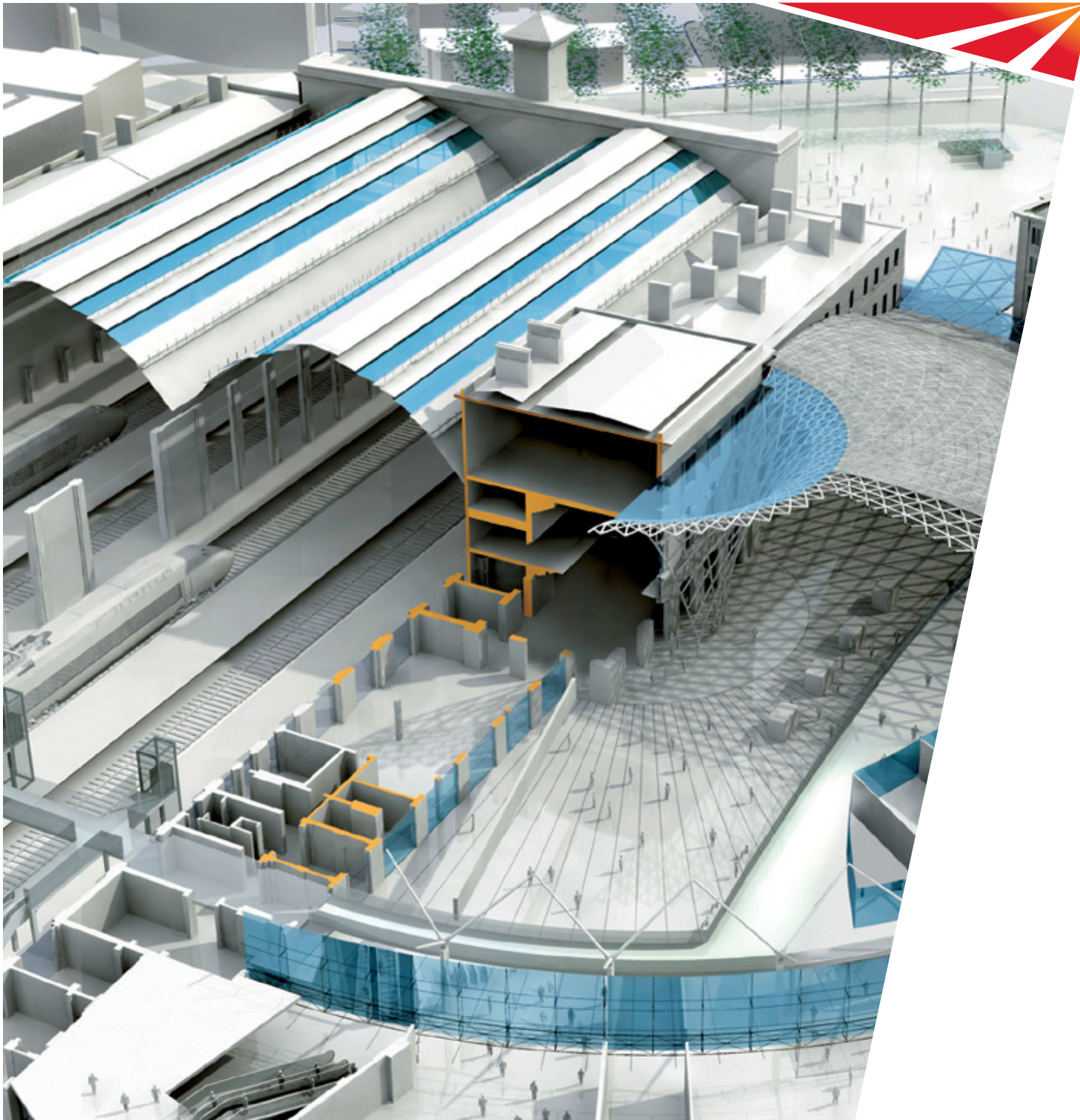


Moving ahead Planning tomorrow's railways

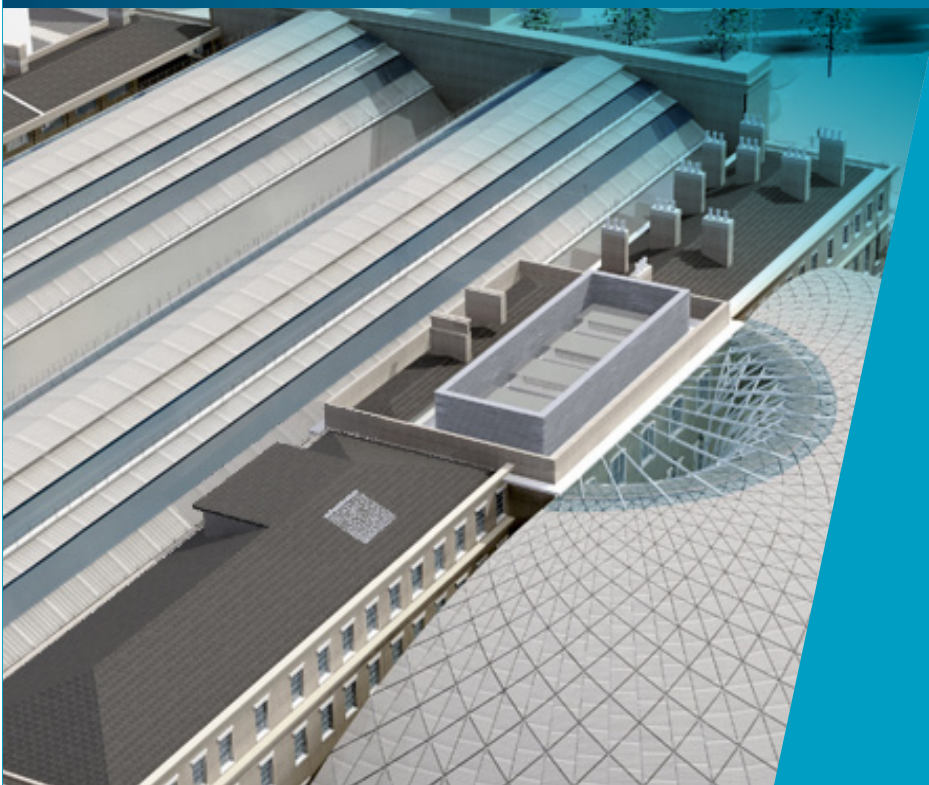
NetworkRail



*Our railways play a vital role
in building Britain's future*

Planning tomorrow's railways

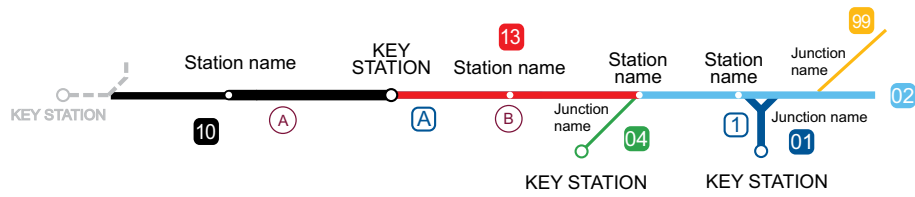
Our £500 million investment in King's Cross station will transform the experience of passengers using the station. We are delivering hundreds of projects across the network to build a bigger, better railway for passengers, freight and the whole of Britain.



Route Plan L
Wales



Key to route diagrams



A Capacity and operational constraints
Location: capacity or operational constraint

1 Issues on the route
Location: issue on the route

A Key planned projects
Location: planned project on the route

01 Strategic route sections
Listed in the appendix of the route plan

Other symbols

	Key station location
	Key station on this route
	Key station on another route
	Other station location
	Other station on this route
	Junction / other landmark

Track descriptions

	Primary
	London and South East commuter
	Secondary
	Rural
	Freight only

The line shading indicates strategic route sections which are numbered on the map

	Multiple track
	Double track
	Single track

Other lines are shown as follows:

	Line on other route
	Non Network Rail infrastructure
	Non operational line

Section 1: Today's railway

Route context

The three major west – east routes that link south Wales, mid-Wales and north Wales with England are also linked to one another by the long distance route along the border counties which lies mainly in England, but crosses in and out of Wales. Together these constitute the basis of the national network and join Carmarthen, Swansea, Cardiff and Newport through Hereford, Shrewsbury and Wrexham to Chester, Bangor and Holyhead. In addition to the inter-city type services which run between Swansea and London Paddington, and Holyhead/Bangor and London Euston, mid-Wales is linked to the west Midlands by regular-interval trains running from Aberystwyth and Machynlleth to Shrewsbury and Birmingham International, giving wide connectivity within and beyond the borders of Wales.

As well as the role played by the route in providing for these long distance links with London, regional services within Wales on the west – east routes in south and north Wales also stretch beyond Wales to connect to the main cities of Bristol, on the cross country axis to Gloucester, Birmingham and Nottingham, and to Manchester respectively.

Much of this extensive route lies in the rural counties of Wales and its role and usage there reflects the demographic features of numerous small towns and generally low population densities, which look to the regional centres and cities. Feeding the west – east routes across Wales are sections of a more rural character which include branch lines in west Wales to Tenby and Pembroke Dock, and to Fishguard Harbour (to serve the Irish ferry route to Rosslare) which both link to Carmarthen, and the 90-mile long “Heart of Wales” route from Llanelli through Llandeilo and Llandrindod Wells to Craven Arms. In mid-Wales the Cambrian Coast line between Dyfi Junction and Pwllheli provides lifeline rural services with a key role in carrying schools traffic flows. In north Wales the Blaenau Ffestiniog branch serves the rural area south of Conwy whilst the Wrexham to Bidston “Borderlands” route links more diverse settlements with urban Wirral.

As well as this network spanning much of Wales in urban south-east Wales the cluster of lines known locally as the Cardiff Valley lines form the South Wales Valleys route. These radiate from the capital city of Cardiff but operationally are practically self-contained from the Welsh main line network. This is essentially a busy urban passenger network which has been experiencing gradual expansion since the

late 1980s. Four sections stretch out northwards to the heads of the valleys at Treherbert, Aberdare, Merthyr and Rhymney whilst to the south and west of Cardiff lies the Vale of Glamorgan and Penarth, Barry and Bridgend, plus the rapidly growing Cardiff Bay area to the south of the city centre. A key strength of the Valleys route is its excellent penetration of the city centre of Cardiff, for retail and employment purposes. As the majority of Valleys trains serve both Cardiff Central and Cardiff Queen Street stations, this enables connectivity with intercity and regional services on the Great Western Main Line (GWML) at Cardiff Central.

In addition to the expansion of the South Wales Valleys local network in recent years, the former freight line to Ebbw Vale was reopened to passenger trains joining Cardiff with six new intermediate stations in the “western valley” above Newport, at which traffic levels have surpassed expectations.

The west – east routes in south Wales and in north Wales experience significant competition from the motorway and road networks. In the south the M4 and its continuation beyond Swansea is a more direct corridor than rail where trains from Cardiff to west Wales have to reverse twice en route, at Swansea and Carmarthen. The north Wales coastal main line is designated as a Trans European Network (TEN) route and Holyhead station acts as a railhead for the ferries to and from Ireland. Traffic to Ireland from Liverpool and Manchester has competition from low cost airlines. Here the M56 is the road alternative to the Manchester to Chester rail routes, and suffers from heavy congestion during peak hours. In north Wales, the A55 provides the direct competition.

