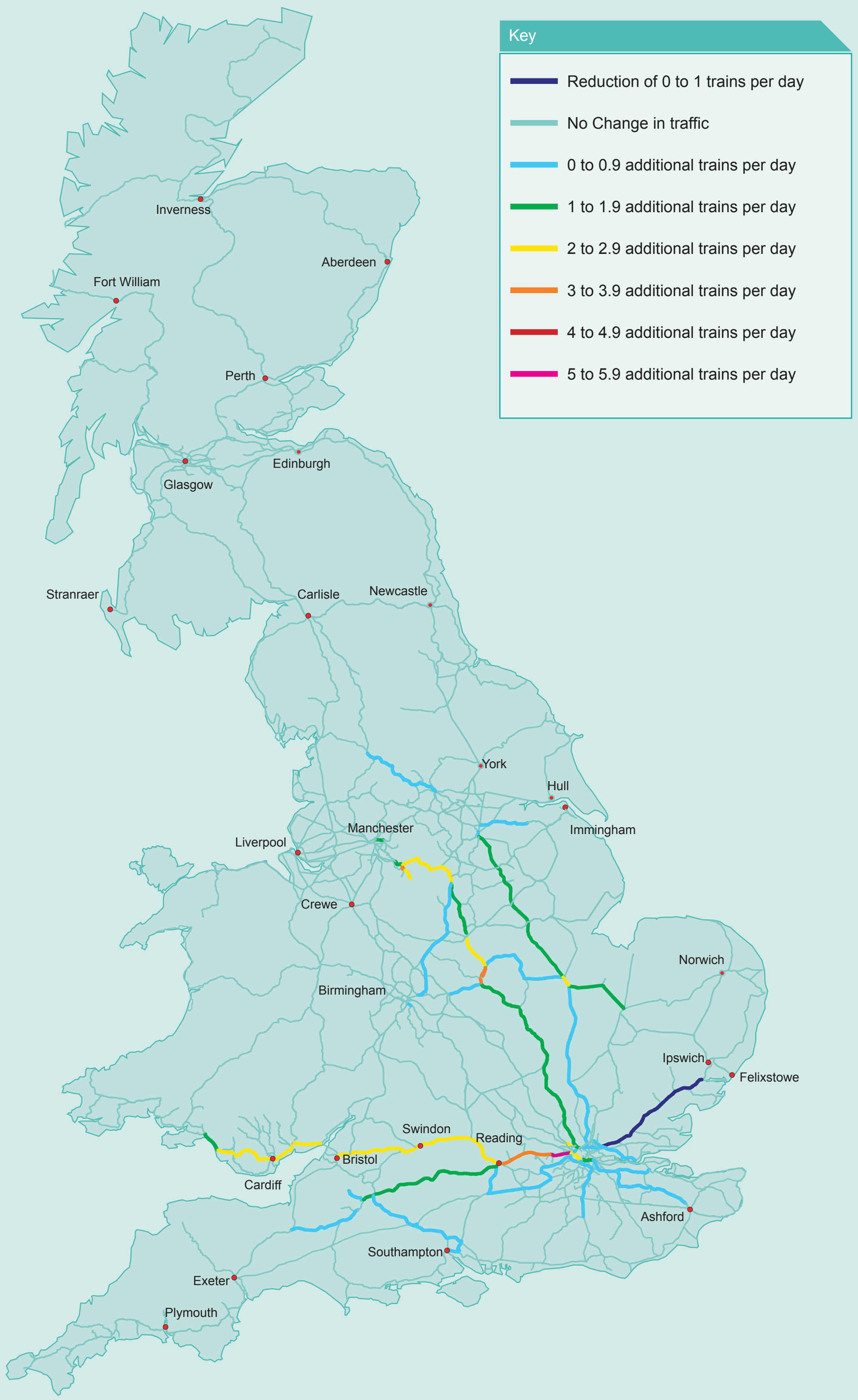
