



Route 13 Great Western Main Line

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In June 2005 the Strategic Rail Authority published the Great Western Main Line Route Utilisation Strategy for the period 2006-2012. The RUS identified the continued growth throughout the GWML with emphasis on the extended Bristol area and the Thames Valley where predicted growth is well above the national average. The Wales Rail Planning Assessment and Regional Planning Assessments for the South West and Thames Valley areas are due to be published during 2006. These will be followed by a Wales RUS to cover all of Wales.

Today's route

The route comprises five distinct sections, which are described below. The relevant Strategic Route Section is shown in brackets:

- GWML, which includes the route from Paddington to Cardiff via Reading, Swindon, Bristol Parkway and the Severn Tunnel, and on to Swansea, and from Swindon to Bristol Temple Meads via Bath (13.01, 13.02, 13.03, 13.04, 13.06 and part of 13.06);
- cross country routes radiating from Birmingham, which includes Oxford to Basingstoke via Didcot (Parkway station or the avoiding line) and Reading (station or west curve) and from south of Birmingham (Stoke Works Junction) to Taunton (Cogload Junction) via Cheltenham, Gloucester, Bristol Parkway and Bristol Temple Meads. (13.07, 13.08, 13.11 and part of 13.06);
- extensions from Old Oak Common West Junction to Northolt towards the Chiltern Line (part of 13.10), from Oxford along the Cotswold line towards Worcester (13.13) and from Swindon to Severn Tunnel Junction via Gloucester (13.12, 13.14 and 13.16);
- branch lines to Greenford (part of 13.10), Heathrow Airport (13.09), Windsor (13.20), Bourne End and Marlow (13.19), Henley on Thames (13.18), Bicester (13.21) and Severn Beach 13.22); and
- freight only branches to Brentford, Colnbrook, Cowley, Sharpness Docks, Tytherington, Avonmouth terminals complex, Portbury Docks, Ebbw Vale (currently closed for conversion to a passenger branch) and Uskmouth (13.17, 13.23 and 13.24).

Route context

The backbone of the Great Western Main Line (GWML) is the high-speed section from London Paddington through Swindon to Cardiff Central and to Bristol Temple Meads. Designated as being of Trans European Network System (TENS) status this key element of the route provides fast inter city links between the English and Welsh capital cities and the west of England regional capital. Beyond Cardiff towards Swansea the lower-speed South Wales Main Line section acts as an integral extension of GWML. The full extent of this core part of the route is replicated by the M4, M32 and M48 motorways.

As well as providing the express rail link to Heathrow airport, the route also links Reading with Basingstoke to the south and extends

northwards from Didcot through Oxford taking in the Cotswold Line towards Worcester and the branch line to Bicester. North of Oxford towards Birmingham is incorporated within Route 17: West Midlands.

From just south of Birmingham the route runs through Gloucestershire towards Bristol and Taunton where it links with Route 12: Reading to Penzance, forming the main artery from the north and midlands to the far west of England. The route diverges at Gloucester where it skirts the banks of the River Severn towards South Wales and via the Golden Valley towards Swindon for links to London and the South East. These elements of the route are replicated by and compete with the M5 motorway and the A48 and A417/419 trunk roads.

Passenger and freight demand

The GWML RUS identified that the route serves a wide range of passenger and freight markets with the mix varying on different sections of the route. The key passenger markets include long-distance travel to and from South Wales, Bristol and the South West and the Cotswolds of which half are for leisure, a third for business travel and the remainder for commuting. Shorter and suburban journeys are predominantly into and out of London, with increased commuter journeys into road congested regional centres such as Reading and the cities of Bristol and Cardiff. Heathrow airport continues to generate significant volumes of passengers.

In 2002/2003, 75 million journeys were made within or to and from the GWML area, around 8% of the national total. 27 million of those journeys were made to and from central London. Over 6 million journeys emanated from the Bristol area, of which nearly half were local to the area. Local journeys contained within the South Wales area (including the Valleys) were just under 9 million, with 1 million to London. The Thames Valley corridor alone generated over 16 million journeys.

A significant number of journeys (35 million or 47%) are less than 20 miles reflecting the volume of commuter journeys in the major conurbations; overcrowding during peak periods is commonplace. However, 75% of passenger miles are associated with longer distance journeys of more than 50 miles.

The route has extremes in station usage. Paddington the busiest with 22.3 million journeys per annum, followed by Reading (13m), Cardiff Central (8m), Bristol Temple Meads (5m), Ealing Broadway (5m) and Slough (4m). However, twelve stations generate fewer than 90 passengers per day, with Pilning, Combe, Finstock and Ascott-under-Wychwood each having less than 6 per day.

Significant volumes of freight are carried over the route. Aggregates dominate the route to the east of Reading with flows from the Mendip Hills and the East Midlands to London area terminals at Paddington, Acton, Brentford, Hayes, West Drayton, Thorney Mill, Colnbrook and others to the south and east of London. The south coast port of Southampton generates significant volumes of container traffic for the West Midlands, the North and Scotland. Avonmouth and Wentloog terminals generate much smaller volumes.

The Port of Bristol's Avonmouth and Portbury terminals handle in the region of 6 million tonnes per year of imported coal destined for power stations at Didcot, Aberthaw and the West Midlands. South Wales, however, remains the focus for metals traffic with major steel production facilities at Llanwern and Port Talbot generating up to 15 trains each way per day, which represents

around 40% of freight traffic levels in the area. The coal fired Uskmouth power station is mainly supplied locally from Newport docks.

Automotive manufacturing on the route is limited to Swindon (Honda) and Oxford Cowley (BMW) with only the latter using rail. The import market is mainly based on the Port of Bristol's Portbury and Avonmouth terminals. Daily trains between Dagenham in east London and Bridgend and Swansea cater for Ford traffic. Petroleum traffic is at a minimal level with a daily train from Milford Haven to either Westerleigh or Theale. Daily train loads of containerised waste to landfill sites at Appleford and Calvert originate from Brentford, and Bristol and Bath respectively. Nuclear traffic moves between two locations on the GWML and the North West.

Following the fire at Buncefield oil terminal near Hemel Hempstead we are exploring the possibility of supplying fuel by rail to Heathrow airport with our customers.

Current services

The passenger service structure can be broken down into distinct groups, which integrate at varying locations throughout the route and reflect the different markets served.

First Great Western* operates main line services which are evenly divided between Paddington and South Wales and between Paddington and the greater Bristol area and main line services to Oxford and the Cotswold line, Cheltenham and the far west of England.

First Great Western Link* operates inner suburban services to the east of Slough, outer suburban services to Oxford and the Cotswold line, Bedwyn and between Reading and Basingstoke, branch line services throughout the Thames Valley; and joint operation with Heathrow Express of Heathrow Connect services to Heathrow airport.

Wessex Trains* operates local services between Swindon and Cheltenham, local services between Worcester/Cheltenham and Taunton, which integrate with services to Weston super Mare to provide an ad hoc cross Bristol service, semi fast services between South Wales and the south coast via Bristol and Bath, and the Severn Beach branch line service.

* Passenger train services currently operated by First Great Western, First Great Western Link and Wessex Trains will be operated by the new Greater Western franchise with effect from April 2006.

Heathrow Express operates non-stop express services, and the jointly operated Heathrow Connect stopping services, between Paddington and Heathrow airport.

Virgin Cross Country operates main line services from the north and midlands to the south coast, which traverse the route via Oxford and Reading, and main line services from the midlands, which run to the south west via Cheltenham and Bristol.

Central Trains operates semi fast services from the Midlands to Cardiff via Gloucester.

Freight services operate throughout the route.

Figure 1 shows the current level of service to London from principal stations.

Figure 2 shows the service frequencies between principal stations.