The west – east routes in south Wales and in north Wales both form important routes for freight, with steel and coal traffics being predominant in the south, and petroleum in the south-west region. The south to north border counties line northwards from Newport has experienced some recent freight traffic growth and offers a key alternative trunk route option to routing traffic to the north and midlands via the busier, steeply-graded Lickey route through Bromsgrove. The South Wales Valleys section of route contains the important coal-fired power station at Aberthaw on the ‘Vale of Glamorgan’ line, and a major opencast site at Cwmbargoed. The ‘Vale of Glamorgan’ line offers a diversionary route to the GWML between Cardiff and Bridgend.

Today's route

The principal elements of the route are described below. The relevant Strategic Route Section is shown in brackets.

In south Wales:

- the South Wales Main Line (SWML) runs from the Severn Tunnel (at Pilning, its eastern extremity) through Newport and Cardiff to Swansea (L.01)
- the Ebbw Vale line (L.17) joins the SWML to the west of Newport, at Ebbw Junction and also at Gaer Junction
- the Maesteg branch (L.19) runs through Tondy to join the SWML at Bridgend
- the SWML continues westwards from Swansea, to Carmarthen and Milford Haven (L.20), with two branches:
 - from Whitland to Tenby and Pembroke Dock (L.21), and a short section beyond Clarbeston Road to Fishguard Harbour (L.22).

In north Wales:

- Holyhead to Chester (L.13 & L.14)
- Bidston – Wrexham line (L.15 & L.16)
- Branches from Llandudno Junction to Llandudno and to Blaenau Ffestiniog (L.23).

In mid-Wales:

The 'North and West' section along the border counties between Crewe and Newport links borders market towns such as Abergavenny and Ludlow with the county towns of Shrewsbury and Hereford, and serves multiple local demands as well as fulfilling an inter-regional role, linking south and north Wales, and the northwest, in the manner of a secondary main line (L.08 and L.09). Shrewsbury acts as the 'hub' for three other sections:

- the 'Cambrian lines' running westwards to Machynlleth and Aberystwyth, and around the coast to Barmouth and Pwllheli (L.08 & L.09)
- the line north-westwards through Wrexham to Chester (L.10, L.11 & L.12)
- the 'Heart of Wales line' south-westwards, from Craven Arms to Llanelli (L.06 & L.07).

The arteries of the South Wales Valleys route (all-L.18) radiate northwards, southwards and westwards from Cardiff. The four main components running northwards are:

- the Taff Vale section from Cardiff to Pontypridd and Merthyr

- the Rhondda valley section from Pontypridd to Treherbert
- the Cynon valley section, from Abercynon to Aberdare, plus the freight-only section beyond Aberdare to Hirwaun/Tower Colliery
- the Rhymney valley section from Cardiff to Rhymney, off which a short branch diverges at Heath Junction to Coryton (which is within the Cardiff city area), plus the freight only line from Ystrad Mynach to Cwmbargoed (L.99).

To the southwards and westwards of Cardiff components of the South Wales Valleys section comprise:

- the short branch from Cardiff Queen Street to Cardiff Bay
- Cardiff to Cogan Junction, Barry and Bridgend
- Cogan Junction to Penarth
- Barry to Barry Island
- Ninian Park to Radyr via the City Line.

Freight only lines (mostly in south Wales) comprise:

- East Usk to Uskmouth, the Newport Docks branch from Alexandra Dock Junction, and Park Junction to Machen in the Newport area
- the Cardiff Docks branch from Pengam to Cardiff Tidal Sidings
- the Swansea District line between Court Sart Junction and Morlais Junction, and the curve between Grovesend Colliery Loop Junction and Hendy Junction on the Heart of Wales line
- Neath and Brecon Junction to Onllwyn and to Cwmgwrach, in the Swansea area, and Jersey Marine to Burrows
- Pantyffynnon to Gwaun-Cae-Gurwen
- Letterston Junction to Trecwn
- In north Wales, Blaenau Ffestiniog to Trawsfynydd is strategically retained but currently disused.

Current passenger and freight demand

The west – east routes in south and north Wales support regular, through intercity services to London reflecting the business and other demands of the long distance market as well as heavy flows within Wales on the mostly urban coastal corridors. Passenger demand between north and south Wales, to enable a days business in the capital, has been further stimulated by the introduction of an express morning southbound train from Holyhead to Cardiff, with catering, and a late-afternoon northwards return. These journeys run in addition to the all day regional services (provided from the commencement of the present franchise), and are intended to promote better transport links between the north and the south in line with pro-active Welsh Assembly Government policies for encouraging demand for rail.

In 2006/07 there were approximately 31 million journeys within to and from the Wales RUS area, of which slightly over half were within that area.

Much of the Welsh railway network is rural in nature, and passenger traffic patterns vary considerably between the sections, with considerable long distance flows between mid Wales and the west Midlands over the Cambrian lines which reflect through service provision as well as competitive journey times relative to roads across mid Wales. West of Shrewsbury, the Cambrian lines principally serve a largely rural catchment, and nearly all services run through from Birmingham International and Birmingham New Street to Aberystwyth, with an element of through running to and from the Cambrian coast section between Dyfi Junction and Pwllheli, where summer traffic levels make strengthening of trains necessary. Schools traffic on the Cambrian coast line (principally to Harlech, from either direction) drives the timetable on this single track section which has few passing loops.

Road competition is more acute in west Wales where the M4 and its extensions often offer more direct journey opportunities than by train as the terminal stations at Swansea and Carmarthen necessitate time-consuming reversals. Much passenger demand to and from the rural parts of Wales is naturally long distance in nature, and rail reduces peripherality in the more remote areas by giving direct links to the capitals of both Wales and England as well as to the west Midlands and the northwest.

Passenger volumes on the Heart of Wales line reflect the much lower frequencies, with less of a pattern to demand, and a very large number of halts

servicing small communities which in some cases have practically no other public transport alternative. 'Heart of Wales' line services generally run throughout between Swansea, Llanelli (where reversal takes place) and Shrewsbury, calling at all of the stations and halts, in some cases only on demand. The highly scenic character of much of the route is a factor in the promotion of rail travel for leisure in this part of Wales. There are significant seasonal fluctuations in demand in the popular Welsh coastal holiday areas along the equally scenic Cambrian Coast line, and around Tenby and in the Conwy valley.

West of Swansea, the majority of local train services are provided by two-car or single vehicle units timed to connect with London services, supplemented (between Swansea and Carmarthen) by the Manchester to Cardiff services to cater for demand on the more urban part of this section. The section beyond Clarbston Road to Fishguard Harbour is used solely by local, twice-daily trains running in connection with the Stena ferry service from Fishguard to Rosslare in southern Ireland.

Within the South Wales Valleys growth in passenger demand has been slightly higher than the PDFH forecasts over the last nine to ten years, comparable with other major urban areas outside London such as Manchester and Leeds. The two main stations at Cardiff (Central and Queen Street) account for 67 percent of all passenger demand on the South Wales Valleys section of the route, with significant secondary volumes carried to Pontypridd, Caerphilly, Barry and Bridgend. There has been significant expansion of passenger services on most sections where demand for travel to Cardiff has grown in line with increased job and leisure opportunities in the capital. Service frequencies to Merthyr doubled during 2009 following major infrastructure enhancement at Merthyr Vale. On the South Wales Main Line the opening (in 2007) of Llanharan station, west of Cardiff, has boosted passenger carryings on Maesteg to Cardiff journeys which call additionally, and a small number of other local workings have needed adjustment to reflect buoyant demand here for Cardiff commuting.

In north Wales passenger usage is mixed. There is some localised commuting and business traffic within the route, but there are also significant commuter flows to destinations off route – notably to Liverpool, Birmingham and Manchester – with South Wales and London being popular destinations for business travellers. There are flows to and from Ireland via the ferry terminal at Holyhead, as well as to and from the various resort towns along the coast, all of which vary in intensity according to season and weather.

The rail freight business in Wales is mostly concentrated upon the corridor in south-east Wales and along the “North & West” border counties line. Steel traffic from Llanwern in south Wales passes over the ‘North & West’ route via Shrewsbury and Wrexham (for Shotton). This route is also used by coal traffic from Portbury Docks (Bristol) to Fiddlers Ferry and Rugeley power stations. In west Wales the oil refineries near Milford Haven generate long distance flows to the Bristol area and to the Home Counties. The Heart of Wales line is occasionally used for freight diversions purposes.

The coal-fired power station at Aberthaw continues as a key power generator in Wales, and attracts traffic from a variety of sources which include Tower Colliery, on the freight line north of Aberdare, Cwmbargoed on the freight line north of Ystrad Mynach, Onllwyn on the freight line north of Neath, and off the route from Avonmouth.

On the freight-only sections of the route from Jersey Marine (near Neath) coal traffic is conveyed to Aberthaw power station from Onllwyn, and various destinations are served from Cwmgwrach. The principal traffic over the ‘Swansea District’ line is steel traffic to and from the Trostre works near Llanelli. This section also conveys coal traffic from the loading point at Gwaun-Cae-Gurwen on the reopened freight-only branch from Pantyffynnon and the southernmost portion of the ‘Heart of Wales’ line.

The principal drivers of freight traffic in north Wales are the steelworks at Dee Marsh and the quarry at Penmaenmawr. On Anglesey the nuclear power station at Holyhead generates occasional movements.

Current services

The bulk of domestic train services within Wales are provided by Arriva Trains Wales (ATW). Other train companies operating services on the route are: First Great Western (FGW) (in south Wales), CrossCountry, Virgin Trains (in north Wales), London Midland Trains (to Hereford and to Shrewsbury only), Northern Rail, and Merseyrail, (to Chester only) and open access operator Wrexham Shropshire and Marylebone Railway Company (WSMR), DB Schenker, Freightliner Heavy Haul Limited and DRS.

Arriva Trains Wales operates a ‘Standard Pattern Timetable’ for most domestic services in Wales.

In the south western part of the route a two-hourly service operates between Swansea and Milford Haven/Pembroke Dock. Two trains per day, in each

direction, operate on the Fishguard Harbour branch. The above services are mainly operated with two-car trains. Four trains per day in each direction operate on the Heart of Wales line. In west Wales FGW provides one return service per day between Carmarthen and London Paddington and a summer Saturday service between London Paddington and Pembroke Dock, to address seasonal demand fluctuations.

In south Wales along the main line section (SWML) the hourly FGW London services from Swansea and from Cardiff are combined to give a half hourly clockface interval pattern east of Cardiff. This is complemented (i.e. between Swansea, Cardiff and Newport) by the ATW hourly Carmarthen to Manchester service. ATW also operate irregular stopping trains between Swansea and Cardiff, serving the “Swanline” local stations west of Bridgend. Added to this pattern is an hourly Maesteg to Cardiff stopping train, often giving four trains per hour on the section of SWML east of Bridgend to Cardiff Central.

There is a denser service provision east of Cardiff, and the hourly (with gaps) ATW Cardiff to Cheltenham stopping service is augmented by the hourly limited stop, faster CrossCountry Cardiff to Nottingham service. FGW provide half hourly interval services between Cardiff and Bristol, of which one per hour runs through to Portsmouth Harbour and the other generally runs through to Weston-super-Mare and Taunton. Another hourly train uses the SWML east of Cardiff Central to run directly to Ebbw Vale.

On the north – south axis, the Standard Pattern Timetable typically offers an hourly service between Carmarthen and Manchester via Cardiff, Hereford, Shrewsbury and Crewe, and a two-hourly service between Cardiff and Holyhead via Wrexham mainly operated by three-car trains with 100mph capability. A two-hourly, all stations stopping service between Shrewsbury and Crewe is also operated by ATW in addition to the fast regional services between west Wales and Manchester.