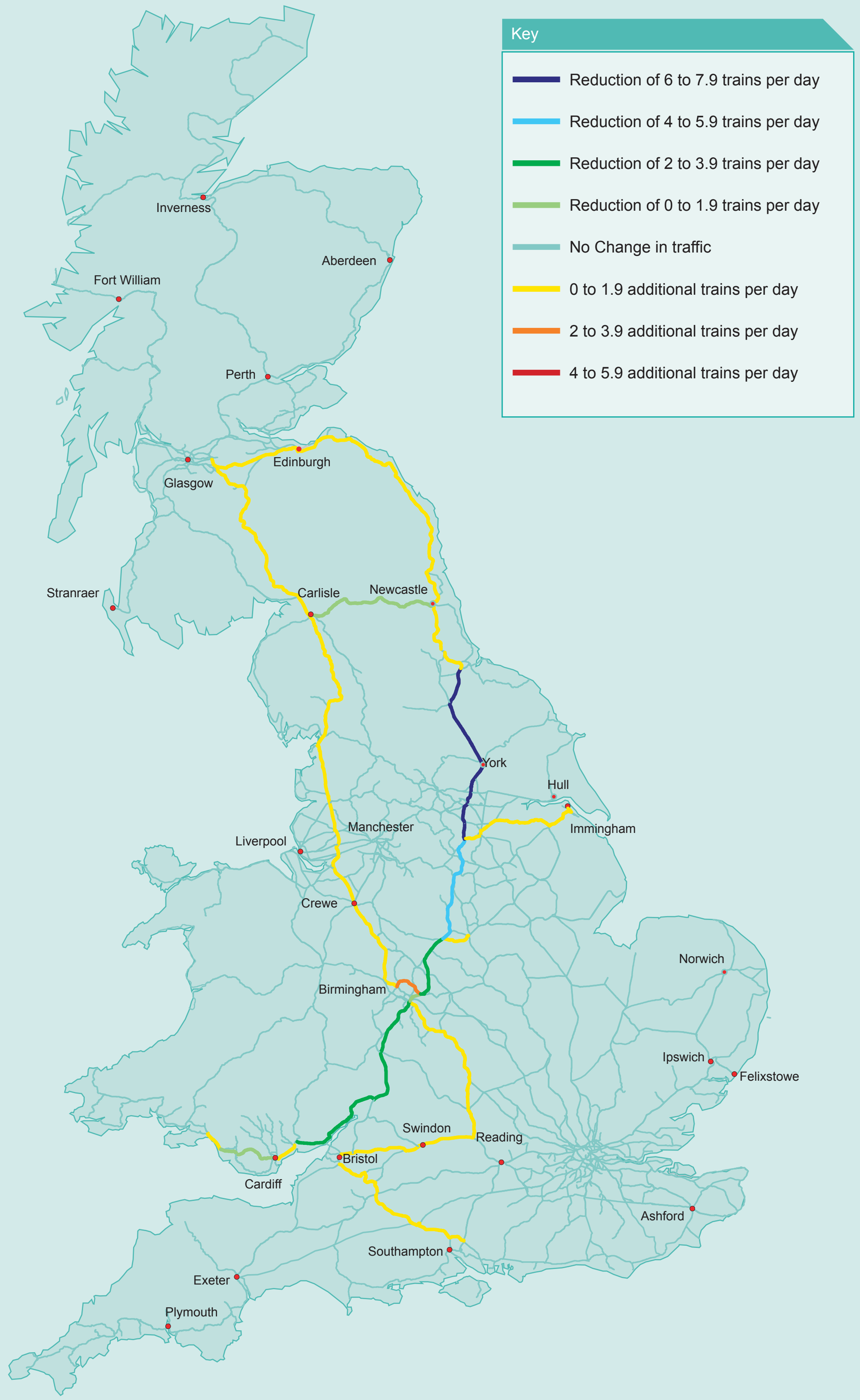