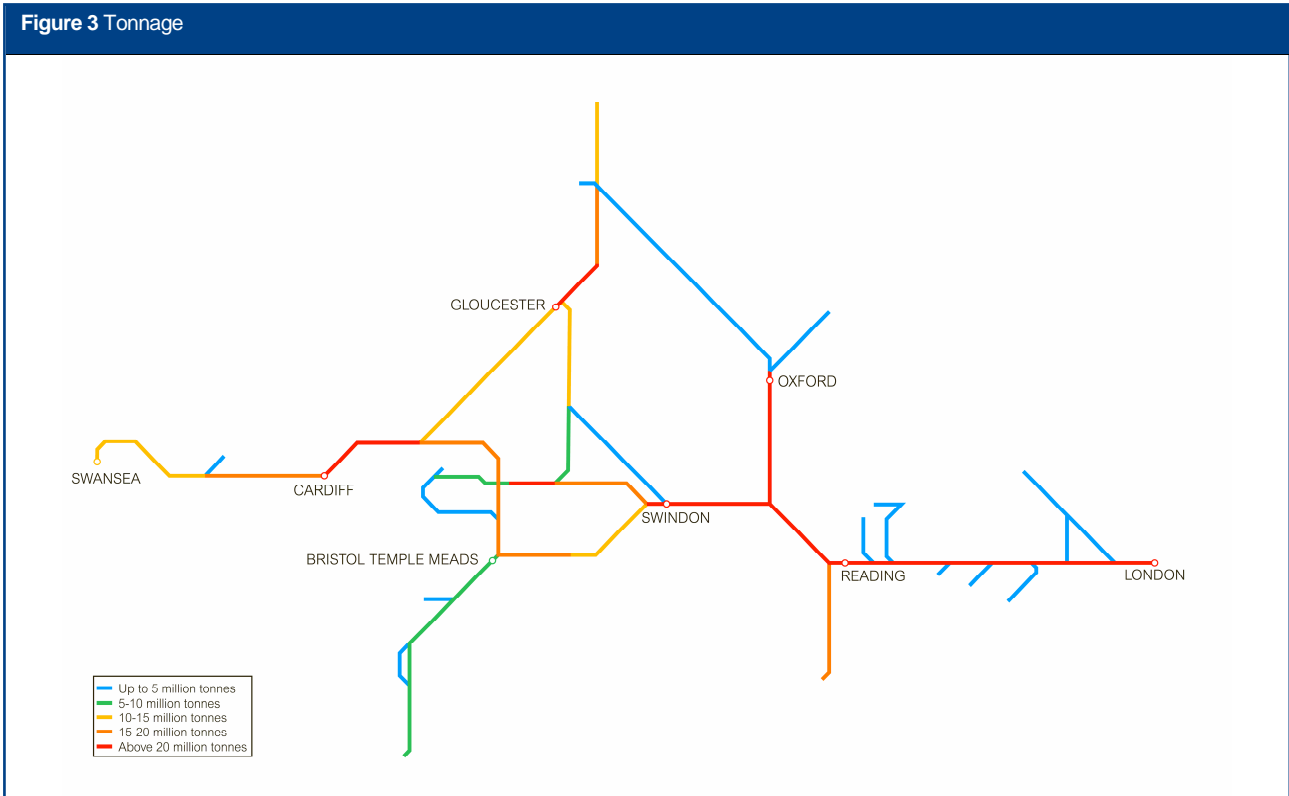
Figure 1 Current train service level (trains per hour)

Originating traffic	Trains per hour to Paddington
Greenford	2 peak/2 off peak
Heathrow Airport	6 peak/6 off peak
Bourne End	1 peak/0 off peak
Henley- on-Thames	1 peak/0 off peak
Reading	2 peak/2 off peak
Newbury	1 peak/1 off peak
Bedwyn	2 peak/1 off peak
Exeter St Davids	1 peak/0 off peak
Plymouth	1 peak/1 off peak (7 trains per day from Penzance)
Oxford	4 peak (1 Bicester, 1 Banbury)/2 off peak
Cotswold line	2 peak/1 off peak
Cheltenham Spa	1 peak/1 every 2 hours off peak
Bristol Temple Meads	2 peak/2 off peak
Cardiff Central	0 peak/1 off peak
Swansea	3 peak/1 off peak

Figure 2 Current train service level (trains per hour)

Regional/Rural Services	Trains per hour each way
Slough – Windsor	2
Marlow – Bourne End – Maidenhead	1
Henley –on –Thames	1
Basingstoke – Reading	2
Bicester – Oxford	5 trains per day
Cheltenham Spa – Swindon	1 every 2 hours
Gloucester – Taunton	1
Bristol – Weston super Mare	1 includes some through Paddington services
Bristol – Avonmouth	1
Cardiff – Swansea	1
Cardiff – Birmingham	1
Cardiff – Portsmouth	1
Bristol – Southampton/Weymouth	1

Figure 3 Tonnage



Current traffic

The GWML carries a mixture of traffic with varying speeds, acceleration and stopping patterns. Segregation of traffic is only achievable on sections of four track railway, as exists between Paddington and Didcot where an intense high speed service operates on the main lines. A mix of inner and outer suburban services and freight trains operate over the lower speed relief lines.

The majority of the route is served by fast, long distance services radiating from London, generally provided by diesel-powered 8 car InterCity125 and 5 car Adelante trains. A number of these services run through to destinations beyond the defined GWML to Hereford, West Wales and Devon & Cornwall. Heathrow Express and Connect services between Paddington and Heathrow airport are the only 25kV electrified services on the route.

On the cross country components of the route, those lines radiating from Birmingham New Street to the South Coast and to the South West of England, services are mostly provided by 4 car or 5 car Virgin Voyager diesel trains.

Thames Valley branch line services are largely self-contained, and generally connect into secondary outer London suburban services. The Stroud Valley line between Swindon and Cheltenham sees a mix of through trains from London and local shuttles.

Gloucester is served by a mix of hourly semi fast Birmingham to Cardiff and local services running between Taunton, Bristol, Cheltenham and Worcester. There are also stopping services between Gloucester and Cardiff. With the exception of the Bristol area ports and South Wales, freight traffic mainly emanates from off the route or traverses the route at various locations.

Figure 3 shows the tonnage levels on the route.

Traffic volumes are summarised in Figure 4.

Figure 4 Current use

	Passenger	Freight	Total
Train km per year (millions)	36	5	41
Train tonne km per year (millions)	8,888	5,268	14,155

Current infrastructure capability
 The following maps set out the capability of the current network.