Between Shrewsbury and Chester an hourly service is provided, alternately either by the Cardiff to Holyhead trains, or the Birmingham International to Holyhead trains. Both of these reverse at Chester to then give an hourly north Wales coast local service.

In addition to the ATW north Wales coast services is a limited stop Virgin Trains London Euston to Bangor and Holyhead service, running as through extensions of the all day hourly service operated over the West Coast Main Line by Virgin Trains between London Euston and Chester, utilising

diesel Virgin Voyager trains. In addition ATW also operate an hourly local service between Crewe and Chester, to give a combined frequency of two trains per hour here.

ATW also operate an hourly stopping train service between Manchester, Warrington Bank Quay, Chester and Llandudno. Some additional trips between Llandudno Junction and Llandudno are provided to connect with the Cardiff and Birmingham regional services, as well as six trips per day between Llandudno Junction and Blaenau Ffestiniog, which generally run through from Llandudno.

In mid Wales a two-hourly service operates between Shrewsbury and Aberystwyth (these run as through services from Birmingham International). Connecting Cambrian coast services between Machynlleth and Pwllheli run at broadly similar intervals, with some through working between Birmingham International and the coast at times of higher demand, involving splitting and joining trains at Machynlleth.

Services provided by the open access operator Wrexham, Shropshire and Marylebone Railway (WSMR) commenced operation in Spring 2008 from Wrexham General to London Marylebone, serving all stations between Wrexham and Shrewsbury.

On the South Wales Valleys section of the route all passenger services are operated by Arriva Trains Wales. The operation is characterised by most services being linked across Cardiff thus catering for demand to both main stations with a fixed range of pairings of north – south origins and destinations. The bulk of services are self-contained to the local network, radiating from Cardiff Queen Street. When major events are staged at the Cardiff Millennium Stadium adjacent to Cardiff Central station, special timetable arrangements are necessary to cater for

the substantially increased demand created across the South Wales Valleys network. The 'inner' sections of the route now all enjoy a minimum weekday frequency of four trains per hour, as far out as Abercynon, Bargoed, Penarth and Barry. Some 'outer' sections have two trains per hour, namely Treherbert, Aberdare and Merthyr, as well as the City Line and Coryton branches. The others (Maesteg, Bridgend via the Vale of Glamorgan line, and Rhymney) have hourly services.

Freight services are operated by DB Schenker, DRS, Freightliner Heavy Haul Limited and Freightliner Limited.

The bulk of freight services in Wales are concentrated in the south and reflect the needs of the major Corus steelworks sites at Port Talbot and Llanwern, for internal movements within Wales (linking to Trostre in west Wales and to Shotton in north Wales) as well as supplying customers in England and on the continent. Aberthaw Power Station takes substantial volumes of electricity supply industry (ESI) coal (from west Wales and Bristol Portbury Dock) and there is also automotive traffic to and from the Ford factory at Bridgend.

Along the north Wales coast there is significant stone traffic of two trains a day from the quarry at Penmaenmawr to the Network Rail local distribution centre at Crewe. On Anglesey nuclear traffic operates between Valley and Sellafield in Cumbria.

Figure 1 shows the current level of service on the route.

Figure 2 shows the total annual tonnage levels on the route.

Figure 3 summarises traffic volumes.

Figure 1 Current train service level (trains per hour)

Regional/Rural Services	Trains per hour each way
Cardiff – Swansea	5 every 2 hours
Cardiff – Holyhead	1 every 2 hours
Swansea – Carmarthen	3 every 2 hours
Newport – Shrewsbury	3 every 2 hours
Shrewsbury – Crewe (stopping services)	3 every 2 hours
Shrewsbury – Chester	1
Pontypridd – Barry	4
Maesteg – Cardiff (via GWML)	1
Llandudno – Manchester	1
Cambrian Lines	1 every 2 hours

Figure 2 Tonnage

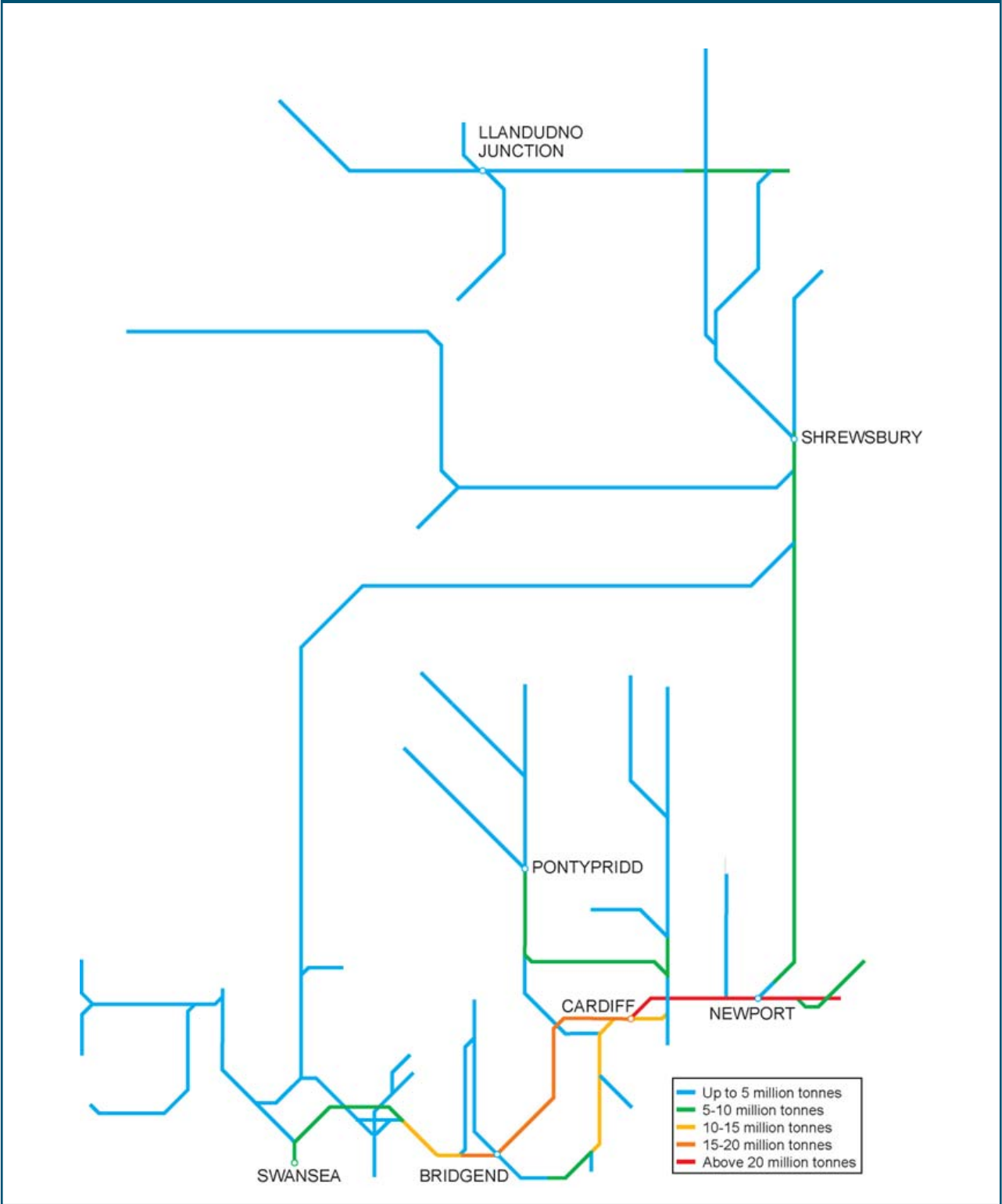


Figure 3 Current use

	Passenger	Freight	Total
Train km per year (millions)	23	3	26
Train tonne km per year (millions)	3,448	2,760	6,168

Current infrastructure capability

The following maps provide an indication of the predominant capability on each section of the route. As part of the Infrastructure Capability Programme a number of Network Changes to Route Availability and Gauge, which may affect some of the detail of these maps, have been issued for consultation. Details of the Network Changes being consulted can be found on the [Network Rail](#) website and

details of Network Changes established can be found on the [Network Rail](#) website. Current capability is shown in the Network Rail Sectional Appendix.