Figure B2: Additional trains by 2014/15: Construction



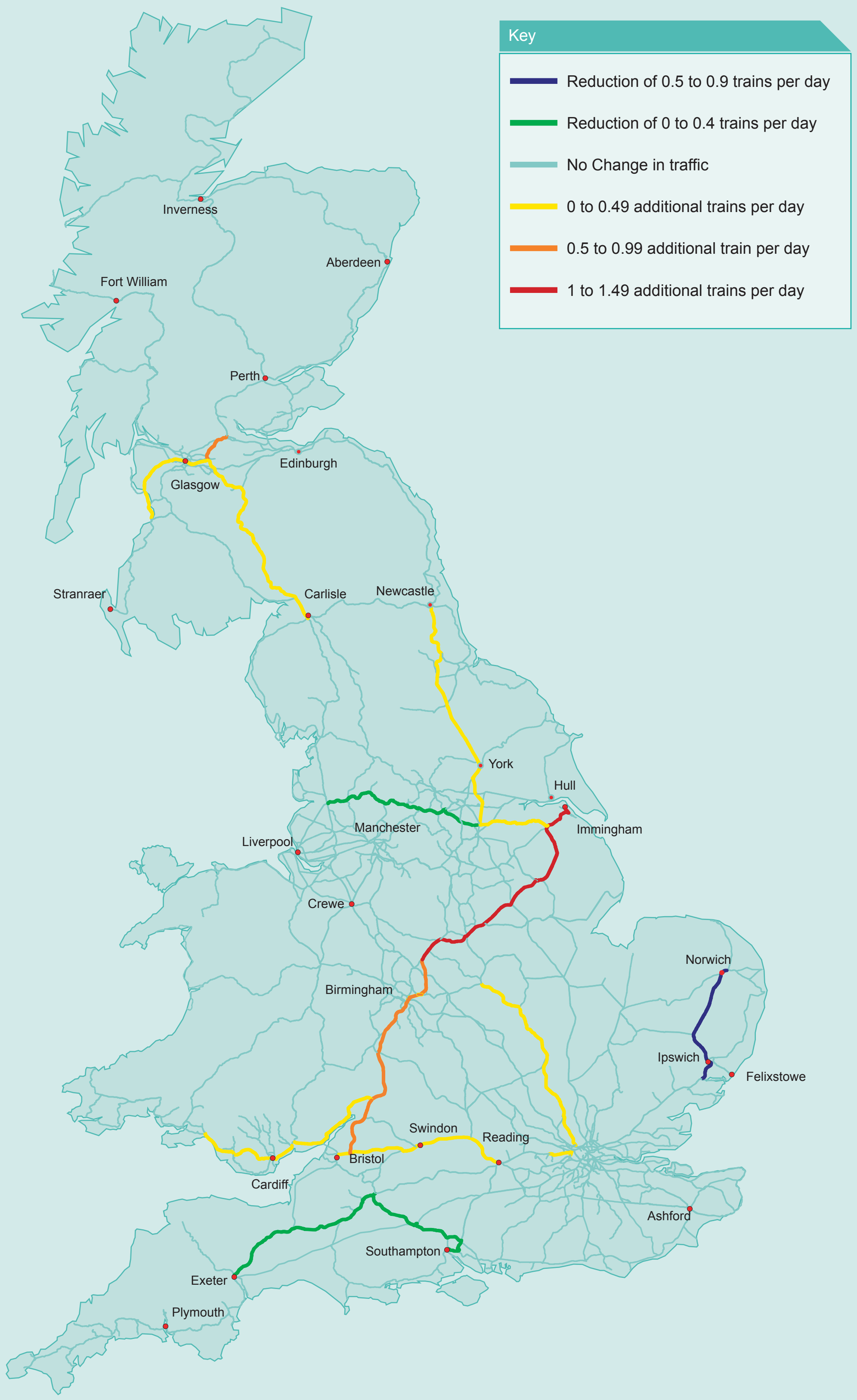
Additional trains are single direction

Figure B3: Additional trains by 2014/15: Metals



Additional trains are single direction

Figure B4: Additional trains by 2014/15: Petroleum



Additional trains are single direction

Table B8: 2005/06 Growth by commodity compared to base year

Gross tonne kilometre growth 2005/06 against 2004/05

Commodity	04/05	05/06	Growth (%)
Coal ESI	13,834	16,698	21%
Coal Other	875	938	7%
Domestic/Maritime Intermodal	9,430	10,916	16%
European Intermodal	714	634	-11%
European Conventional	507	399	-21%
European Automotive	56	45	-20%
Enterprise	2,293	2,256	-2%
Construction Materials	5,414	5,664	5%
Industrial Materials	1,767	1,561	-12%
Steel	5,191	4,468	-14%
Iron Ore	312	332	6%
Petroleum	2,463	2,556	4%
Mail and Premium Logistics	137	229	67%
Domestic Waste	515	532	3%
Chemicals	29	16	-44%
Domestic Automotive	901	676	-25%
General Merchandise	835	382	-54%
Other	415	458	10%
Total	**45,689**	**48,761**	**6.7%**

Appendix C: Key capacity gaps

Table C1: Key capacity gaps against 2014/15 base forecasts

Freight RUS capacity gap No.	Route / Route Section	Key growth driver	Forecast wkday av. actual uncon-strained 2014/15	Av. Actual 2004/05 daily average Thurs (max actual)	Planned WTT paths 2004/05	CUI index (highest direction & highest point on section) Morn peak	Off peak	Even. peak	Applicable study
Anglo-Scottish route (Sensitivity 1)									
I	GSW: Falkland yard – Annbank Junction Mauchline Junction – Gretna Junction	1	28	14 (19) Recorded Dumfries	21	75	61	59	Scotland RUS
1	Gretna Junction – Carlisle station – Petteril Bridge Junction	1	57	37 (46)	60	31	41	36	Freight RUS
2	Settle and Carlisle: Petteril Bridge Junction – Settle Junction	1	24	11 (17)	14	26	62	40	Freight RUS
3	Settle Junction – Skipton – Whitehall Junction	1	28	15 (23)	19	60	76	60	Freight RUS
West Coast Main Line (Base Case)									
4	Carlisle –Lancaster (data sample Carnforth – Upperby Bridge Junction)	2,6 + General	41	27 (32)	44	48	52	59	Freight RUS
5	Weaver Junction – Winsford South Junction	2,3,6	69 - 74	52 (67)	73	61	60	66	Freight RUS
K	Manchester Piccadilly - Deansgate	2,3,6	29	17(22)	33	41	48	45	North West RUS
6	Stafford Station	2,3,6	83	52(67)	89	35	34	40	Freight RUS