Figure 5 Linespeed

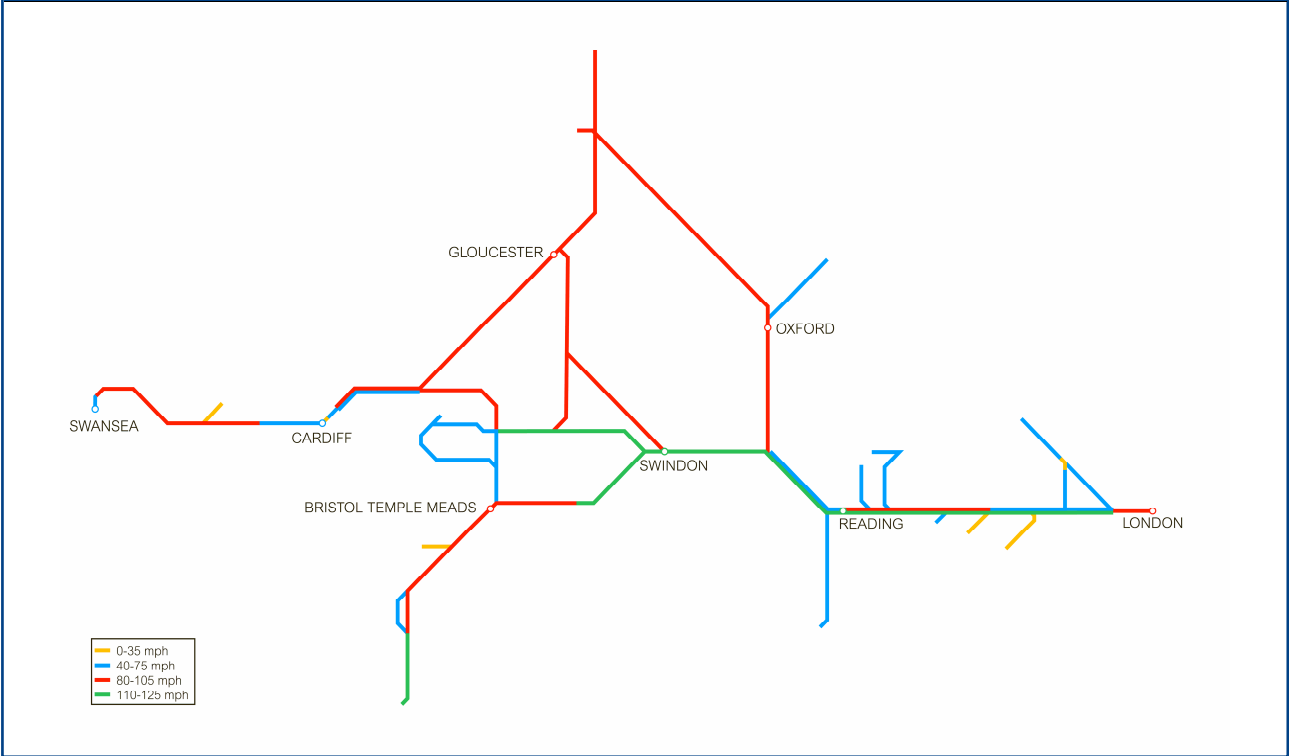


Figure 6 Electrification

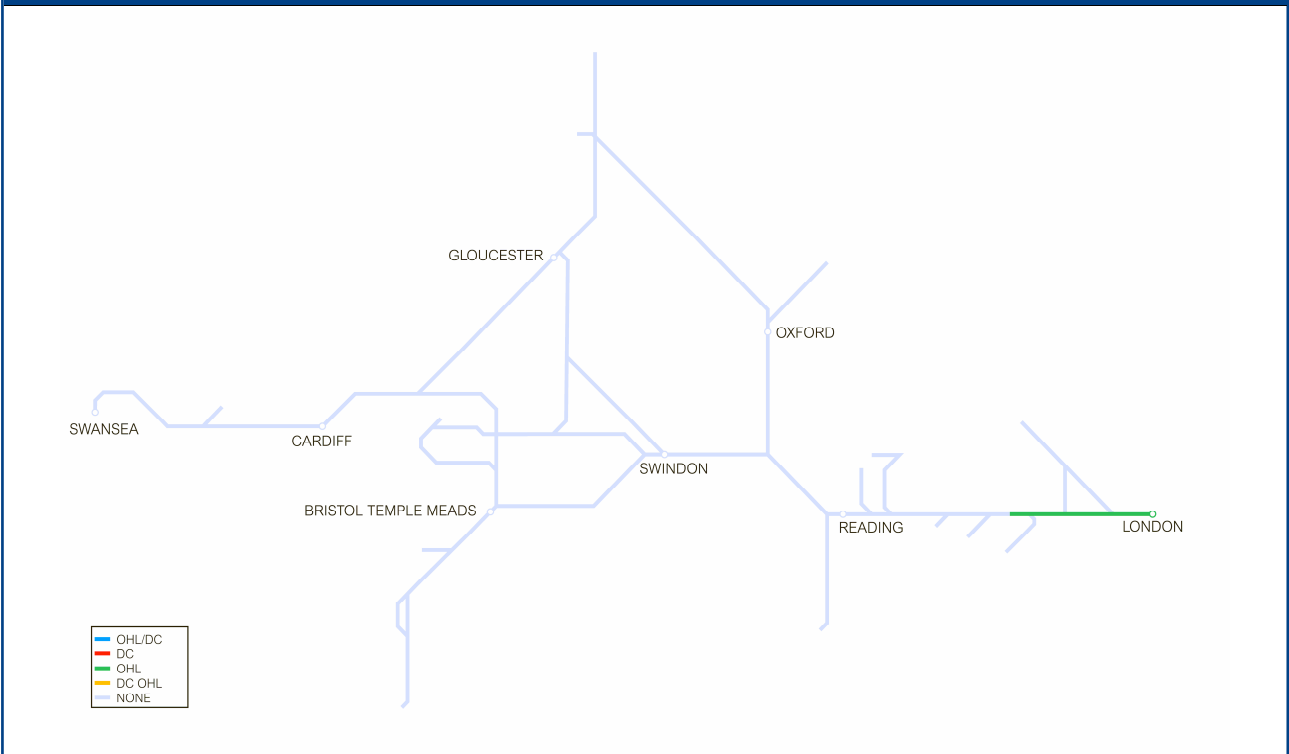


Figure 7 Route availability

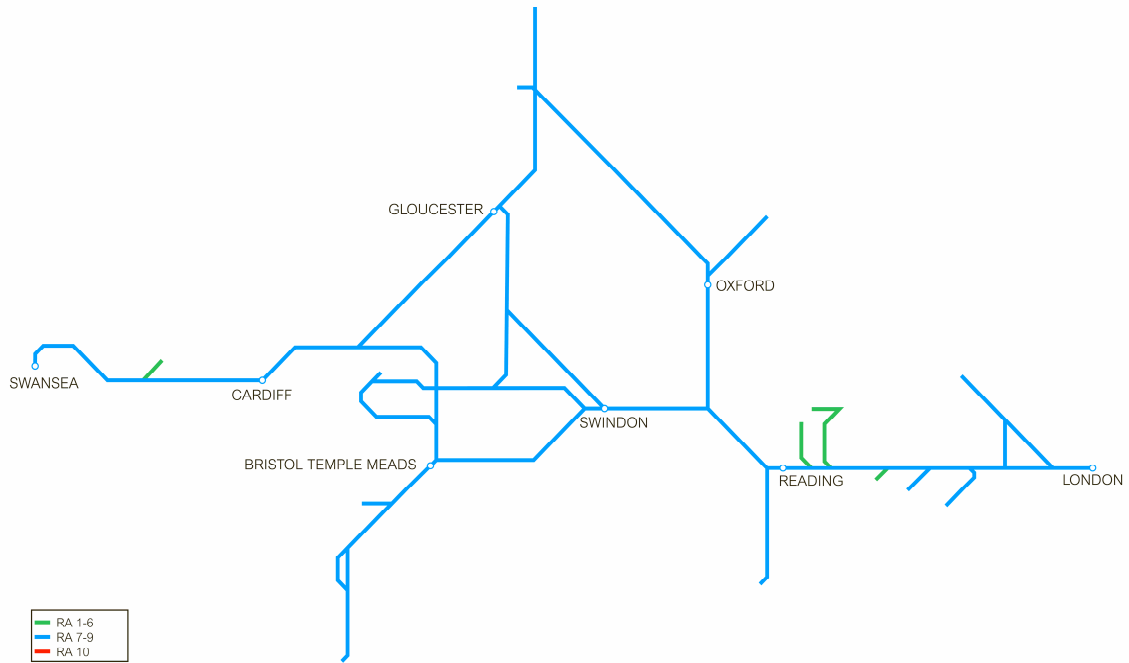
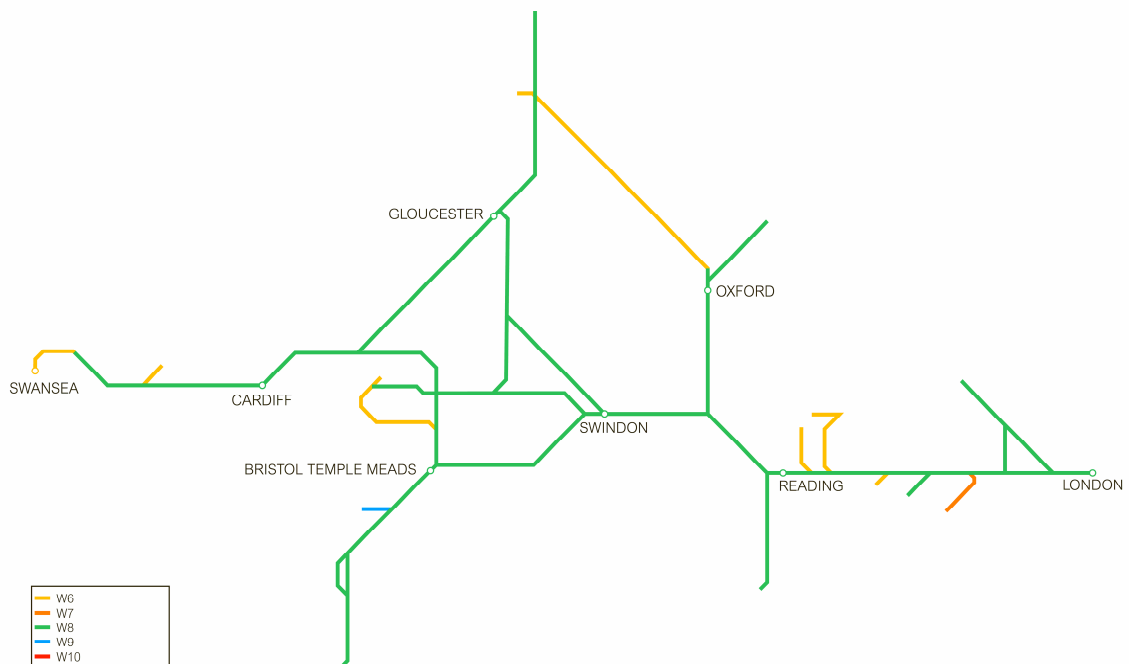


Figure 8 Gauge



Current capacity

Paddington station operates to near capacity throughout the day and to full capacity at peak times with accessibility for long inter city style trains restricted by a number of shorter platforms on the north side of the station and the dedication of two platforms for the electric Heathrow Express service. The recent introduction of the electric Heathrow Connect service, whilst replacing a diesel service, has further reduced available capacity due to the limited number of electrified platforms.

Between Paddington and Reading the route is operating at near capacity for large parts of the day with a Capacity Utilisation Index (CUI) of 84.1%. Whilst the GWML RUS confirms that the number of train services that weave between the main and relief lines has significantly reduced in recent years, further segregation of the main and relief lines will be needed to deliver main line capacity improvements. The GWML RUS also reaffirms that operation of rolling stock of varying speed capabilities, and station calls at Slough on the main lines, inhibit the provision of additional train paths to meet current and future demand. However, the new Greater Western franchise train service specification introduces a ½ hourly stopping service at Slough on the main lines. Relief Line capacity is constrained by the close proximity of some stations and the variable stopping patterns of local passenger trains. Nearly all freight through the inner London area of the route requires access to the Acton yard complex via a single lead connection crossing the Relief Lines amidst the suburban passenger service. This severely restricts the ability to provide additional paths to meet growth.