Figure 4 Linespeed

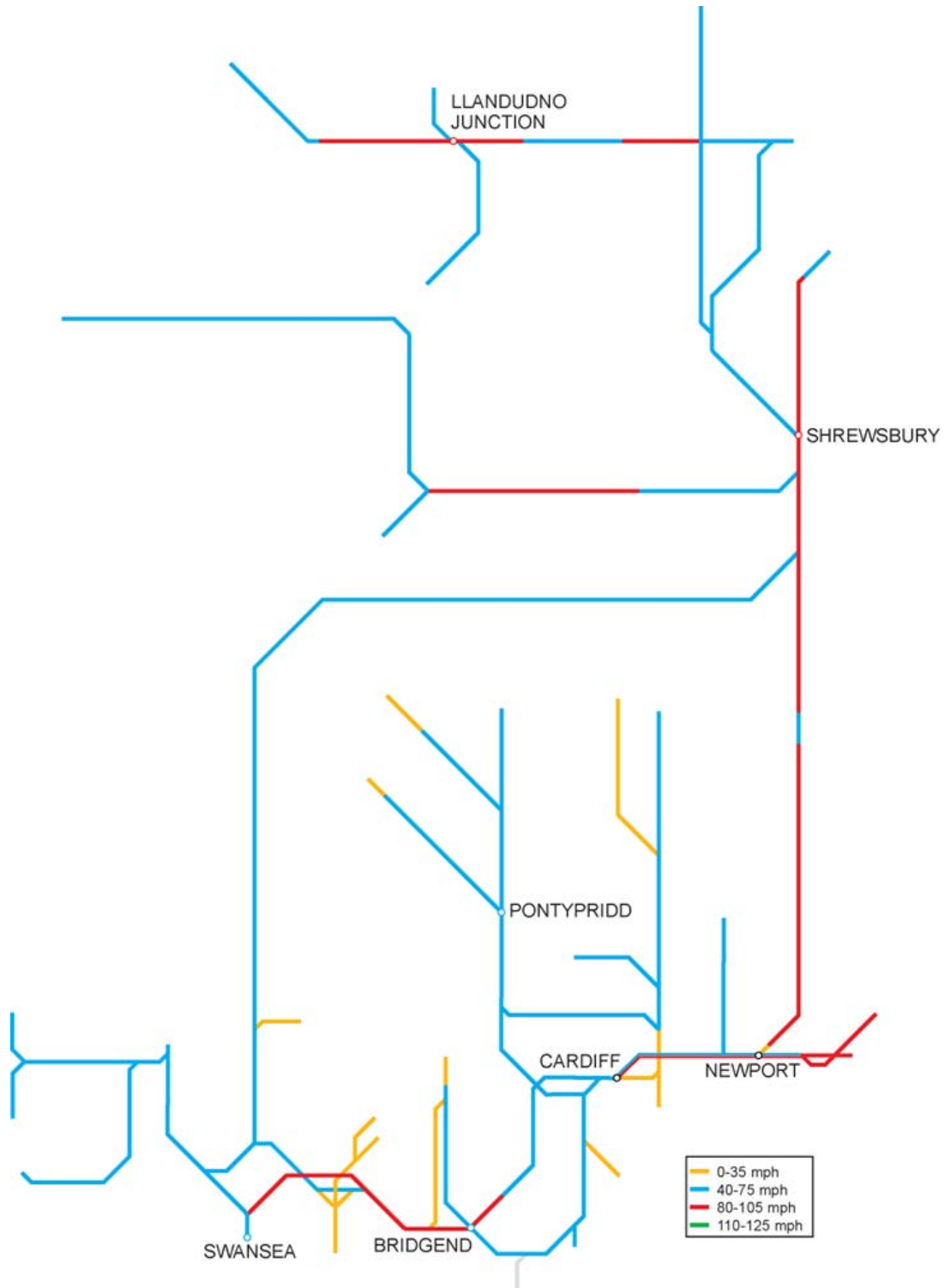


Figure 5 Electrification

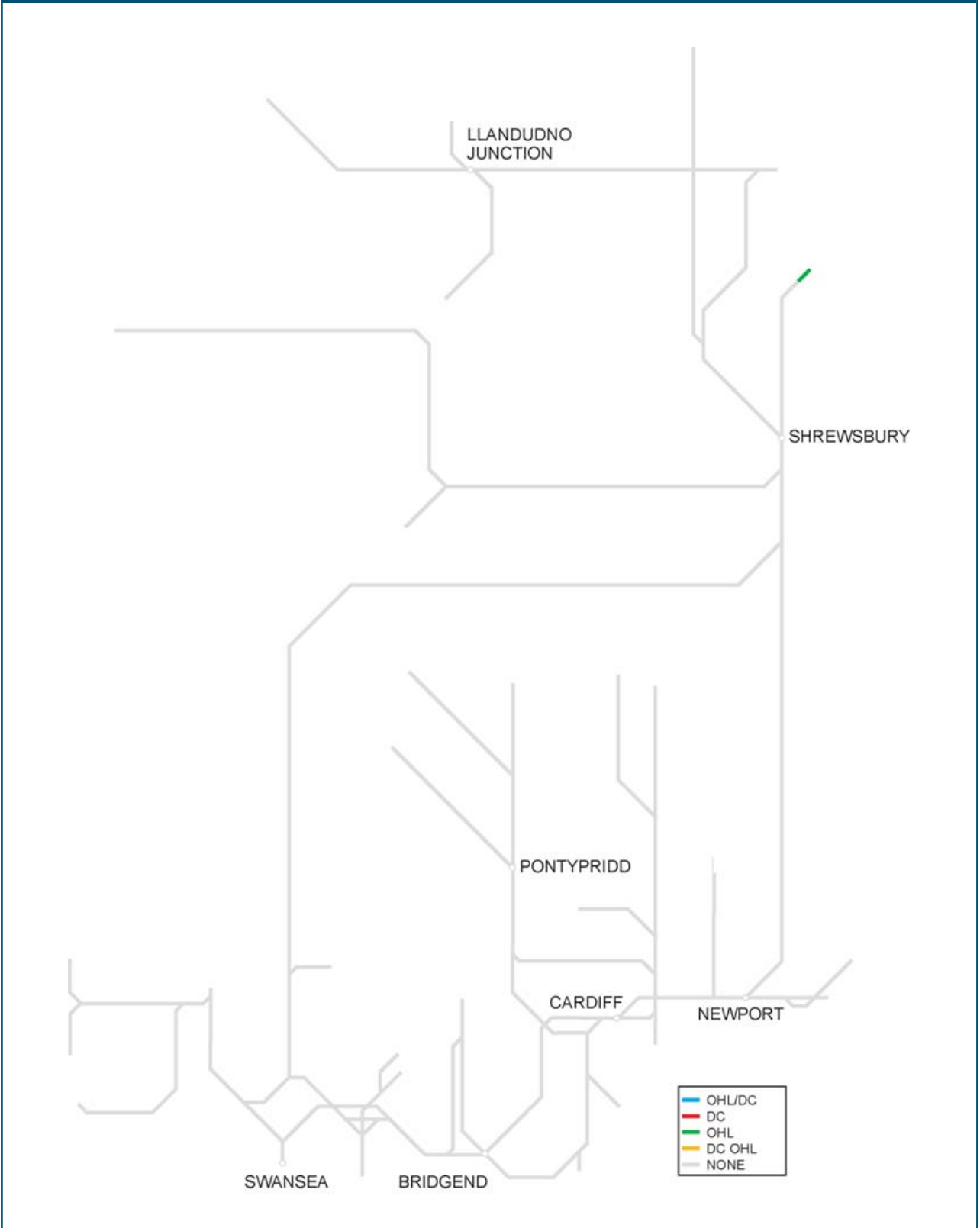


Figure 6 Route availability

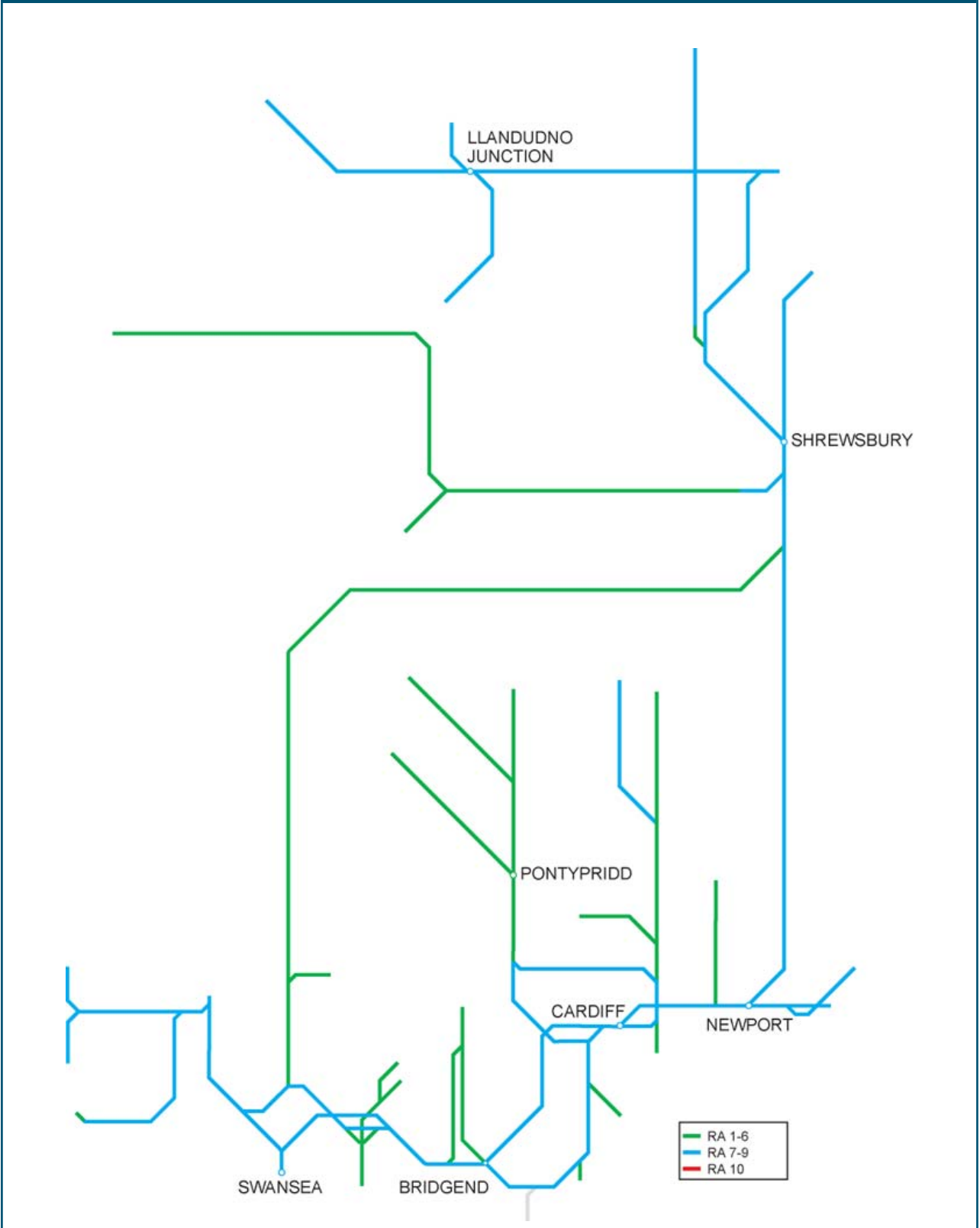


Figure 7 Gauge

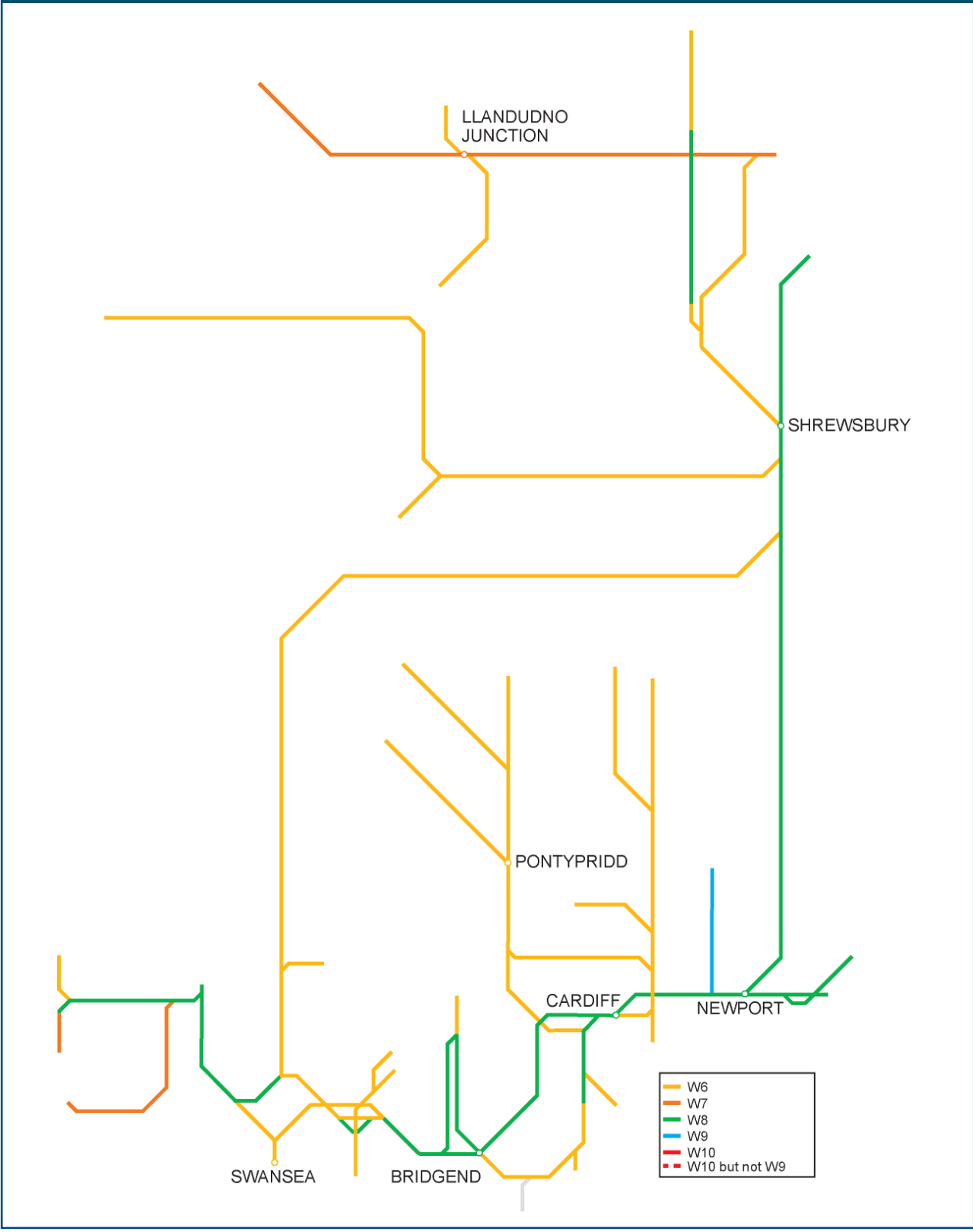


Figure 8 Current train service level (peak trains per hour)

Route Section	Peak trains per hour
South Wales main line, Cardiff to Newport	9
West Wales, Llanelli to Swansea	4
'North & West', Leominster to Hereford	2
North Wales coast, Llandudno Junction to Chester	3
'Cambrian lines', Newtown to Shrewsbury	1 every 2 hours
Wrexham to Chester	1

Current capacity

In general capacity on the double track sections of the route (and on the four track SWML between Cardiff and the Severn Tunnel) is sufficient for existing volumes.