7	Rugby – Wembley Central	2,6	65	32(40)	74	79	63	84	Freight RUS
Southampton to West Midlands (Sensitivity 3)									
8	Sutton Park Line	3							Freight RUS
8	Leamington-Coventry-Nuneaton (recording point-Coventry Station)	3	17	15 (30)	18	76	84	85	Freight RUS
9	Millbrook – Southampton Central – Eastleigh	3	35-37	29 (38)	49	40	40	39	Freight RUS
	Eastleigh – Winchester – Worting Junction	3	33-35	27 (34)	35	48	56	54	Freight RUS
	Worting Junction – Basingstoke – Bas. G.W.R. Junction	3	29 -32	23 (26)	30	28	30	28	Freight RUS
	Reading West Junction	3	46- 48	36 (46)	58	42	44	42	Freight RUS
	Didcot East Junction Leamington	3	30-32	22 (30)	39	61	69	73	Freight RUS/ Reading area Renewals scheme
North East Ports – Aire/Trent Valley (Base Case)									
B	Joan Croft Junction – Hambleton Junction	4	43	31(44)	65	34	30	42	ECML RUS
10	Wrawby Junction – Scunthorpe	4	59	46 (62)	64	34	30	34	Freight RUS & Yorks & Humber RUS
11	Hull Hedon Road – Hessle Road Junction	4	17	15 (30)	18	76	84	85	Freight RUS & Yorks & Humber RUS
12	Tyne Yd – Tursdale Junction	4							
Haven Ports to London (Base Case)									
EF	GE: Ipswich yard – Halifax Junction	2,6	*40* -37	20 (31)	27	25	30	39	Anglia RUS
	GE: Halifax Junction – Shenfield	2,6	*37* -31	17 (25)	24	73	53	77	Anglia RUS
	GE: Shenfield - Forest Gate	2,6	*37* -31	17 (25)	24	47	32	46	Anglia RUS
	GE: Forest Gate – Stratford	2,6,	*55* -51	28 (37)	48	65	38	60	Anglia RUS
D	Stratford – Channelsea Nth Junction	2,6	*55* -50	27 (36)	48	66	53	62	Cross London RUS
D	Channelsea North – Camden Road Junction	2,6	*62* -50	38 (52)	61	66	53	62	Cross London RUS
Haven Ports to the North East (Base Case)									
GH	Haughley– Kennett – Ely West Junction	5	*21*	13(25)	14	50	43	45	Anglia RUS
	Ely West Junction – Peterborough	5	31	23(41)	28	32	34	34	Anglia RUS
C	ECML: Peterborough Crescent Junction – Doncaster Loversall Carr Junction	5	34	14 (18)	27 Nb 16 Sb	53	46	51	ECML RUS
A	ECML: Hare Park Junction – South Kikby Junction	1,5	36	23 (28)	32	61	49	49	ECML RUS
Hope Valley (Base Case)									
13	Chinley East Junction – Dore West Junction	General construction traffic							Freight RUS
Scottish Coal (Base Case)									
J	Larbert -Stirling	Re-routeing of existing Longannet flows	18	6(10)	14	47	49	54	Scotland RUS