The Reading station area is a critical 'crossroads' on the east-west and north-south axes for both passenger and freight flows and the lack of available platforms, allied with the aforementioned Paddington constraints, prevent train service

growth to meet current and future passenger demand. The area is further restricted at Reading West Junction where long north-south axis freight services have to cross the GWML at grade.

Between Didcot and Oxford the mix of non stop passenger and freight services with local services calling at little used stations reduces the ability to maximise capacity (CUI 80.8%). The current layout at Oxford station necessitates empty stock movements to cross at the north end of the station between arrival and departure, which restricts flexibility of operation.

Inadequate signal spacing in the Bath to Bristol corridor impacts on the ability to improve the operation of the approaches to both Bristol Temple Meads and Bath Spa stations.

A number of lengthy single line sections, notably, on the Cotswold Line and between Swindon and Kemble and the Weston super Mare loop constrain the ability to improve service provision. The Swindon to Kemble line is also the main diversionary route to and from South Wales when the Severn Tunnel is closed.

With the increasing number of freight services emanating from the Avonmouth terminal complex the GWML's other 'crossroads', Bristol Parkway station to Westerleigh Junction, can become severely congested due the limited number of platforms and track sharing with two distinct main line passenger flows. This also impacts on the route further east towards Didcot.

The 7 minute headway through the 4 mile 628 yards long Severn Tunnel severely reduces the ability to enhance services to and from South Wales and in particular the growth in imported coal traffic from the Avonmouth port complex. Figure 9 shows the current peak hour train service levels on the route.

Figure 9 Current train service level (peak trains per hour)

Route Section	Main Lines	Relief Lines
Paddington – Heathrow Airport Junction	20	12
Heathrow Airport Junction – Reading	16	10
Reading – Didcot	9	7
Didcot – Oxford	7	–
Didcot – Swindon	7	–
Swindon – Gloucester	3	–
Gloucester – Severn Tunnel Junction	2	–
Swindon – Bristol Parkway	4	–
Bristol Parkway – Cardiff	7	5
Cardiff – Swansea	6	–
Swindon – Bristol Temple Meads	6	–
Stoke Works Junction – Bristol Temple Meads	6	–
Bristol Temple Meads – Taunton	7	–

Figure 10 Current PPM MAA (2005/06)

TOC	MAA	As at period
Arriva Trains Wales	80.4%	10
First Great Western	74.8%	10
First Great Western Link	83.0%	10
South West Trains	89.1%	10
Virgin Cross Country	80.2%	10
Wessex Trains	84.6%	10

Current performance

Figure 10 shows the current PPM for the main TOCs running along the route.

The Great Western Joint Board generally meets at three-monthly intervals and comprises representatives of Network Rail, all TOCs using Western route infrastructure, DfT and ORR, and focuses particularly on performance issues at a strategic level.

The GWML continues to suffer from a number of performance issues. A prime cause of delay is the increasing number of temporary speed restrictions imposed throughout the route due to the poor condition of track, which is age related. A sustained programme of track renewal is planned to address this by the end of March 2009.

The Network Rail Route Director, in conjunction with the Territory Maintenance Director, has set up the Western Accelerated Recovery (WAR) project to target poor performing assets and implement 'quick win' remedial action.

To improve operational management Integrated Control Centres at Swindon and Cardiff are being introduced. New signalling centres in the Thames Valley and in South Wales are proposed.

The lack of spare capacity on the route, particularly in the Severn Tunnel/Bristol Parkway and Thames Valley areas, is evident at times of perturbation making service recovery difficult and resulting in greatly extended journey times.

One of the principal objectives of the new Greater Western Franchise, which commences in April 2006, is to provide the basis for a more robust timetable that will improve train service performance throughout the route. This timetable will become operative in December 2006.

Future requirements

Strategic direction

The GWML Route Utilisation Strategy, published by the SRA in June 2005, demonstrates that the Thames Valley and the greater Bristol areas are the key growth areas on the route. Future demand on the routes from South Wales, the greater Bristol area, the Cotswolds, Wiltshire and the Thames Valley to London are expected to grow between 2.6% and 3.3% year on year over until 2012. Although the RUS was developed without any infrastructure enhancement, it is our judgement that capacity enhancement will be required to meet current and long term demand.

The South West Regional Assembly's (SWRA) emerging Regional Spatial Strategy (RSS) covering the period until 2026, will focus on the implementation of an integrated Transport Corridor approach where local authorities will work with the rail industry to develop opportunities to facilitate modal shift, address overcrowding, improve strategic interchanges and improve use of the network to deliver spatial growth and congestion targets. The RSS also recommends that commercial developments which generate high volumes of freight movements should be located close to appropriate rail freight facilities to support more sustainable distribution.

The Greater Bristol Strategic Transport Study, published in 2005 by a partnership of the DfT, Government Office for the South West, South West of England Regional Development Agency and South Gloucestershire, Bath & North East Somerset, Bristol City and North Somerset Councils, reviewed the area's long term transport needs as far ahead as 2031, and recommends that the heavy rail network should be developed as part of the solution for reducing car usage across the heavily congested greater Bristol area road network and to meet the forecast commuter growth for areas to the north and south of the city.

The Welsh Assembly Government will be undertaking the Wales Rail Planning Assessment during 2006, which will inform the Route Utilisation Strategy for Wales. We will start baselining work for the RUS in January 2007.

Sewta (the South East Wales Transport Alliance) is a consortium of ten unitary authorities and works in partnership with the Welsh Assembly Government and Network Rail and the transport operators towards the development of transportation strategies for the region, and coordinates third-party enhancement schemes on the route. There is continuing interest in providing greater capacity and reduced journey times, to offer improved frequencies as an attractive alternative to road to both Newport and to Cardiff thereby seeking to actively increase rail market share. During 2005 a strategic review of Sewta rail policy was carried out in order to create a framework for future investment over the period 2009-2018. The review took account of existing network utilisation and performance issues whilst considering how growth trends might trigger the need for selective enhancement coordinated with the emerging signalling renewals plans for the Newport and Cardiff areas. New stations at Magor with Undy, replacing Severn Tunnel Junction, Llanwern, Coedkernew, St Mellons and Llanharan are proposed.

To address the growing need for additional capacity to meet forecast demand we are in the initial stages of development for schemes at, and between, Paddington, Reading, and Oxford, across the greater Bristol area and in South Wales. These include additional OHL and capacity improvements at Paddington station, relief line speed increases between Paddington and Reading, capacity improvements at Reading and Oxford stations and their approaches; turnback and capacity improvements between Yate and Weston Super Mare and relief line speed increases between Severn Tunnel Junction and Cardiff. Further schemes are detailed in the Infrastructure investment section.

The construction and implementation of Crossrail will have a dramatic effect on the GWML and all other routes that are linked to it. Until the current uncertainties surrounding the project are removed our strategy for the route will be based on a number of assumptions.

Future demand

We anticipate that demand for rail travel throughout the Thames Valley area will grow at least in line with that forecast in the GWML RUS. Drivers for growth include the ODPM's South East Plan housing allocation of about 100,000 houses for the Basingstoke – Reading – Oxford corridor over the next twenty years, and the planned regeneration of commercial and residential property around the Reading station and town centre area, which is forecast to increase peak demand for services into and out of the town.

Growth in outlying major centres off the route will compound the 2.7% year on year growth forecast for the Thames Valley area during the period of the RUS until 2012.

Road congestion in the major towns and cities on the route is forcing local authorities to seek alternative modes of transport to provide a solution, of which rail service enhancement is considered a key option.

Access to London within a two hour journey time is seen as extremely important within the business community and this is achievable from most stations on the route. However, the demand for cross country travel is also on the increase and the re-mapping of the Central Trains and Virgin Cross Country franchises will influence those passenger markets.

With the Olympics being held in London in 2012 demand will manifest itself on two fronts. Firstly the demand for construction materials from the Mendips will see an increase in freight tonnage during the construction phase and secondly, passenger demand is likely to increase during and after the events.

The introduction of Crossrail, as far as Maidenhead, will provide through services to and from the City of London and will impact on travelling patterns along the route and at the Ealing Broadway and Paddington interchanges.

Growth in freight services through the Southampton ports, across the route, to the Midlands, the north of England and Scotland is expected to continue.