On the single track Cambrian lines section, the limited number of passing loops influences the availability of paths, but other factors off the route – principally pathing over the busy WCML and platform availability at Birmingham New Street – likewise drive overall service provision. The long single track 'Heart of Wales' line between Craven Arms and Pontarddulais has numerous passing loops, not all of which are required to sustain existing service frequencies, but which provide a contingency in the event of out of course running on this long section.

Arriva Trains Wales' Standard Pattern Timetable introduced long distance services between west Wales and the north west of England, via Cardiff. This has increased capacity utilisation between Swansea and Llanelli, and puts pressure on the single line between Cockett and Duffryn, and similarly (with north to south Wales services) between Wrexham and Saltney Junction near Chester.

A capacity constraint exists for northbound traffic on the Newport to Shrewsbury route, to the north of Abergavenny, where a long signalling block section restricts pathing opportunities in those hours when two passenger trains run, such that freight paths only exist in the hours when only one passenger train is scheduled, in daytime hours.

Where constraints exist in north Wales, they tend to restrict flexibility when planning the overall timetable, or restrict perturbation management, rather than prevent the desired level of traffic. Examples of current constraints are:

- the restricted layout at Chester East Junction, which creates an interaction between North Wales – Crewe traffic and Manchester – Northwich – Chester traffic
- a lack of regulating points Crewe/Chester to Holyhead

- the single electrified access to Chester station for Merseyrail trains
- a few long absolute block sections that are adequate for the quantity of traffic, but restrict the spacing of trains
- the single line with one loop on the Blaenau branch.

In the South Wales Valleys, the northern extremities of the route are single track, with double track south of Porth, Abercynon and Bargoed. The Cardiff Bay branch, the Coryton branch, Cogan Junction to Penarth, Barry to Barry Island and Bridgend to Maesteg are also single track. Passenger services are provided wholly by Arriva Trains Wales, and in many cases the paths utilised now fully consume available capacity particularly over the single track stretches of most routes at their outer extremities and through the 'bottleneck' at Cardiff Queen Street.

Whilst the basic train size is a two-car diesel multiple unit, increasing numbers of trains are scheduled for four-car operation, particularly in the peak hours, although certain route sections (Heath Junction Low Level to Coryton, and the City Line) are limited by two-car length platforms. The expansion of passenger services has been such that at peak hours network capability is practically fully taken up.

Regular coal flows remain in the Cynon Valley and the Rhymney Valley, and the major power station at Aberthaw receives coal from within the route as well as from further afield. Pathing freight trains through Cardiff Queen Street from the Rhymney Valley necessitates minor alterations to the passenger standard pattern timetable.

The increase in patronage at Cardiff Queen Street station has on occasions necessitated restrictions to be imposed on the number of passengers allowed on to the narrow platforms at peak times.

Figure 8 shows the peak hour train service level for key sections of the route.

Current performance

The last two years have seen a solid improvement in performance on the route, with reductions in delays and improvements in punctuality for all operators. As a result of the Temporary Speed Restriction reduction strategy and continuing volumes of track renewals, track delays in particular have been significantly improved.

Challenges remain in terms of the volume of reactionary delay, particularly for services west of Swansea where delay is compounded when waiting to cross the five mile single line section between Cockett and Duffryn. Similar delays occur over the ten mile single line section between Wrexham North Junction and Saltney Junction (near Chester).

Delays on the Cambrian line are often exported to and imported from off route and due to the length of single line sections service recovery is difficult. Last year's extension of services from Aberystwyth beyond Birmingham New Street to Birmingham International and re-diagramming to provide more robust turnround margins at the latter station have improved Cambrian route performance, and have reduced the number of occasions where late running towards Birmingham has necessitated services being turned round at Wolverhampton short of their proper destination.

In addition, the spring 2009 creation of new Integrated Control Centre in Cardiff, designed around optimising communications flows, has helped to improve incident management.

Figure 9 shows the forecast 2009/10 Public Performance Measure (PPM) for the main operators on the route.

All operators continue to build on the improvements of previous years to reach improved levels of performance. Arriva Trains Wales forecast PPM is 94.7 percent, ahead of their target of 93.0 percent PPM MAA, in spite of service disruption due to cable theft in the South Wales area.

First Great Western's PPM MAA is forecast to be 92.2 percent, ahead of the target of 92.0 percent. In two years, FGW's PPM has improved by almost nine percentage points, reflecting the benefits of improvements in Network Rail's infrastructure and operations, and a reduction in delay caused to themselves.

CrossCountry's PPM also continues to improve, despite the challenges of operating across the country, and the capacity constraints and pinch-points encountered.

Figure 8 (South Wales Valleys) Current train service level (peak trains per hour)

Route Section	Number of trains
'Taff Vale' section, Pontypridd to Radyr	6
Rhymney Valley, Heath Junction to Cardiff Queen Street	6
Cardiff Queen Street to Cardiff Central	12
Grangetown to Cardiff Central	8
Cardiff Queen Street to Cardiff Bay	5
Barry to Bridgend	1

Figure 9 2009/10 PPM

TOC	Forecast MAA	As at period
First Great Western	92.2%	11
CrossCountry	90.4%	11
Arriva Trains Wales	94.7%	11
Virgin Trains	84.4%	11

Section 2: Tomorrow's railway: requirements

HLOS output requirements

Figure 10 below shows the HLOS output requirement for the total demand to be accommodated on the former strategic routes which make up Route L: Wales.

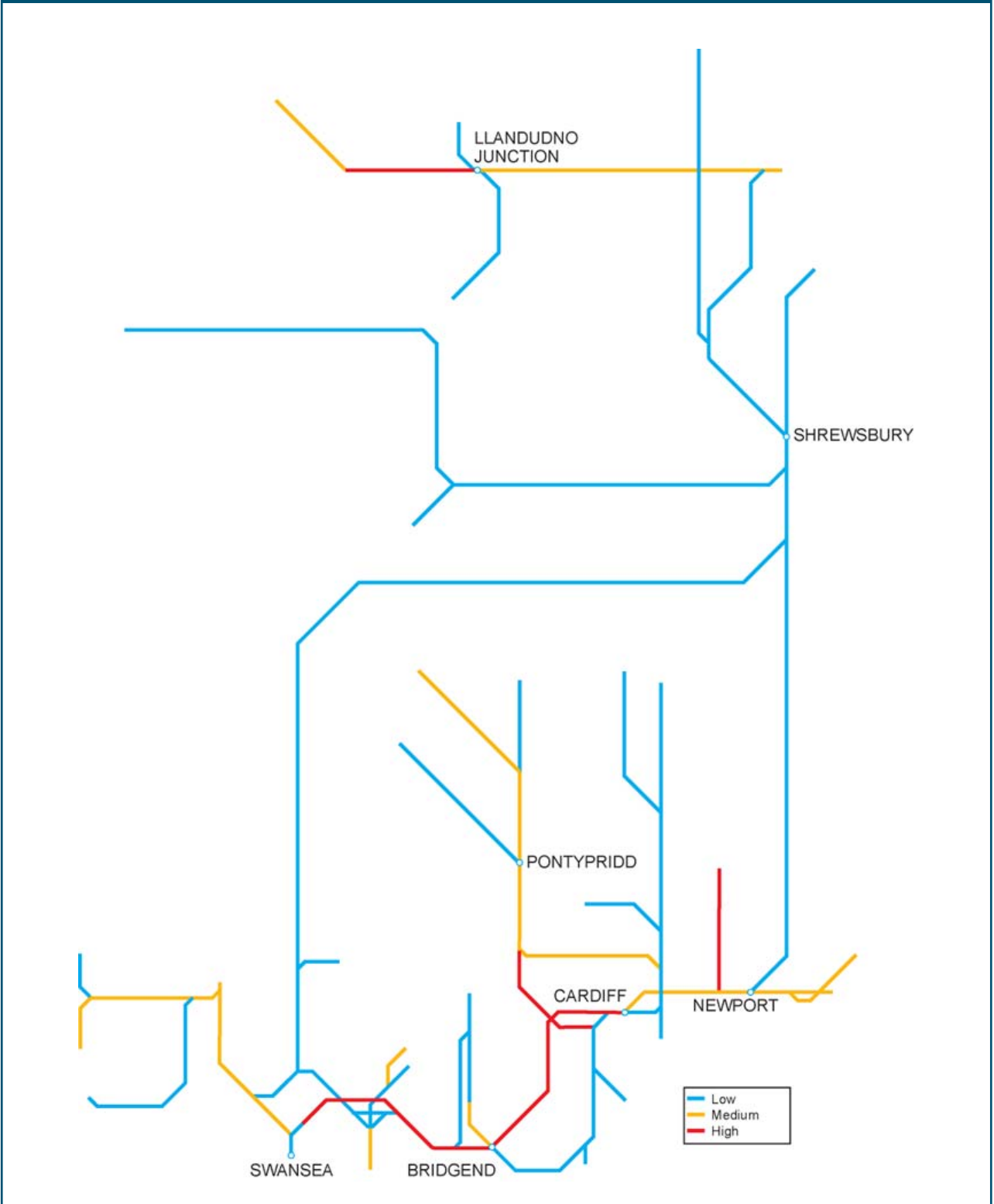
Figure 10 Total demand to be accommodated by Strategic Route

Routes	Annual passenger km (millions) in 2008/09	Additional passenger km (millions) to be accommodated by 2013/14
GWML	4,327	637
South and Central Wales and Borders	328	29
South Wales Valleys	153	13
North Wales and Borders	223	26

Figure 11 Peak hour arrivals to be accommodated by Strategic Route

City	Peak three hours			High- peak hours		
	Assessed demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)	Assessed demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)
Cardiff	8,500	900	39	4,000	600	43

Figure 12 Tonnage growth



Future demand in CP4

The Wales Spatial Plan (published in 2004) recognised the importance of the East – West corridors for the movement of people and goods across Wales, and called for “... progressive improvements to North – South links within Wales and through England, which are important for connecting Wales as a country”. This is further underpinned by the National Assembly for Wales’ ‘One Wales – a progressive agenda for the government of Wales’. Development by the Welsh Assembly Government (WAG) of a Wales Transport Strategy commenced in 2005, and the document ‘One Wales: Connecting the Nation’ was published in May 2008. The importance of good rail links between north and south Wales is emphasised.

