Delivering a better railway for a better Britain
Network Specification 2017
Wales
This Network Specification describes the Wales Route in its geographical context and provides a summary of the infrastructure that is available for passenger and freight operators. It identifies the key markets for passenger and freight services by Strategic Route Sections (SRS). The SRSs cover specific sections of the route and are published as appendices to this document. They describe in greater detail the current and future requirements of each SRS to inform both internal and external stakeholders of our future strategy.

This Network Specification draws upon the supporting evidence from the Route Utilisation Strategy (RUS) process which informs the strategy to 2019, and the emerging findings from the Long Term Planning Process (LTPP) which looks ahead 10 and 30 years.

As part of the LTPP, four Market Studies have been established, covering the following markets:

- Long Distance passenger
- Regional urban passenger
- London and South East passenger
- Freight.

The Market Studies look at the strategic goals of the transport sector as a whole and those circumstances where rail can contribute to those goals, before forecasting future passenger and freight demand over the next 30 years. The studies then articulate a series of service level Conditional Outputs to meet the Strategic Goals, accommodating the forecast demand. The Market Studies are informing a series of Route Studies disaggregated nationally by Network Rail’s devolved Routes.

The Welsh Route Study was published in March 2016. It has developed demand forecasts and Conditional Outputs for flows wholly within the Wales Route, and seeks to accommodate these and the cross border Conditional Outputs from the Market Studies onto the Network; firstly by making best use of existing capacity and secondly through infrastructure intervention where there is an affordable and value for money business case for doing so. It provides choices for funders and will be a key part of the evidence base for the CP6 High Level Output Specification (HLOS).

There are also a number of other supporting documents that present specific strategies including:

- Scenarios and Long Distance Forecasts – published in June 2009. The document considers how demand for long distance rail services, both passenger and freight, might be impacted by four alternative future scenarios
- Electrification Strategy – published October 2009 presents a strategy for further electrification of the network. Work is ongoing to refresh the Strategy in the light of committed Control Period 5 electrification schemes, the ‘Electric Spine’ development project and the formation of a ‘Task Force’ to consider further electrification opportunities across the North of England.
- Stations – published in August 2011. This strategy considered the pedestrian capacity of stations on the network. It sets out a process for considering congestion at stations and proactively reviewing congestion across the network
- Passenger Rolling Stock and Depots – published in September 2011. This strategy takes a long term view of future passenger rolling stock and infrastructure to establish whether there may be opportunities to plan the railway more efficiently
- Alternative Solutions for Delivering Passenger Demand Efficiently – published in July 2013. This RUS has developed a strategy which presents a number of alternative solutions to carrying the future demand for rail passengers on some parts of the network more cost effectively.

You can find out more about the Long Term Planning Process here: https://www.networkrail.co.uk/running-the-railway/long-term-planning/
Route context

Across Wales

There are three major west-east routes in Wales, one in south Wales which continues to Bristol Parkway and to London Paddington, one in mid Wales which continues to the West Midlands, and one in north Wales which continues to Chester, Crewe, Warrington Bank Quay and Manchester Piccadilly with connections to the West Coast Main Line. These are all linked by a north-south route along the border counties which lies mainly in England but also weaves in and out of Wales – this is the spine of the network which connects the south, mid and north to each other.

When considered together, these routes form the basis of the national network in Wales which provides good connectivity within Wales and with the economic hubs at Birmingham, Bristol, London, Manchester and the Thames Valley. The network also serves the main UK – Ireland ports at Holyhead, Pembroke Dock and Fishguard.

South East Wales

This is the most densely populated area in Wales and it is well served by a mix of long distance services as well as urban commuter services which are referred to as the Valley Lines network. The Welsh Government has funded enhancements to the network which means that more frequent services now run on some lines.

Since 2005, two new commuter railway lines have reopened for passenger use in south east Wales – the Vale of Glamorgan line and the Ebbw Vale line. These lines are part of the Valley Lines network and services operate at an hourly frequency. The growth in demand has been exceptionally strong with train lengthening taking place on some journeys.

In Control Period 5 (CP5), there has been significant investment in the railway in south east Wales. The Newport Area Resignalling Scheme was completed in CP4 and the Cardiff Area Resignalling Scheme (CASR) has been completed in CP5. These schemes are the key to improving the asset condition, capability and performance of the railway.

The South Wales Main Line runs between Swansea, Cardiff, Newport and Severn Tunnel Junction. There is a mix of long distance train services to Holyhead, London, Manchester and Nottingham (via Birmingham), as well as interurban services to Bristol, Gloucester, the south coast and the west country.

The Valley Lines network consists of the Maesteg, Treherbert, Aberdare, Merthyr Tydfil, Rhymney, Ebbw Vale, City Line, Cardiff Bay, Penarth, Barry and Vale of Glamorgan Lines. This is a commuter railway network and the two stations in Cardiff namely Cardiff Central and Cardiff Queen Street are the hubs.