Figure 11 Tonnage growth

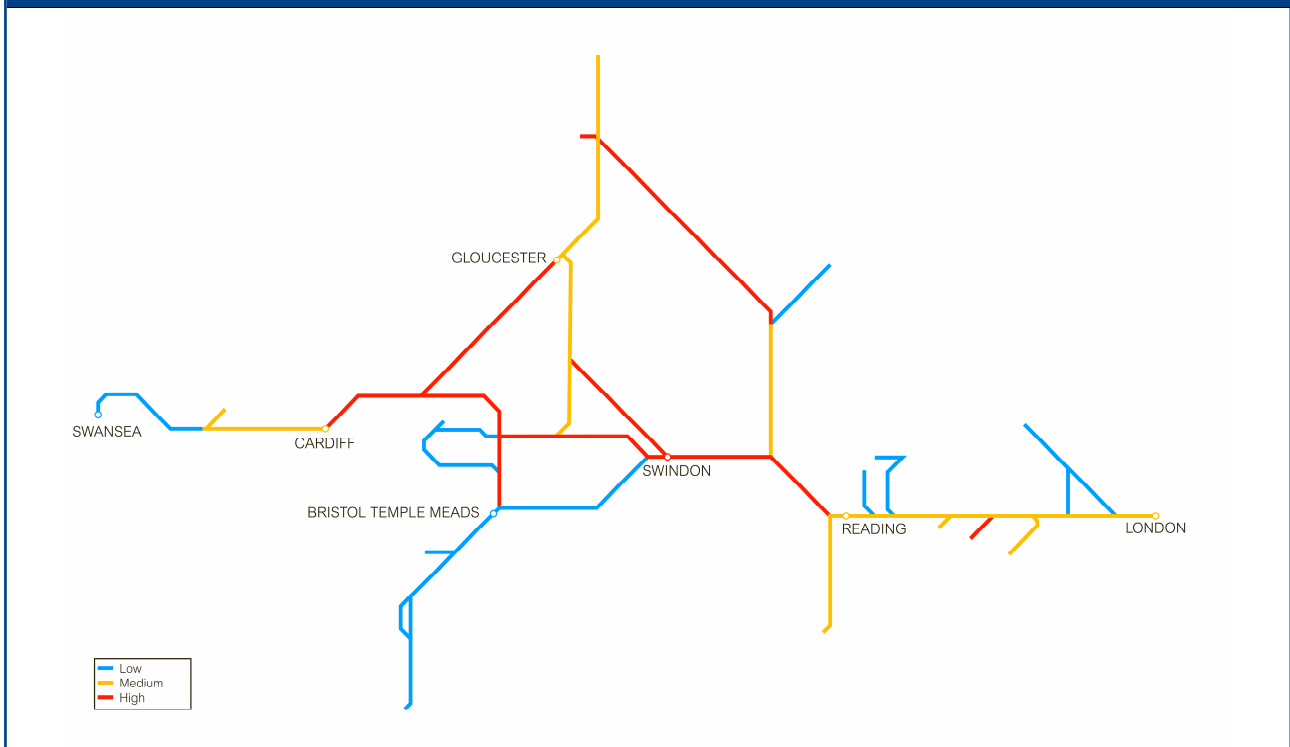


Figure 11 indicates the forecast percentage change in tonnage to 2015.

Future capability

Our proposed strategy for improving the capability and performance of the route between South Wales/Bristol and London consists of implementing a number of smaller enhancements along the route. These include raising the Relief Line speeds between Cardiff and the Severn Tunnel, an additional platform at Bristol Parkway station, shortening signal spacing for the approaches to Bath Spa station, converting the Swindon up goods line to passenger status with a linespeed improvement and line speed improvements to the Relief Lines between Reading and Paddington. These will complement the much larger enhancement of Reading station and its approaches.

A similar proposed strategy for improving the midlands – south west axis could include converting Bromsgrove down goods loop to passenger status with a linespeed increase (Route 17), increasing the entrance speed to the Charfield loops, introducing a turn back facility at Yate, increasing the linespeed approaching Westerleigh Junction from the north, upgrading Worle Junction from a single to a double junction, part redoubling the Worle Junction – Weston super Mare single line, and linespeed improvements between Bristol and Taunton.

The SRA Gauging Policy set out a proposed intermodal freight network cleared for the transportation of 9' 6" high ISO containers. This would impact on the route between Basingstoke and Oxford and major infrastructure investment would be necessary to accommodate both gauge and longer train lengths.

Fragile routes

Network Rail engineers have identified a set of 'Fragile routes' across the country where the addition of any further loco hauled traffic would have a significant impact on the residual life of track and/or structures.

The rail freight industry has recently provided to Network Rail a set of 10 year traffic forecasts, and we are presently assessing their implications. The key route section within this route that has been identified as a fragile route and has clearly defined additional tonnage/train numbers projected by the industry is the Clifton Extension Line (Narrowways Hill Junction – Filton West Junction via Avonmouth).

Future capacity

The GWML, particularly through the Thames Valley operates at capacity at peak times and to near capacity off peak. Reading station is the key component of our strategy to increase capacity and improve performance throughout the GWML.

In line with the GWML RUS, the new Greater Western franchise will introduce revised train formations on key sections of the route, such as the relief line services to relieve overcrowding and accommodate growth in the inner suburban areas.

However, passenger overcrowding on peak time main line services, particularly from Reading with its short journey time to London Paddington will remain unless additional capacity is provided. As a first step First Great Western has started a programme of modernising its High Speed Train carriages which will also provide additional seating capacity. The first set of carriages are planned to enter service within six months of the start of the new Greater Western franchise in April 2006

We believe that increasing platform capacity and remodelling the approaches at Reading station will unlock this well documented 'bottleneck' on the GWML and north – south axes and deliver improved performance and meet longer term growth forecasts.

We are extending the very short and rarely used platform 4 at Newport station to accommodate 8 car HST or 10 car Adelante train sets. This will also provide extra capacity and operational flexibility through the station area and reduce the number of conflicting movements that are currently necessary to a minimum.

We plan to raise speeds on the Relief Lines between the Severn Tunnel and Cardiff to create additional capacity for both freight and local passenger service use, which will free up capacity on the main lines for higher speed services. This also facilitates the development of new stations on the relief lines as proposed by the Sewta rail strategy.

We shall be re-evaluating elements of the former SRA Southampton – West Coast freight upgrade – capacity study, which included revised layout options for Reading West Junction, including a flyover, and upgrading and linking freight loops between Didcot and Oxford.

We have a number of capacity improvement schemes currently undergoing evaluation. These schemes are catalogued in the 'Investment under consideration' appendix.

We shall be maximising the opportunities presented by future major resignalling schemes to reduce signalling headways where possible to improve capacity and performance.

Future performance

In addition to continued improvement in asset reliability, a major focus of attention going forward is the work necessary to devise more robust train timetables. The opportunity arises with the creation of the new Greater Western franchise for Network Rail to work more closely with the train operator to encourage the development of timetables and resource plans that are more robust in terms of recovery from incidents.

First Great Western has started a programme of overhauling its High Speed Train power car fleet with new quieter and more environmentally friendly engines which will provide greater efficiency and reliability. The vast majority of the fleet will be overhauled within two years of the start of the new Greater Western franchise in April 2006. On the Paddington to Bristol and Paddington to Oxford routes High Speed Train sets will be reduced in formation by the removal of the buffet coach. This reduction in train weight will improve performance. However, seating reconfiguration will provide additional seating capacity

The introduction of the new Integrated Control Centres in Swindon and Cardiff will deliver greater operational and performance management benefits for our customers.

The table below shows the forecast reduction in Network Rail delay minutes compared with 2005/06.

Figure 12 shows the forecast PPM for the main TOCs running along the route.

Figure 12 Forecast PPM MAA

TOC	2006/07	2007/08	2008/09
Arriva Trains Wales	83.6%	84.5%	85.2%
First Great Western	77.2%	78.9%	80.3%
First Great Western Link	84.4%	85.5%	86.4%
South West Trains	90.3%	90.5%	90.6%
Virgin Cross Country	81.6%	83.5%	84.3%
Wessex Trains	86.0%	86.7%	87.4%

Figure 13 Forecast reduction in delay minutes

	2006/07	2007/08	2008/09
% reduction in delay minutes	12%	20%	26%

Engineering access

Engineering access on this route varies from being fairly restrictive on the mainline to reasonably available on the branches. In the four-track areas at the London end of the route overnight two-track maintenance possessions are taken for up to eight hours every night. The remainder of the route relies upon a cyclical maintenance strategy, which involves weeknight diversions on some of the key sections.

Under the Efficient Engineering Access (EEA) initiative to reach the optimum balance between network closures against passenger disbenefits, we are planning to improve productivity and make more efficient use of resources by undertaking more maintenance and renewal work during the week through longer mid-week night possessions and reducing the peak workload which has traditionally occurred at weekends. We also plan to seek agreement with train operators for more daytime mid-week closures of sections of main lines where suitable diversionary routes exist and substantial opportunities for efficiency improvement and cost reduction can be identified.

The vast majority of renewals and enhancement work is undertaken at weekends and the track possession plan is constructed on a region wide basis to ensure that on most weekends at least one route is available from London to Bristol and South Wales. This possession strategy also needs to intertwine with other key routes throughout the rest of the country.