Specific policies in the updated Wales Spatial Plan (which was updated in 2008) mentioned include some decentralisation of Welsh Assembly Government jobs to Aberystwyth, and (in the Central Wales region) enhancement to rail services through direct support, although it was noted that the area’s relatively low population density makes substantial improvements to external links uneconomic. The DfT and WAG jointly commissioned Wales Rail Planning Assessment (WRPA) recognised that growth in traffic levels were mainly in south Wales. However, we recognise that the low levels of growth forecast for the more rural parts of the route may well increase depending on continued success of the Standard Pattern Timetable.

A forecast of future passenger demand undertaken for the WRPA indicates an increase of 35 percent by 2016 and to 48 percent by 2026. The WRPA informed the Network Rail led Wales RUS, which was published in November 2008, providing a forward view of the next ten years.

Figure 12 indicates the forecast percentage change in tonnage to 2019.

One of the key themes of the Wales RUS is the development of faster and more frequent passenger services between north and south Wales, in conjunction with recent growth in the demand for long distance freight movement on the corridor through Abergavenny.

Another key theme is the expectation of continuing population growth and employment in the south east (Sewta) region of Wales, and the importance of further growth in local rail demand around the capital and along the coastal corridor more generally.

This short-term growth, within the South Wales Valleys, will be handled by train lengthening to six-cars, when necessary, on the Treherbert and Rhymney sections.

Similarly demand growth on the Maesteg line will be met by train lengthening when necessary, as Cardiff to Maesteg trains also serve intermediate main line stations between Cardiff and Bridgend where the recent opening of Llanharan station placed more pressure on services.

The Government’s White Paper – delivering a Sustainable Railway, forecasts that the number of journeys into the centre of Cardiff during the three hour morning peak period will increase to 9,400 by the end of the current regulatory control period (CP4) in 2014. At the rate of growth projected within the Sewta strategy, five percent year on year, the needs for more Valleys paths north of Cardiff is expected to become a critical issue by 2013 – 2014, beyond recently completed lengthening works to permit six-car operation of some existing peak trains. Additional platforms at Cardiff Queen Street and Cardiff Central will be necessary for more paths and these are being developed in conjunction with Cardiff Area Signalling Renewal (CASR) works for delivery in late-CP4.

To the south of Cardiff an additional platform at Barry (also linked to the CASR works) will enable more trains to run to Bridgend via the Vale of Glamorgan as demand grows.

In the medium term there will be a continuing exploitation of structural funding opportunities to further the goals set out in the National Transport Plan (published in 2009) and including further expansion of the rail network. A next step towards this particular objective is likely to be a northwards extension of the Ebbw Vale line through the now-cleared steelworks site, as a proactive stimulant to greater rail market share in the “western valley” above Newport, and subsequently provision of a direct passenger rail link to Newport.

The Freight RUS was published in March 2007 and established by the Office of Rail Regulation in May 2007. A key input to the strategy was a set of ten-year demand forecasts that were developed and agreed by the industry through the RUS Stakeholder Management Group. The forecasts indicate that the majority of freight growth in the area will be in south Wales, mostly concentrated on the main line between Severn Tunnel Junction and the Port Talbot area, for various commodities.

Future demand beyond CP4

Demand growth is expected to continue well into CP5, for both freight and passenger businesses. Beyond that the Government's July 2007 White Paper challenged the industry to plan for a doubling of demand in the subsequent 30 years.

Forecast long-term growth in demand (in the Sewta region) to and from Cardiff is predicted to eventually exceed the additional capacity that will be provided through train lengthening in the medium term, that is, on the existing twelve trains per hour pattern which is the maximum sustainable through the Cardiff Valleys network. Enhancement to this network which will be completed during the early part of Control Period 5, CP5 namely 2014 – 2019, will then permit the operation of more trains, which will be targeted at peak times on the busiest sections, between Caerphilly and Cardiff and between Pontypridd and Cardiff, thus freeing up capacity on the longer-distance services from further up the Rhymney valley, and the Taff Vale towards Merthyr Tydfil.

On the South Wales Main Line between Swansea, Cardiff and Newport the relatively high capacity of the long distance London services is expected to cater for demand at principal stations, whilst for the intermediate stations west of Chepstow lengthening domestic services from two-car to either three-car or four-car will address expected demand.

The Governments' 2007 Rail White Paper predicts a doubling of freight demand over the next thirty years. Forecasts of freight demand in the longer term have been agreed with the industry. These continue growth beyond the period of the Freight RUS. It was noted that should bulk traffic through Port Talbot Dock be resumed by rail, this was not anticipated to cause any gap to arise.

Section 3: Tomorrow's railway: strategy

Figure 13 summarises the key milestones during CP4 in delivering the proposed strategy for the route. Further explanation of the key service changes and infrastructure enhancements are set out in the following sections.

Figure 13 Summary of proposed strategy milestones			
Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
2010/11	Additional trains between Aberystwyth and Shrewsbury	Extra passing loop at Dyfi Junction, enhanced passing loops at Talerddig and at Welshpool	Additional track capacity and minor journey time reduction
2011/12	2-hourly Cardiff – Holyhead service journey time improvements	Redoubling part or whole of the Wrexham North Junction – Saltney Junction single line	Improved reliability and additional track capacity. Reduced train service journey times
2011/12	2-hourly Cardiff – Holyhead and hourly Carmarthen – Manchester service reduced journey times	Newport – Crewe/Chester linespeed upgrade	Improved reliability and additional track capacity. Reduced train service journey times – facilitates 100mph capability on parts of the route
2011-2014		Cardiff Area Signalling Renewal (CASR)	Improved reliability – facilitates additional capacity and improved capability throughout the area with additional platforms at Cardiff Queen Street and at Cardiff Central and remodelled track layout – signalling controls migrate to new South Wales signalling centre – signal box closures
2012/13		Redoubling Cockett – Duffryn single line	Improved reliability and additional track capacity. Improved train service
2012/13		Ninian Park-Radyr (City Line)	Reduced journey times – improved reliability
2012/13		Trefforest Curve doubling of single line)	Reduced journey times – improved reliability
2012/13		Additional platform faces at Barry, Caerphilly and at Pontypridd	Additional capacity for extra services
2012/13		Newport Area Signalling Renewal (NASR) Phase 2	Improved reliability – facilitates additional capacity and improved capability throughout the area – signalling controls migrate to new South Wales signalling Centre – signal box closures +Gaer Jn

Figure 14 Capacity enhancements to meet HLOS peak capacity in CP4

Description	Additional vehicles involved	Station served	0700 – 0959 Capacity Impact	0800 – 0859 Capacity Impact
Train lengthening	6	Cardiff	600	200

Figure 15 shows how the HLOS load factor targets for locations on the route are met by the proposed strategy.

The measures will also allow the total additional passenger KM to be accommodated.

Figure 15 Impact on HLOS peak capacity metric

London Terminals and regional Hubs	Peak three hours				High peak hours			
	Demand end CP4	Capacity start CP4	Capacity end CP4	Load factor end CP4	Demand end CP4	Capacity start CP4	Capacity end CP4	Load factor end CP4
Cardiff	9,400	28,400	29,000	32%	4,600	9,000	11,800	39%

Strategic direction

The DfT and Welsh Assembly Government jointly commissioned Wales Rail Planning Assessment (WRPA) assessed rail traffic and infrastructure needs for the next twenty years. This recognised significant growth in traffic levels in south Wales and endorsed the need for development of schemes to enhance capacity at Cardiff Central station to cater for longer term projected growth. The WRPA informed the Wales Route Utilisation Strategy (RUS).

The final Wales RUS was published in November 2008. It covers all of Wales, and also addresses the considerable portion of route lying in the English border counties of Herefordshire, Shropshire and Cheshire and sets the strategic direction. Following publication of the Wales RUS, in July 2009 WAG published the Wales National Transport Plan (NTP), covering all modes, and which for rail set out the national prioritisation of schemes in development, and confirmed funding and timescales for certain schemes which had been addressed by the Wales RUS. The Wales NTP consolidates at national level rail schemes which in some cases initiated within the four regions, and is closely aligned with the Wales RUS.

There is continued interest from the Welsh Assembly Government in an improved frequency of services on the Cambrian line from Aberystwyth to Shrewsbury and Birmingham. The Welsh Assembly Government is contributing towards the additional infrastructure (i.e. passing loops) needed.

The Welsh Assembly Government will be promoting a number of strategic transport infrastructure projects, including major strategic rail enhancement schemes, for support under the Sustainable Transport theme of the Convergence programme of European Structural Funds. These schemes will achieve priorities under the National and Regional Transport plans and the Welsh Assembly Government will develop schemes in partnership with the rail industry and the regional consortia of local authorities in Wales

As the hub of five different sections of route linking mid Wales with England, Shrewsbury station is clearly fundamental in enabling the levels of interchange that are sought to be achieved. Changes to platforming requirements at Shrewsbury station for this corridor would have an impact upon its growing 'hub' role.

The initial application of ERTMS will be introduced on the Cambrian lines during 2010. ERTMS is an in-cab signalling system supported by the GSM-R radio network, replacing the need for fixed lineside equipment. In connection with the ERTMS scheme, we are upgrading the following level crossings to CCTV; Llanidloes Road, Caersws, Weig Lane and Merilyn. We are also developing a detailed level crossings strategy for the route.

The railway between Newport and Crewe is seen as a core freight route with capacity for growth.

Future train service proposals

The current Arriva Trains Wales franchise specification does not provide for additional services within the term of the franchise, which ends in 2018.

However, the Welsh Assembly Government is seeking to improve business travel between north and south Wales with the introduction of faster early morning and evening services offering first class seating and on-board facilities. These commenced in December 2008. A reduction in journey times for Holyhead and Manchester services to Cardiff is also sought. Possibly another pair will be introduced during CP4 subject to WAG funding.

Future capability

The Welsh Assembly Government is seeking to maximise the 100mph capability of the Arriva Trains Wales Class 175 fleet over the route between Newport and Chester. The route is mainly restricted to 70mph with a 90mph differential speed limit and would need substantial investment to achieve 100mph capability.

Additional passing loops on the Cambrian line are necessary to facilitate the introduction of an enhanced train service and to improve performance. The commissioning of these is dependent on satisfactory introduction of the new ERTMS arrangements controlled from Machynlleth.

Redoubling of the Cockett – Duffryn single line would remove the constraint on the number of calls that can be made at Gowerton station at Cockett. A major park and ride development is being considered here by the regional transport consortium Swwitch, together with more frequent train services in west Wales generally.

The line from Shrewsbury to Crewe has been identified as a pilot route for the trial of modular signalling renewal.

This is a programme that aims to deliver lower cost signalling, and will provide reverse direction functionality for the majority of the route. Works on site are planned to commence in January 2011.

Travel patterns in north Wales are heavily influenced by the proximity of the major north west region cities of Manchester and Liverpool. In addition the airports at Manchester and at Liverpool (John Lennon International Airport, accessed from the recently expanded Liverpool South Parkway station) influence demand on the north Wales coast line, which has no through services from Liverpool. The strategic development of the railway between Liverpool and Chester through enhancement of the Halton Curve, near Frodsham, would enable a new regional link to operate and which would create better connectivity between Liverpool and the north Wales coast as well as with Wrexham. Although there is ample main line capacity west of Chester currently, Taith (the north Wales regional transport consortium) recognise the likely need for investment to enhance the route if more stations were built and an intensified suburban-style service operated between Liverpool, Chester and Rhyl as the obvious western terminus for such additional movements. It is envisaged that this would permit acceleration of existing regional long distance services consistent with the strategic vision of the Welsh Assembly Government.