(all numbers trains in busiest direction)

Assumptions:

- Key constraints identified against present passenger service base. Where information is available e.g. emerging 2008 WCML specification, this has been considered.

Notes:

- Forecasts consist of bottom up forecast for 2014-15 overlay. Where top down figures differ significantly a range is presented.
- The bottom up forcasts do not at present include any additional light engine movements
- "Planned" represents a sample of Thursday booked WTT paths (highest direction is quoted). Winter 2004/05 timetable base.
- CUI data: As at winter 2004/05. morn. peak: 06:30 – 09:30, off peak: 09:30 – 16:30, evening peak: 16:30 – 19:30.

Key growth drivers:

1: Coal: Sensitivity 1 : Hunterston/Ayrshire – Aire/Trent Valley

2: Deep sea intermodal: Base Case: Haven Ports – the Midlands/the North West/ Scotland

3: Deep sea intermodal: Sensitivity 3: Southampton – WCML (W10 cleared)

4: Coal: Base Case: east coast ports (Immingham/Hull/Redcar/Tyne/Blyth) – Aire/Trent valley

5: Deep sea intermodal: Base Case: Haven Ports – Yorkshire/the North East

6: Deep sea intermodal: Sensitivity 2: Shell Haven – the Midlands/the North West/ Scotland & Haven Ports – the Midlands/the North West/Scotland

Glossary

CNRS	Company Neutral Revenue Support
CTRL	Channel Tunnel Rail Link
DfT	Department for Transport
Down	Generally direction away from London
ECML	East Coast Main Line
ESI Coal	Electricity Supply Industry Coal
F2N	Felixstowe to Nuneaton
FGD	Flue gas desulphurisation
FOC	Freight Operating Company
GEML	Great Eastern Main Line
GBFM	Great Britain Freight Model
HIT	Humber International Terminal
HTA	High capacity coal wagons
IBS	Intermediate Block Signal
NLL	North London Line
NRDF	Network Rail Discretionary Fund
Up	Generally direction towards London
RA	Route Availability – a system to determine which types of locomotive and rolling-stock may travel over a route, normally governed by the strength of underline bridges in relation to axle-loads and speed
REPS	Rail Environmental Benefit Procurement Schemes
RUS	Route Utilisation Strategy
SHML	South Humberside Main Line
SRA	Strategic Rail Authority
T & H	Tottenham & Hampstead Line
TEU	Twenty foot Equivalent Unit – standard measure of intermodal containers
TfL	Transport for London
TPD	Trains per day
WCML	West Coast Main Line
WTT	Working Timetable

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