Opportunities and challenges

Consideration is being given to installing additional overhead line equipment (OHL) to the unwired platforms at Paddington station to deliver greater flexibility of operation. This could provide an alternative base for Heathrow Express services at platforms 2 and 3, with platform 1 dedicated to a future fast Reading shuttle service. The middle range platforms would then provide the base for long-distance inter city services.

We shall be maximising the opportunities arising from major resignalling schemes to modernise the route to meet current and future demand with extensive changes in South Wales and the Reading area.

As an example we shall be simplifying the track layout between Severn Tunnel Junction and Cardiff Central to gain faster approaches to stations and the Severn Tunnel. We shall also be increasing the linespeeds on the Relief Lines from the current mix of 40 mph and 60 mph to a near constant 70 mph, with the exception of the Bishton Flyover area. In

doing so, we will facilitate the aspirations of the Welsh Assembly Government for new stations on the Relief Lines at Magor with Undy, Llanwern and Coedkernew, with the former possibly replacing Severn Tunnel Junction station. New stations at St Mellons and Llanharan are also being considered. The higher Relief Line speeds will provide better opportunities for freight and encourage local services off the main lines, freeing up capacity on those lines. We shall also make provision for an additional platform at Cardiff Central to serve the Valley Lines.

Similarly we shall seek to modernise the layout in the Reading station area to accommodate an enhanced station to meet the growing demand currently experienced and forecast for the future. This may include the reopening of the Reading East underpass for potential use by Airtrack or diversion of the current diesel services from the Waterloo lines, enabling connection of platforms 4a and 4b to the GWML.

To meet the challenge of increased growth in freight from the Southampton ports to the Midlands, the north of England and Scotland, we will also be exploring the opportunities arising from the Thames Valley signalling renewal programme to increase freight capacity and engineering access in the Reading West Junction area and between Didcot and Oxford.

The construction of Crossrail and its operation will present the greatest challenge on the route since the upgrade for 125 mph running in the 1970s. Crossrail will have a major impact not only within its boundaries but throughout the route. However, the project will potentially deliver many station facility and infrastructure improvements.

We shall be examining the potential to increase linespeeds on the cross country sections of the route. However, five automatic half barrier level crossings to the north of Cheltenham currently restrict linespeed to 100 mph through that area.

Delivering future requirements

Expenditure

The age of rail and sleepers on the route is amongst the highest on the national network and varies between 30 and 40 years old. To address this we are implementing a track renewals strategy which matches the traffic usage of the route. This will include the deployment of Network Rail's new High Output equipment on the most intensely used parts of the route between London and Bristol (via Bath Spa and via Bristol Parkway) and between Bromsgrove and Taunton to deliver a higher track quality with absolute minimum rail failures; more

conventional targeted renewals will be carried out on other less intensely used sections, with patch repairs and renewals to maintain stable infrastructure on the branch lines.

Figure 14 shows the planned level of expenditure on renewals on this route over the next three years. However, the precise timing and scope of renewals remains subject to review to enable us to meet our overall obligations as efficiently as possible consistent with the reasonable requirements of operators and other stakeholders.

Figure 14 Forecast expenditure

£m (05/06 prices)	2006/07	2007/08	2008/09
Renewals			
Track			
Plain Line	92	79	74
S&C	11	11	10
Track Total	102	90	85
Civils			
Underbridges	1	3	5
Overbridges	1	0	2
Bridgeguard 3	2	0	–
Footbridges	0	0	1
Earthworks	14	12	11
Tunnels	1	1	–
Culverts	0	0	–
Coastal & estuary defence	–	–	1
Retaining walls	–	0	1
Other	–	0	2
Civils Total	19	17	22
Signalling			
Resignalling	28	42	33
Minor works/other	8	6	2
Signalling Total	35	48	35
Telecoms			
Concentrators: large	3	1	1
Concentrators: small	0	–	–
CIS systems	0	1	2
Telecoms cables	–	1	1
Other	0	2	0
Telecoms Total	3	4	3
Plant and machinery			
Fixed plant	1	3	3
Point heating	3	0	0
Plant Total	4	3	3

Operational property			
Stations	4	7	20
Light maintenance depots	0	–	–
Lineside buildings	1	0	–
Operational property Total	5	7	20
Other Renewals			
Maintenance delivery unit depots	0	–	–
Other Renewals Total	0	–	–
Total Renewals	169	169	167
Enhancements (funded by)			
Network Rail (RAB)			
Bristol Parkway new platform	3	–	–
Newport station regeneration	0	3	6
South Wales relief line linespeed upgrades	0	3	4
Weston Super Mare/Worle Junction enhancements	–	–	3
Worle Junction enhancements	1	4	–
Other	1	–	–
Network Rail (RAB) Total	5	9	13
Welsh Assembly			
Llanharan new station	2	1	–
Newport station regeneration	0	5	–
Other	1	–	–
Welsh Assembly Total	3	6	–
Other Third Party			
Greater Western Franchise (Marsh Junction depot)	8	–	–
Greater Western Franchise (other items)	4	8	8
Heathrow Terminal 5	12	5	–
Southampton – West Coast	0	4	19
Other	0	0	0
Other Third Party Total	24	16	27
Total Enhancements	32	31	40

Figure 15 Forecast volumes

	2006/07	2007/08	2008/09
Track			
Rail (km)	151	142	142
Sleepers (km)	152	144	144
Ballast (km)	153	145	145
Switches & crossings (no)			
Complete renewal	52	59	59
Partial renewal/reballasting	3	3	3
Abandonment	10	11	11
Civils			
Underbridges (square metres)	375	1,313	1,992
Overbridges (square metres)	633	64	1,083
Footbridge (square metres)	101	37	106
Embankments (square metres)	105,283	120,459	143,788
Tunnels (square metres)	3,454	225	–
Culverts (square metres)	1	22	–
Coastal & estuary defence (linear metres)	–	–	1,005
Retaining walls (square metres)	–	60	724
Signalling			
Resignalling (SEUs)	–	208	127
Telecoms			
Concentrators: large (no)	6	–	2
Concentrators: small (no)	1	–	–
CIS systems (stations)	–	–	72
Plant and machinery			
Point heating (point end)	133	27	25

The planned volume of renewals is detailed in Figure 15. It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of overplanning in our work banks. As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small proportion of the activities in these areas will slip to subsequent years.

Maintenance

Figure 16 shows the planned level of expenditure on maintenance on this route over the next three years.

Figure 16 Forecast expenditure

£m (05/06 prices)	2006/07	2007/08	2008/09
Maintenance	60	55	51

Infrastructure investment

Figure 17 highlights committed schemes that are planned for completion in the financial year shown.

Figure 17 Planned infrastructure investment							
Project	Scope	Enhancement or output change	Main asset type(s)	Third Party Funding	GRIP stage	Completion year	
A	Swindon Up Goods Conversion to passenger status with linespeed increase	Improved station approach speed and performance	Track, signals	None	4	2006	
B	Marsh Junction Depot Development of the former DMU depot	New servicing facility for First Great Western DMUs	Civils	First Great Western franchise commitment		2006	
C	Goring Wallingford Road, over bridge repairs	Improved reliability of asset	Civils	None	3	2006/07	
A	Swindon PSB SPT concentrator renewal	Improved reliability of asset	Telecoms	None	1	2006/07	
D	Westerleigh East Embankment stabilisation	Improved reliability of asset	Civils	None	3	2006/07	
D	Westerleigh North Embankment stabilisation	Improved reliability of asset and removal of speed restriction	Civils	None	3	2006/07	
D	Coalpit Heath Embankment stabilisation	Improved reliability of asset and removal of speed restriction	Civils	None	3	2006/07	
E	Sudbrook Pumping station	Decommissioning of water treatment plant	Property	None	4	2006/07	
F	Newport PSB SPT concentrator renewal	Improved reliability of asset	Telecoms	None	1	2006/07	
H	Langley Burrell Embankment stabilisation	Improved reliability of asset and removal of speed restriction	Civils	None	3	2006/07	
I	Bristol PSB SPT concentrator renewal	Improved reliability of asset	Telecoms	None	1	2007/08	