Network Rail is developing a national programme for station improvements and car park expansion, which includes a number of stations on the route. Working in conjunction with our customers we have identified a number of stations on the route for modernisation as part of the Government's £150m funding initiative. These are Severn Tunnel Junction, Port Talbot Parkway, Carmarthen, Hereford, Shrewsbury, Aberystwyth and Pontypridd. In addition there is CIS fitment planned at a number of stations across Wales.

The Department for Transport's Access for All Programme also targets improvements to station access at a number of locations. The current programme includes Wrexham General, Leominster, Hereford and Abergavenny.

The services between Aberystwyth and Birmingham run for much of their distance over the West Midlands Route east of Shrewsbury. A factor which would beneficially impact upon overall journey times between mid-Wales and England on this corridor would be the effect of potential line speed increases between Wolverhampton and Shrewsbury, identified in the West Midlands RUS, and subject to further development during CP4 to give journey time reductions. These potential

improvements to track would build on recently completed renewal of much of the signalling equipment east of Shrewsbury.

The Network RUS for Electrification was published in October 2009, and confirmed that electrification of the Great Western Main Line was to be introduced by 2016 – 2017. For Wales this will involve wiring the route from England through the Severn Tunnel to Cardiff and Swansea such that electrically-powered Super Express Trains will replace the existing diesel units operating between London Paddington and south Wales.

Future capacity

We believe that the solution to passenger growth and future capacity requirements for the sections of route with a higher capacity utilisation can be met by a combination of train lengthening, and where appropriate supported by platform lengthening and incremental enhancements. These can be delivered as improvements to planned track, structures and signalling renewals as well as certain limited standalone enhancements. These have the potential to improve performance necessary for growth, enable specific increases in train paths and facilitate timetable restructuring.

These principles have already been applied in the South Wales Valleys (Sewta region) such that additional capacity can be gradually switched on through train lengthening during the remainder of this control period and beyond.

On behalf of the Welsh Assembly Government we are developing schemes to redouble the Cockett – Duffryn and Wrexham North – Saltney Junction single line sections to increase capacity, improve reliability, and facilitate new stations. Work on the scheme to provide additional passing loops on the Cambrian line to facilitate an hourly service between Shrewsbury and Aberystwyth commenced in 2008.

At Shrewsbury we plan to enhance signalling on the approaches to the station from the Hereford direction to allow more flexible working at platform 3. This is a Network Rail funded scheme to be delivered in 2010.

Any future capacity enhancements will take consideration of freight companies' aspirations, particularly over the North and West route. In particular, a new intermediate block signal is proposed on Llanvihangel bank in order to increase capacity. This is planned for 2010/11.

Within the regions to a very large extent the capacity increases desired (i.e. through more frequent train services) are dependent upon the completion of the upgrades already mentioned, notably hourly Cambrian trains through mid-Wales (TraCC region) and more frequent west Wales services (Swwitch region). In the Taith region infrastructure is generally already in place which will permit more services in north Wales, in terms of signalling headway capability, possibly augmented by a turnback bay platform facility at Rhyl clear of existing running lines.

In the Sewta region in southeast Wales schemes will be developed both for more stations on existing routes (such as at Caerleon, between Newport and Cwmbran) and for route extensions (such as beyond Aberdare to Hirwaun) or additional routes (such as from Aberbeeg, north of Llanhilleth on the Ebbw Vale branch) to Abertillery). Tower Colliery remains on the existing freight only line to Hirwaun, and during 2009 WAG requested the start of feasibility to address how current passenger services between Cardiff and Aberdare might be extended to address longer-term redevelopment of the upper Cynon Valley in conjunction with continuation of freight access.

We shall continue to maximise opportunities presented by future area signalling renewal schemes to improve capacity and reliability.

Future performance

Network Rail's CP4 Delivery Plan set out the high-level performance aspirations for each operator, as summarised in Figure 16.

In planning to achieve these targets, Network Rail is implementing a multi-tiered approach to performance improvement, combining high-level strategic initiatives with local, tactical improvements to performance.

The key strategic action for 2010 is the widespread installation of remote condition monitoring to points. This technology is a key enabler to the delivery of an intelligent infrastructure and will deliver both performance improvements and maintenance efficiencies through moving away from "fix on failure" to "predict and prevent". The remote condition monitoring equipment will automatically alert control teams and technicians of adverse conditions, enabling asset response staff to attend to equipment without delay to trains. Rollout will be throughout 2010/11, and is being carried out on a priority basis according to the potential performance impact of failure at key sets of points.

This is the main strategic thrust towards an increased focus on core asset reliability, which will also include a number of local improvements, both in terms of physical changes to assets and also in terms of enhanced staff training and sharing of best practice.

In addition, the following key improvements will deliver a benefit to operators on the route:

- the renewed points, train detection and signalling equipment in the area of the Severn Tunnel as a result of the first phase of the Newport Area Signalling Renewal
- anti-cable theft mitigations at high-risk locations on the route
- renewal of signalling and electrical power supply cables at vulnerable locations
- reliability improvements to mechanical signalling in the Cardiff Valleys and on the North and West route, and the motorisation of two sets of points at Ystrad Mynach
- fencing enhancements at Severn Tunnel Junction to reduce the risk of route crime
- lightning protection on key signalling assets in West Wales
- upgrade of signalling transmission equipment in the Newport area
- refurbishment of critical points at Newport
- a series of actions to reduce both the impact and number of railway suicides, through a range of physical initiatives at stations, and work with the Samaritans to train station staff to engage with vulnerable individuals
- implementation of a comprehensive vegetation management strategy to improve performance during the autumn leaf-fall season.

Network availability

The Newport – Crewe route features key seven day per week freight flows and has a strategic role in handling freight diverted from the route between Crewe, Wolverhampton, Birmingham and Gloucester.

For engineering access purposes the route divides broadly into three sections – south, mid and north. On the south between Newport (Maindee West Junction) and Hereford, and mid, between Hereford (Shelwick Junction) and Shrewsbury (Sutton Bridge Junction), restrictive midweek night access is routinely available through single line working. However, diversionary activity frequently affects the pattern.

On the northern section between Shrewsbury (Crewe Bank) and Crewe (Gresty Lane), access is heavily restricted to two opportunities per year.

Between Shrewsbury (Crewe Junction) and Chester (Saltney Junction), midweek nights access can be granted.

On the Cambrian lines, midweek night access can be granted, based around start-up times of empty stock workings from Machynlleth depot. The installation works for ERTMS, due for completion in 2010. Major work tends to take place in the spring and autumn school holidays, by agreement with Arriva Trains Wales.

Figure 16 Forecast PPM MAA – CP4 plan

	2010/11	2011/12	2012/13
First Great Western	91.3%	92.2%	92.7%
Cross Country	90.2%	90.6%	90.9%
Arriva Trains Wales	92.9%	93.2%	93.4%
Virgin Trains	87.8%	90.3%	90.6%

The west Wales section divides broadly into two sub-sections. Between Swansea and Llanelli, midweek night access can be granted provided that this does not conflict with periods when the Swansea District line (between Briton Ferry and Llandeilo Junction via Llangyfelach) is under occupation. Beyond Llanelli, midweek nights access can be granted, with single line working on the double track section to Clarboston Road (provided that the night-time Fishguard boat train can still be passed).

On the Heart of Wales section (north of Morlais Junction through to Craven Arms), ample midweek night access is available. The route is maintained to W5 standard because it is essential for occasional DB Schenker diversions for Margam and Llanwern traffic when the south Wales route is closed (e.g. for signalling commissioning).

Long term opportunities and challenges

The Network RUS for Electrification (published in October 2009, and which confirmed electrification of the Great Western Main Line by 2016 – 2017) also identified the possibility in the longer term of electrification of the South Wales Valley network based on Cardiff. The business case will largely depend on replacement of the existing diesel units by suitable electric units once the diesels become life-expired. It will also reflect synergy with the electrification of the main lines through Cardiff Central after completion of signalling renewal works.

In north Wales there continue to be stakeholder calls for a substantial number of additional stations to be built on the coast line, mainly between Chester and Rhyl, such that the route would be called upon to deliver a new role of providing for a frequent, urban stopping-train operation sharing the tracks with existing, faster long distance regional services which essentially link London, Birmingham and Cardiff with Holyhead. The three current stations between Chester and Rhyl (Shotton, Fflint and Prestatyn) are envisaged to be augmented by possibly four new stations at Broughton Airbus, Queensferry, Holywell Junction (for Greenfield) and "Rhyl and Prestatyn Parkway". Such additional services might link across Chester, whether from Crewe, or from Liverpool Lime Street via Liverpool South Parkway if north-west regional government funding is made available to open up the Halton Curve route described earlier.

Taith envisage possibly six additional sets of rolling stock being needed to sustain such an operation, which would place pressure on the Chester depot facilities unless an alternative site (off the direct line

of route) were identified. The 2010 Taith RTP notes that reasonable Benefit to Cost Ratios might accrue from the revenue generated by such a radically changed style of service provision of the eastern portion of the north Wales coast line, and further notes that franchise re-negotiation could be necessary to deliver a major regional and possibly cross-border aspiration of this nature reaching into north-west England.

Another long-term aim of WAG and Taith jointly is for restoration of passenger train services on that part of the former Amlwch branch, on Anglesey, between Gaerwen and Llangefni, probably running through to the island capital from Bangor or possibly from Llandudno Junction. This will require restoration of the junction at Gaerwen (now removed), and refitting (or renewal) of branch line track, plus construction of suitable new station facilities at Llangefni. Feasibility was initiated in late 2009 on behalf of WAG.

Infrastructure investment in CP4

Figure 17 Infrastructure investment in CP4 (formerly Proposed enhancements in CP4)

Implementation date	Project	Project description	Output change	Funder	GRIP stage
2010/11	(A) Buildings renewals	Buildings renewals at Pontypridd and Swansea	Renewal	Network Rail	Various
2010/11	(B) Earthworks renewals	Embankments renewals at Battlefield	Renewal	Network Rail	5
2010/11	(C) Structures renewals	Structures renewal at Britannia Bridge	Renewal	Network Rail	3
2010/11	(D) Track renewals	S&C renewals at Newport Usk Viaduct and Maindee North Junction	Renewal	Network Rail	Various
2010/11	(E) Cambrian Line	New and improved passing loops	Improved reliability and additional capacity	Network Rail and Welsh Assembly Government	6
2010/11	(F) Shrewsbury platform 3	Direct access to platform 3 from the Craven Arms direction	Improved reliability – modernised signalling system	Network Rail Discretionary Fund	6
2010/11	(G) Newport Area Signalling Renewal (NASR) Phase 2 enhancement element	Signalling renewal of Severn Tunnel Junction – Newport – boundary of Cardiff PSB	Improved reliability, additional capacity and improved track layout throughout the Newport area with rationalised eastern approaches to Newport station	Network Rail	4
2010/11	(H) Gaer Junction	Remodelled junction	Improved reliability and additional capacity	Network Rail and Welsh Assembly Government	4
2010/11	(I) Newport station	Station regeneration	Major station upgrade in time for the 2010 Ryder Cup Contribution to Newport regeneration	Welsh Assembly Government	6
2010/11	(J) Cogan Junction	Remodelled junction	Improved reliability and additional capacity	Periodic Review 2008	3
2010/11	(K) Wrexham North Junction – Saltney Junction single line	Options to redouble single line in part or whole	Increased capacity and linespeed improvements – journey time reductions	Welsh Assembly Government	3
2010/11	(L) North – South linespeeds	Options to develop linespeed increase	Reduced journey times	Welsh Assembly Government	3
2012/13	(M) Cockett – Duffryn single line	Options to redouble single line	Increased capacity and improved performance	Welsh Assembly Government	3
2010/11	(N) Chester station car park	Expansion of car park on west side of station	Increased car parking spaces	Third Party	4