As part of CASR, additional capacity has been provided which includes the redoubling of the single track Treforest Curve between Cardiff West Junction and Penarth Curve North Junction, improving capacity on the City Line. Additional platforms at Cardiff Central, Cardiff Queen Street, Caerphilly, Barry and Pontypool; allowing for an additional four trains per hour to traverse the core section between Cardiff Central and Cardiff Queen Street during the peak. And a new passing loop at Tir Phil on the Rhymney Line which enables a half hourly frequency to Rhymney.

The Wales Route works very closely with the Welsh Government to identify options for meeting the growth in demand on the Valley Lines network. In 2013 a new station was opened on the Rhymney Line at Energlyn and Churchill Park, in 2014, a new station at Pye Corner opened on the Ebbw Vale branch, and in 2015 an extension of the Ebbw Vale line to an additional station at Ebbw Vale Town was delivered, all funded by the Welsh Government.

Control Period 5 will see the electrification of the Great Western Main Line from London Paddington to Cardiff. Intercity Express Programme (IEP) services will be introduced between Swansea, Cardiff and London, bi-mode trains.

As part of the procurement of the next Wales and Borders franchise, which will commence in October 2018, Welsh Government and Transport for Wales are assessing options for how they will modernise the Core Valley Lines network north of Cardiff Central including the line to Cardiff Bay. It is anticipated that the programme of work will be announced in early 2018, with modernisation works being delivered during CP6.
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March 2017

West and Mid Wales

In west Wales, the spine of the network is the South Wales Main Line which serves Swansea, Llanelli, Carmarthen, Whitland and Clarbeston Road.

The Pembroke and Tenby Branch Line, the Milford Haven Branch Line and the Fishguard Branch feed into the South Wales Main Line to provide through services to Swansea, Cardiff and Manchester.

The area is served by a mixture of interurban services and rural services, with the most frequent services running between Milford Haven, Carmarthen and Swansea with onward through journeys to Cardiff, Newport, Hereford, Shrewsbury and Manchester.

The first phase of Port Talbot West resignalling is taking place in CPS.

In mid Wales, the Cambrian Line and the Heart of Wales Line serve the rural market.

The Cambrian Line runs from Shrewsbury to Machynlleth, Dovey Junction and Aberystwyth, and the Cambrian Coast Line runs from Machynlleth to Dovey Junction, Barmouth and Pwllheli. These are predominantly single line railways with passing loops. Services currently run on two hourly frequencies through the day and hourly in the peak as part of a three year trial, and provide connectivity with the market towns of Newtown and Welshpool, as well as onward through journeys to Shrewsbury, Birmingham New Street and Birmingham International. The first UK application of the European Rail Traffic Management System (ERTMS) is on the Cambrian Line and the Cambrian Coast Line, which was commissioned in March 2011. In parallel with the ERTMS scheme, the Welsh Government funded infrastructure enhancements to enable more frequent train services on the line, as well as funding works at Dovey Junction to protect the railway from the effects of flooding during high tides.

The Heart of Wales Line runs between Llanelli and Craven Arms, via Llandeilo, Llangammarch and Llandrindod. It is a single line rural railway with passing loops, and it is popular with tourists and visitors. There are five journeys per day in each direction, which includes an additional peak service introduced as a three year trial, with services starting and finishing at Swansea and Shrewsbury.

The Marches and North Wales

The Marches line is the spine of the national network, as it connects south Wales with north Wales, weaving across the border counties of Herefordshire and Shropshire. It is a two track railway with mainly semaphore signalling.

At Shrewsbury, the line diverges to Crewe and Manchester in one direction and to Wrexham, Chester and north Wales in the other direction.

The North Wales Coast Line connects Holyhead, Bangor, Llandudno, Conway and Flint with Chester, which is an important interchange for passengers. The Blaenau Ffestiniog branchline connects with the North Wales Coast Line at Llandudno Junction.

The route from Chester to Llandudno Junction will be resignalised in CPS.

The Wrexham to Bidston line connects with the Merseyrail service at Bidston on the Wirral, providing an interchange for passengers travelling to and from Birkenhead and Liverpool. The line also serves Deeside which is an Enterprise Zone and a major employment area for people in north east Wales and Chester.

There is a mix of services running along the North Wales Coast Line and its feeder branches, with long distance services running from Holyhead and Bangor to London Euston via the West Coast Main Line. There are interurban services between Llandudno and Manchester, between Holyhead and Birmingham, between Manchester and west Wales via Newport and Cardiff and between Holyhead and Cardiff. Rural services run between Blaenau Ffestiniog and Llandudno on a broadly three hourly frequency.
Key markets and traffic flows

The passenger services which operate in Wales can be described in four distinct groups:

Long distance services

Long distance services run between south Wales and London using eight-coach formation high speed trains. These services cater for the long distance London market, and within Wales call at the principal stations at Swansea, Neath, Port Talbot, Bridgend, Cardiff Central and Newport. The frequency of services is every half hour between Cardiff and London, with half hourly services from Swansea to London in the peak and hourly services in the off-peak.

There are regular long distance services between Holyhead/Bangor and London Euston, which call at the principal stations including Bangor, Llandudno Junction, Colwyn Bay, Ryl, Prestatyn, Flint and Chester. There are six through services from north Wales to London, and seven through services from London to north Wales, every day.