Figure 17 Planned infrastructure investment							
Project	Scope	Enhancement or output change	Main asset type(s)	Third Party Funding	GRIP stage	Completion year	
● Flax Bourton	Embankment stabilisation	Improved reliability of asset	Civils	None	3	2006/07	
● Track Renewals	S&C renewals are planned at Southall West, Didcot East, Rushey Platt, Wootton Bassett, Chipping Sodbury, Bedminster, Highbridge and Bridgwater	Improved reliability of asset	Track	None		2006/07	
● Track Renewals	Plain line renewals are planned at Didcot East, Shipton, Woolaston, Awre and Llisbury	Improved reliability of asset	Track	None		2006/07	
● Paddington station	Span 4 roof drainage and platform works	Improved reliability of asset	Property	None	1	2006/12	
● Paddington station	Additional OHL for platforms 12 to 14	Improved station operational flexibility and performance	Electrification	None		2007	
● Paddington – Reading Relief Lines	Linespeed increase	Up to 90% of the route increased up to 90 mph	Track, signals	First Great Western franchise commitment		2007	
● Reading Green Park station	New station	New station adjacent to the M4 motorway Junction 11 commercial area	Civils	Developer	4	2007	
● Bristol Parkway station	Provision of a 3 rd platform	Improved station operation and performance	Civils	None	4	2007	
● Newport station	Platform 4 extension	Accommodate 10 car trains and improve capacity and operation of the station area	Civils	None	5	2007	
● Ebbw Valley railway	Convert former freight only line to passenger status	Provision of 6 new stations on 18 miles of single line with a 3 mile long passing loop	Civils, track, signals	WAG	5	2007	

Figure 17 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party Funding	GRIP stage	Completion year
Port Talbot East Area Signalling Renewal (PASR)	Resignalling scheme with track layout modernisation	Improved asset condition and performance with provision for a new station at Llanharan	Signals, track	None	5	2007
Paddington station	High voltage equipment renewals	Improved reliability of asset	Plant	None	2	2007/08
Slough PSB & IECC	Concentrator renewals	Improved reliability of asset	Telecoms	None	1	2007/08
Honeybourne	Embankment stabilisation	Improved reliability of asset	Civils	None	1	2007/08
Evesham	Relocation of signalling token machine from the signal box to the station platform	Improved performance by removing the need to stop outside Evesham signal box to pick up/set down the single line token	Signals	None		2007/08
Sapperton	Tunnel repairs	Improved reliability of asset	Civils	None	1	2007/08
Severn Tunnel East	Cutting stabilisation	Improved reliability of asset	Civils	None	5	2007/08
Dauntsey Bank	Embankment stabilisation	Improved reliability of asset	Civils	None	1	2007/08
Christian Malford	Embankment stabilisation	Improved reliability of asset and removal of speed restriction	Civils	None	1	2007/08

Figure 17 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party Funding	GRIP stage	Completion year
U Tredington	Embankment stabilisation	Improved reliability of asset and removal of speed restriction	Civils	None	1	2007/08
V Track Renewals	S&C renewals are planned at Didcot East, Foxhall Junction, Oxford station south, Newport West and Stoke Works Junction	Improved reliability of asset	Track	None		2007/08
W Track Renewals	Plain line renewals are planned at Goring (down relief lines), Wolvercot Junction and Norton Junction	Improved reliability of asset	Track	None		2007/08
A Swindon station area	Track layout modernisation for the Kemble line (double track section), Swindon station area and east Swindon approaches and sidings	Improved station approaches and modernised siding facilities Improved asset condition and performance	Track, signals	None	1	2007/08
X Maidenhead station	Extension of down main line platform	Platform to accommodate 2+8 HST during two-track railway operation for engineering work only	Civils	First Great Western franchise commitment		2008
O Basingstoke Area Signalling Renewal (BASR)	Conversion of two aspect signalling to three aspect signalling	Improved capacity between Basingstoke and Southcote Junction	Signals	None		2008
V Worle Junction	Junction upgrade	Increased capacity and performance onto and off the Weston Super Mare loop	Track, signals	None		2008

Figure 17 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party Funding	GRIP stage	Completion year
Z	Kensal Green Wash Plant Renewal	Improved asset condition and performance	Property	First Great Western	1	2008/09
O	Pound Green Embankment strengthening works	Improved asset condition and performance	Civils	None		2008/09
E	Severn Tunnel Cable hanger route renewal	Improved reliability of asset	Telecoms	None	1	2008/09
E	Severn Tunnel Communication system renewal	Improved reliability of asset	Telecoms	None	1	2008/09
G	Cardiff PSB SPT concentrator renewal	Improved reliability of asset	Telecoms	None	1	2008/09
W	Severn Tunnel Junction – Relief lines speed increases from 14 miles @ 40 mph & 3 miles @ 60 mph to 1 mile @ 50 mph & 16 miles @ 70/75 mph	Improved Relief Lines capacity to encourage freight and local services off the main lines to release capacity and improve performance on the main lines Facilitates new Relief Line stations proposed in Sewta rail strategy	Track	None		2009
F	Newport station Station regeneration	Major station upgrade in time for the Ryder Cup in 2010	Civils	WAG	2	2009
F	Newport Area Signalling Renewal (NASR) Phase 1 Resignalling scheme with provision for track layout and station modernisation	Modernised track layout throughout the Severn Tunnel Junction – Newport area and north towards Llantarnam, with increased bi-directional signalling Provision for new stations on the relief lines Relief line speed increases Improved asset condition and performance	Signals	None	3	2010

Figure 17 Planned infrastructure investment

Project	Scope	Enhancement or output change	Main asset type(s)	Third Party Funding	GRIP stage	Completion year
<p>G Cardiff Area Signalling Renewal (CASR)</p>	Resignalling scheme with provision for track layout and station modernisation	<p>Modernised track layout throughout the Cardiff Central and Queen Street station areas with increased bi-directional signalling</p> <p>Provision for additional Valley Lines platform 8</p> <p>Enable Cardiff Central platform 0 to be used for loaded trains from the west</p> <p>Relief line speed increases</p> <p>Improved asset condition and performance</p>	Signals	None	3	2012
<p>F Newport Area Signalling Renewal (NASR) Phase 2</p>	Resignalling scheme with provision for track layout and station modernisation	<p>Modernised track layout to the east of Severn Tunnel Junction to towards Chepstow and Gloucester, and north of Llantarnam towards Little Mill and the southern end of the Ebbw Valley lines at Park Junction</p> <p>Provision for new stations</p> <p>Improved asset condition and performance</p>	Signals	None	3	2013
<p>C Reading Area Signalling Renewal (RASR)</p>	Resignalling scheme with provision for track layout and station modernisation	<p>Modernised track layout throughout the Reading station area with increased bi-directional signalling</p> <p>Provision for additional and reconfigured platforms</p> <p>Improved asset condition and performance</p>	Signals, track, civils	None	1	2013

Figure 17 Planned infrastructure investment


Project	Scope	Enhancement or output change	Main asset type(s)	Third Party Funding	GRIP stage	Completion year
 Oxford Area Signalling Renewal (OASR)	Resignalling scheme with provision for track layout and station modernisation	Modernised track layout to the north and south of Oxford station Provision for an additional platform Improved asset condition and performance	Signals, track, civils	Network Rail & Local Authority	1	2014

Figure 18 highlights uncommitted schemes under development.

Figure 18 Infrastructure investment under consideration					
Project	Scope	Enhancement or output change	Main asset type(s)	Status	
🚂	Paddington station Install additional OHL on platforms 1 & 2	Increased platform operational flexibility by transferring Heathrow Express from platforms 6 and 7, leaving central platforms for long distance services	Civils, track and signals	Under consideration	
🚂	Paddington station Platform extensions & additional platform	Accommodation for longer trains	Civils, track and signals	Under consideration	
🚂	Heathrow Airport Junction – Reading	Capacity improvement	Signals	Under consideration Aligned to Reading Area Signalling Renewal	
🚂	Reading East Underpass	Facilitate the diversion of diesel services from platforms 4a and 4b.	Civils, track and signals	Under consideration Aligned to Reading Area Signalling Renewal	
🚂	Reading station Capacity and performance enhancement	Connect platforms 4a and 4b to GWML to facilitate a future Paddington and Reading high speed shuttle	Civils, track and signals	Under consideration Aligned to Reading Area Signalling Renewal	
🚂	Reading station Capacity and performance enhancement	Additional platforms with revised track layout for the station approaches	Civils, track and signals	Joint working party with Reading Borough Council evaluating options Aligned to Reading Area Signalling Renewal	
🚂	Reading West Junction Flyover Flyover linking Oxford Road Junction to the relief lines near Tilehurst East Junction	Conflict free movement for long intermodal freight trains releasing capacity on the GWML.	Civils, track and signals	Under consideration Aligned to Reading Area Signalling Renewal	
🚂	Reading – Didcot Reduced main line headways	Capacity improvement	Signals	Under consideration Aligned to Reading Area Signalling Renewal	


Figure 18 Infrastructure investment under consideration

Project	Scope	Enhancement or output change	Main asset type(s)	Status
Ⓐ Basingstoke – Oxford	Gauge enhancement	Gauge clearance for conveyance of 9' 6" containers	Civils, track	Under consideration
Ⓐ Didcot – Oxford	Upgrading and linking of freight loops	Linked freight loops for improved freight capacity and engineering access	Track	Under consideration
Ⓐ Oxford station	Capacity and performance enhancement	Additional platform at the south end of the current station to accommodate trains turning round from the south. Simplified track layout for the northern approaches to the station to facilitate improved operation of the Bicester branch, and upgrade of the Up Goods Loop to passenger status	Civils, track and signals	Joint working party with Oxfordshire County Council evaluating options. Aligned to Oxford Area Signalling Renewal
Ⓐ Swindon – Kemble	Redoubling of the single line	Capacity enhancement of this key traffic and diversionary route for South Wales	Track, signals	Under consideration as an alternative to the reinstatement of Westerleigh east curve
Ⓐ Swindon – Standish	Reduced headways	Capacity improvement	Signals	Under consideration
Ⓐ Severn Tunnel Junction	Station relocation	Relocated to new site at Magor with Undy, with improved parking facilities	Civils	Network Rail proposal under consideration
Ⓐ Magor with Undy	New station on the relief lines	New station with parking facilities adjacent to the M4 motorway	Civils	Proposed under Sewta rail strategy.
Ⓐ Llanwern	New station on the relief lines	New station with parking facilities	Civils	Proposed under Sewta rail strategy.
Ⓐ Coedkernew	New station on the relief lines	New station with parking facilities	Civils	Proposed under Sewta rail strategy.
Ⓐ St Mellons	New station on the relief lines	New station with parking facilities	Civils	Proposed under Sewta rail strategy.