Figure 17 Infrastructure investment in CP4 (formerly Proposed enhancements in CP4)

Implementation date	Project	Project description	Output change	Funder	GRIP stage
2010/11	Ⓞ Llandudno transport interchange	New transport interchange on the station forecourt	Improved station facilities and local connectivity with buses	Welsh Assembly Government	4
2010/11	Ⓟ Bangor transport interchange	Provision of a new car park, improved access and a new transport interchange on the station forecourt	Improved station facilities and local connectivity with buses	Welsh Assembly Government	3
2010 – 2013	Ⓠ Cardiff Queen Street – Cardiff Central corridor	Additional platforms at Cardiff Queen Street and Cardiff Central and bi-directional signalling	Improved reliability and additional capacity	Periodic Review 2008	3
2010 – 2014	Ⓡ Cardiff Area Signalling Renewal (CASR)	Signalling renewal of Cardiff PSB area	Improved reliability, additional capacity and capability throughout the Cardiff area – facilitates additional platforms at Cardiff Central and Queen Street – signalling controls migrate to new South Wales signalling centre – signal box closures	Network Rail	3
2011/12	Ⓢ Track renewals	S&C renewals at Caldicot, Carmarthen, Cogan loops, Gobowen, Grange Court, Margam Moors Junction, Panteg and Pwllheli	Renewal	Network Rail	Various
2012/13	Ⓣ Structures renewals	Structures renewals at Loughor Viaduct, Morrision Viaduct, River Cynon and Pont Briwet	Renewal	Network Rail	Various
2012/13	Ⓤ Track renewals	S&C renewals at Bridgend, Court Sart Junction, Craven Arms, English Bridge Junction, Holywell Junction and Whitchurch	Renewal	Network Rail	Various
2012/13	Ⓥ Ebbw Vale branch	Extension of Ebbw Vale branch northwards beyond Ebbw Vale Parkway to new station at Ebbw Vale Town	Lengthened branch line	Welsh Assembly Government (subject to agreement)	2
2012/13	Ⓦ Ninian Park – Radyr (City line)	Linespeed improvements	Reduced journey times – additional capacity	Periodic Review 2008	3

Figure 17 Infrastructure investment in CP4 (formerly Proposed enhancements in CP4)

Implementation date	Project	Project description	Output change	Funder	GRIP stage
2012/13	(X) Barry station additional platform	Additional platform	Improved reliability and additional capacity for Vale of Glamorgan line	Welsh Assembly Government	3
2012/13	(Y) Caerphilly station additional platform	Additional turnback bay platform	Additional capacity for Rhymney Valley line	Welsh Assembly Government	3
2012/13	(Z) Pontypridd station additional platform	Additional turnback bay platform	Additional capacity for Taff Vale line	Welsh Assembly Government	3
2012/13	(AA) Trefforest Curve	Doubling of single line (adjacent to Canton depot) between Cardiff Central and Ninian Park	Improved reliability and additional capacity	Periodic Review 2008	3
2012/13	(AB) Maesteg branch capacity	New passing loop at Tondy	Additional capacity for half hourly frequencies	Welsh Assembly Government (subject to agreement)	3
2012/13	(AC) Rhymney Valley capacity	New passing loop at Tir-phil	Additional capacity for half hourly frequencies north of Bargoed	Welsh Assembly Government (subject to agreement)	3
2012/13	(AD) Rhymney Valley line	New station at Energlyn	Improved access to the railway in the area north of Caerphilly	Welsh Assembly Government (subject to agreement)	3
2013/14	(AE) Cynon Valley extension	Extension of Cardiff-Aberdare passenger services beyond Aberdare to Hirwaun	Expansion of south Wales valleys network	Welsh Assembly Government (subject to agreement)	1
2013/14	(AF) Milford Haven station	Upgrade of facilities	Improved station facilities	Third Party (subject to agreement)	2
2013/14	(AG) Holyhead Depot relocation	Relocation of depot to permit land release at Holyhead station for road to link to Salt Island ferry berths for lorries	Relocated depot	Third Party (subject to agreement)	1
2013/14	(AH) Gaerwen – Llangefni	Reopening of branch line for new services from Llandudno Junction/Bangor to Llangefni	Addition of branch line to Wales national network	Welsh Assembly Government	1
2013/14	(AI) Newport Area Signalling Renewal (NASR) Phase 2 enhancement element	Signalling renewal of Severn Tunnel Junction – Gloucester and Newport – Abergavenny	Additional capacity and improved track layout throughout the area – signalling controls migrate to new South Wales Signalling Centre	Network Rail	3

NRDF candidate schemes in CP4

Figure 18 Candidate NRDF schemes in CP4

Implementation date	Project	Project description	Output change	Funder	GRIP stage
2010/11	(AJ) Llanvihangel bank	Introduction of a new intermediate block signal on Llanvihangel bank	Reduced signalling headways and increased capacity	Network Rail Discretionary Fund	4

GRIP stages: 1 Output definition, 2 Pre-feasibility, 3 Option selection, 4 Single option selection, 5 Detailed design, 6 Construction, test and commission, 7 Scheme hand back, 8 Project close out

Renewals activity

Figure 19 shows the estimated renewals costs and activity volumes.

The precise timing and scope of renewals will remain 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.

It should be noted that in order to manage the deliverability of our Civils, Signalling and Electrification plans we have included an element of over planning 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 proportion of the activities in these areas will slip to subsequent years.

Figure 19 Summary of estimated renewals costs and activity volumes

£m (2010/11 prices)	2010/11	2011/12	2012/13	2013/14
Renewals				
Track	49	49	28	49
Signalling	73	51	48	36
Civils	36	25	50	6
Operational property	18	14	14	11
Electrification	0	0	0	0
Telecoms	5	3	4	5
Total renewals	180	143	143	107
Renewals volumes				
Track				
Rail (km)	35	51	48	49
Sleepers (km)	26	48	34	35
Ballast (km)	24	41	31	32
S&C (equivalent units)	37	22	22	20
Signalling				
Conventional (SEU)	0	95	0	0
ERTMS (SEU)	88	0	0	0
Level crossings (no)	8	11	0	2

Appendix

Figure 20 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 (mins)	No of Tracks
L.01	Border (nr Pilning) – Swansea	SWB, BSW, SWM2, SWA	Primary	DfT	No	W8, W6A	8	90 (60)	none	TCB	7, 4	2
L.02	Gloucester – Border (nr Chepstow)	SWM2	Secondary	DfT	No	W8	8	90	none	TCB	4	2
L.03	Border (nr Chepstow) – Severn Tunnel Junction	SWM2	Secondary	DfT	No	W8	8	90	none	TCB	4	2
L.04	Border (nr Pontrilas) – Newport	MAI, HNL1	Secondary	DfT	No	W8	8	80	none	AB	(AB)	2
L.05	Crewe – Border (nr Pontrilas)	SYC, WSJ, SHL, HDC, HNL1	Secondary	DfT	No	W8	8	90	none	AB	(AB)	1
L.06	Craven Arms – Border (nr Knighton)	CWL1	Rural	DfT	No	W6A	5	60	none	NSKT	(n/a)	1
L.07	Llanelli – Border (nr Knighton)	CWL1, CWL2, VOT, LLA	Rural	DfT	No	W6A	5	60	none	NSKT	(n/a)	1
L.08	Cambrian Lines (Wales)	SBA, DJP	Rural	DfT	No	W6A	5	80	none	RETB	(n/a)	1
L.09	Shrewsbury – Border (nr Welshpool)	SBA	Rural	DfT	No	W6A	7	75	none	RETB	(n/a)	1

Figure 20 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 (mins)	No of Tracks
L.10	Shrewsbury – Border (nr Chirk)	WSJ	Secondary	DfT	No	W6A	8	70	none	AB	(AB)	2
L.11	Border (nr Chirk) – Border (nr Wrexham)	WSJ	Secondary	DfT	No	W6A	8	60	none	AB	(AB)	2
L.12	Chester – Border (nr Wrexham)	WSJ	Secondary	DfT	No	W6A	8	60	none	TCB	(AB)	1
L.13	Chester – Border (nr Saltney Junction)	CNH2	Secondary	DfT	Yes	W8	8	75	none	TCB/AB	6	2
L.14	Border (nr Saltney Junction) – Holyhead	CNH3	Secondary	DfT	No	W8	8	90 (75)	none	TCB/AB	4 to 22	2
L.15	Bidston – Border (nr Hawarden Bridge)	WDB3	Rural	DfT	No	W5	7	50	none	TCB	10	2
L.16	Border (nr Hawarden Bridge) – Wrexham	WDB1, WDB2	Secondary	DfT	Yes	W8	8	40	none	AB	4 to 14	2
L.17	Ebbw Vale Line	GAE, WV L	Rural	DfT	No	W8	8	50	none	OTW	(AB)	1
L.18	South Wales Valleys	(Multiple)	Secondary	DfT	No	W6A		50	none	TCB/mech	3 to 6	1 (2)
L.19	Maesteg – Bridgend	BAL	Rural	DfT	No	W6A	6	40	none	TCB/OTW	(AB)	1

Figure 20 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 (mins)	No of Tracks
L.20	Swansea – Milford Haven	SWL, SWM2, CAN, CNW	Secondary	DfT	No	W8	8	75	none	TCB/AB	6	2
L.21	Whitland – Pembroke Dock	PEM	Rural	DfT	No	W7	6	50	none	OTW	(AB)	1
L.22	Fishguard – Clarbeston Road	CRL, NPF	Rural	DfT	No	W6A	7	55	none	OTW	(AB)	1
L.23	Llandudno – Blaenau Ffestiniog	LTJ1, LLJ	Rural	DfT	Yes	W6	7	45 (50)	None	TCB, ETB, NSKT	4 to 74	1 (2)
L.99	Other freight lines			DfT	No				none			

Capacity and operational constraints

- | | |
|---|---|
| A | Cockett – Duffryn: Single line limits capacity |
| B | Newport – Crewe: Existing line speeds restrict journey time improvements |
| C | Cambrian Line: Single line sections limit capacity |
| D | Wrexham North Junction – Saltney Junction: Single line limits capacity |
| E | Severn Tunnel: seven minute headways limit capacity |
| F | Severn Tunnel Junction – Cardiff: variable relief line speeds restrict capacity |
| G | Capacity constraint at Cardiff Queen Street station |
| H | Capacity constraint at Cogan Junction |
| I | Single line between Porth and Treherbert |
| J | Single line between Abercynon and Aberdare |
| K | Single line between Abercynon and Merthyr Tydfil |
| L | Single line between Bargoed and Rhydney |
| M | Single line between Heath Junction and Coryton |
| N | Single line between Cardiff Queen Street and Cardiff Bay |
| O | Single line between Cogan Junction and Penarth |
| P | Single line between Barry and Barry Island |
| Q | Single line between Bridgend, Tondy and Maesteg |
| R | Holyhead – Llanfairpwll: long signalling block section |
| S | Conwy Valley: single line |

Other issues on the route

- | | |
|---|---|
| 1 | Cambrian line: introduction of ERTMS |
| 2 | Tywyn Sea Defences: require constant monitoring |
| 3 | City of Cardiff expansion and road congestion |
| 4 | Employment profile changes throughout the south Wales valleys |
| 5 | Expansion of Cardiff Airport |
| 6 | North Wales coast sea defence issues |
| 7 | River Conwy flooding issues |

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