Figure 18 Infrastructure investment under consideration

Project	Scope	Enhancement or output change	Main asset type(s)	Status
Ⓒ	Cardiff station area Capacity and performance enhancement	Simplified track layout for the approaches to the station to provide improved operational flexibility and additional capacity Provision for an additional Valley Lines platform Enable Cardiff Central platform 0 to be used for loaded trains from the west Turn back facility for trains arriving and departing via the east end	Civils, track and signals	Joint working party with Welsh Assembly Government evaluating options. Aligned to Cardiff Area Signalling Renewal
Ⓐ	Llanharan New station	New station with parking facilities	Civils	Proposed under Sewta rail strategy.
Ⓐ	Llantrisant – Beddau New railway line	New railway with four new stations	Track	Proposed under Sewta rail strategy
Ⓐ	Bath Spa station Additional signals	Improved capacity and performance	Signals	Under consideration
Ⓐ	Worcester Parkway New station	New station with park and ride facilities to accommodate long inter-city trains	Civils	Proposed by Worcestershire County Council.
Ⓐ	Gloucester Parkway New station	New station with park and ride facilities to accommodate long inter city trains	Civils	Proposed by Gloucestershire County Council.
Ⓐ	Yate station Turn back facility	Facilitate growth for enhanced cross Bristol service	Signals, track	Under consideration
Ⓐ	Charfield Loops Increase entrance and loop speeds	Improved performance	Track	Under consideration
Ⓓ	Westerleigh Junction Reinstate the east curve	Diversions route for South Wales, and Birmingham to GWML	Track, signals	Under consideration as an alternative to the potential Swindon – Kemble redoubling
Ⓜ	Worle station Development of station to a 'Parkway' type	Extended platforms to accommodate long inter city trains	Civils	Proposed by North Somerset Council
Ⓜ	Weston Super Mare Reinstate the bay	Facilitate growth for enhanced cross Bristol service	Signals, track	Under consideration

Figure 18 Infrastructure investment under consideration

Project	Scope	Enhancement or output change	Main asset type(s)	Status
	platform			
 Stoke Works – Taunton	Linespeed upgrade	Improved performance and journey times	Track	Under consideration

Non infrastructure developments

Figure 19 shows potential developments which do not involve changes to the infrastructure.

Figure 19 Timetable development

Description	Key issues	Actions or options being developed	Benefits	Target timetable implementation
Greater Western Franchise	Proposed timetable specification	Timetable specification review	Improved performance	December 2006
Greater Western Franchise	Trains stopping at Slough on the main lines reducing capacity and constraining growth	Timetable specification review	Alternative provision for Slough fast services	December 2006
Central Re-mapping and re-specification	Re-mapping of Central and Cross Country franchises.	Timetable specification review	Improved pattern of service	December 2007 & December 2008
Theory of Constraints	Key capacity and performance constrained locations	Analysis of locations	Improved capacity and performance	December 2007

Figure 20 Other projects

Description	Key issues	Actions or options being developed	Benefits	Start Date
Smartcard introduction	Revenue protection and flexible ticketing	TfL/ATOC to take forward	Revenue increase and potentially demand management improvements	

Appendix

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference and RA is Route Availability.												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway	No of Tracks
13.01	Paddington – Airport Junction	MLN1	Primary	DfT	No	W8	8	125(90)	25kV	TCB	2.5	4
13.02	Airport Junction – Southcote Junction	MLN1, BKE	Primary	DfT	No	W8	8	125(75)	none	TCB	3	4
13.03	Reading – Didcot	MLN1	Primary	DfT	No	W8	8	125(100)	none	TCB	4	4
13.04	Didcot – Border (nr Piling)	MLN1, SWB	Primary	DfT	No	W8	8	125	none	TCB	4	2
13.05	Border (nr Piling) – Swansea	SWB,BSW, SWM2,SWA	Primary	DfT	No	W8, W6A	8	90(60)	none	TCB	7,4	2
13.06	Wotton Bassett Junction – Cogload Junction (via Bristol Temple Meads) – Filton Junction	MLN1, BSW	Primary	DfT	No	W8	8	100	none	TCB	4	2
13.07	Didcot Junction – Wolvercot Junction	DEC, DCL	Primary	DfT	No	W8	8	90	none	TCB	4	2
13.08	Bristol – Birmingham Line	YAT,BGL2, CHL,BAG2	Primary	DfT	No	W8	8	100	none	TCB	4	2

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference and RA is Route Availability.												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway	No of Tracks
13.09	Heathrow Airport	HAL	(owned by BAA)	DfT	No	W6A	8	80	25kV	TCB	2.5	2
13.10	Greenford Lines	WEL1,GEC, HAN	LSE	DfT	No	W8	8	40	none	TCB	6	2
13.11	Southcote Junction – Basingstoke Junction	BKE	LSE	DfT	No	W8	8	90	none	TCB	4 – 4.5	2
13.12	Swindon Junction – Standish Junction	SWM1	Secondary	DfT	No	W8	8	90	none	TCB	(AB)	single/2
13.13	Cotswolds Line	OWW	Secondary	DfT	No	W6A	7	90	none	Mech.	(AB)	single/2
13.14	Border (Chepstow) – Gloucester	SWM2	Secondary	DfT	No	W8	8	90	none	TCB	4	2
13.15	Weston–Super–Mare Loop	WSM	Secondary	DfT	No	W8	8	90	none	TCB	4	single
13.16	Severn Tunnel Junction – Border (Chepstow)	SWM2	Secondary	DfT	No	W8	8	90	none	TCB	4	2
13.17	Ebbw Vale Line	GAE, WVL	FOL	DfT	No	W8	8	tba	none	OTW	(AB)	1

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference and RA is Route Availability.												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway	No of Tracks
13.18	Henley-on-Thames Branch	HEN	Rural	DfT	Yes	W6A	6	50	none	OTW	(AB)	1
13.19	Marlow Branch	WBB, MWB	Rural	DfT	Yes	W6A	6	50	none	OTW	(AB)	1
13.20	Windsor and Eton Branch	WIN	Rural	DfT	Yes	W6A	6	50	none	OTW	(AB)	1
13.21	Bicester Town branch	OXD	Rural	DfT	Yes	W8	7	40	none	OTW	(TB)	1
13.22	Avonmouth Branch	CNX, AMB	Rural	DfT	Yes	W6A	7	60	none	OTW	(AB)	1
13.23	Freight Lines (England)			DfT	No				none			
13.24	Freight Lines (Wales)			DfT	No				none			

Capacity and operational constraints

- A Paddington station: platform configuration and OHL
- B Acton West Junction: single lead junction
- C Variable relief line speeds between Paddington and Reading
- D Reading station: flat junctions and restricted platform capacity
- E Reading West Curve and Junction: Short length curve and junction crossing main and relief lines at grade
- F Didcot – Oxford: two track section capacity limitations with little used stations
- F Oxford – Worcester: single track sections limit capacity and flexibility
- G Swindon – Kemble: 14 miles of single line limit capacity and flexibility
- G Kemble – Standish Junction: 14 minute headways limit capacity
- H Westerleigh Junction – Bristol Parkway: two track section on highly utilised converging route
- I Severn Tunnel: 7 minute headways limit capacity
- J Severn Tunnel Junction – Cardiff: variable relief line speeds restrict capacity
- K Weston Super Mare loop: single line restricts capacity and flexibility
- L 5 AHB level crossings north of Cheltenham restrict linespeed to 100 mph

Other issues on the route

- 1 Heathrow terminal 5 and 3rd runway
- 2 Crossrail: construction and decision on final destination (Maidenhead or Reading)
- 3 ERTMS pilot scheme on the GWML
- 4 East – West Railway