More frequent services run from Chester to London.

Control Period 5 will see the electrification of the Great Western Main Line from London Paddington to Cardiff. Intercity Express Programme (IEP) services will be introduced between Swansea, Cardiff and London, bi-mode trains.

Interurban services

There is a strong interurban market in Wales, with regular through services between west Wales and Manchester (hourly), north Wales and Manchester (hourly) and, also, between Cardiff and Holyhead (two hourly), Cardiff and Bristol (half hourly) and Cardiff and Gloucester (hourly).

The Welsh Government funds a limited stop express train from Holyhead and Cardiff for the business market, with one return journey per day, as part of its policy to reduce journey times between north and south Wales.

Commuter services

The long distance services between Swansea and London also serve the commuter market between Swansea, Cardiff, Newport and Bristol and there are heavy peak flows in both directions. There are also very strong commuter flows from Severn Tunnel Junction to Bristol Temple Meads.

The busiest commuter market in Wales is on the Valley Lines network, where demand continues to grow at a rate of around five per cent per annum. South-east Wales is the most densely populated area and the Welsh Government continues to invest in service enhancements and train strengthening on the Valley Lines network, with high frequencies into Cardiff from Cardiff Bay, Barry, Penarth, Radyr, Pontypridd and Caerphilly. There is an hourly service to Cardiff Airport and St. Athan Enterprise Zone enabled by a rail-bus connection at Rhoose Station.

In parallel with the Cardiff Area Resignalling Scheme, the Welsh Government has funded enhancements to the Valley Lines network to help deliver the output of 16 trains per hour through the central Cardiff core between Cardiff Central and Cardiff Queen Street in the peak. This includes new turnback platforms at Pontypridd, Caerphilly and Barry, additional platforms at Cardiff Queen Street and Cardiff Central, and the redoubling of the Treforest Curve, which will provide the capacity and operational flexibility to deliver the enhanced service frequency. On the Cardiff to Rhyndney line, a new passing-loop at Tir Phil has been delivered which enables the frequency to be doubled.

Welsh Government is funding development of a scheme to enhance infrastructure along the route to Ebbw Vale to enable a more frequent service on the line. Additionally during CP5 an extension of the line was built from Ebbw Vale Parkway station to a new station at Ebbw Vale Town. An additional station at Pye Corner was opened in December 2014.

As part of the procurement of the next Wales and Borders franchise, which will commence in October 2018, Welsh Government and Transport for Wales are assessing options for how they will modernise the Core Valley Lines network north of Cardiff Central including the line to Cardiff Bay. It is anticipated that the programme of work will be announced in early 2018, with modernisation works being delivered during CP6.
Rural services

Most of mid Wales, west Wales and north west Wales is rural in nature. While these areas are often well served by interurban train services running on the main spines, the pattern of traffic on the feeder branch lines is less frequent.

There is growing demand on the Cambrian Line for leisure and business journeys to Shrewsbury, Birmingham and Birmingham International Airport.

The Heart of Wales Line and the Blaenau Ffestiniog Line are typical examples with several journeys in each direction per day and frequent stopping patterns at unstaffed stations. The Heart of Wales Line is popular with visitors and tourists and there are various promotions on the line to encourage demand.

The Welsh Government has funded additional services on both the Cambrian Line and the Heart of Wales Line to enable peak commuting into and out of Shrewsbury and Swansea respectively, for a trial period of three years.

A new passenger service between Carmarthen and Fishguard started in September 2011, initially on an experimental basis for three years, with funding from the Welsh Government. This service adds five return journeys per day to plug a gap in the network, as the only other trains serving Fishguard are timed to meet the ferry from Rosslare in Ireland at midday and midnight.

Across Wales, there are good connections between rural and interurban services and, in a number of cases, some rural services continue through to serve the interurban market. A good example of this is the Cambrian service, which is rural in nature between mid-Wales and Shrewsbury and which then continues to serve the interurban market between Shrewsbury, Wolverhampton and Birmingham.
Key freight markets and traffic flows

The rail industry’s accepted freight forecasts were published in the Freight Market Study in 2013. The Market Study is part of the Long Term Planning Process and these forecasts were developed in collaboration with a Working Group which included freight operators and stakeholders. The Market Study has been established by the Office of Rail and Road (the new name for the Office of Rail Regulation). The base year is 2011-12 and forecasts are available for 2023, 2033 and 2043 which in summary show:

- substantial growth in intermodal freight from ports and, in the longer term, between domestic intermodal terminals (many of which do not currently exist but are expected to be developed in future)
- a decline in coal traffic over the long term, partly offset by a growth in biomass as coal forms a smaller part of the UK’s power generation mix
- modest growth in other commodities, in particular aggregates for the construction industry.

Freight Market Study forecast freight growth is unconstrained by rail capacity and the extent of future new terminal developments. The unconstrained forecasts form the conditional outputs which have been assessed in the Welsh Route Study.

The South Wales Main Line, the North Wales Main Line and the Marches Line between Newport and Shrewsbury form the basis of the national freight network in Wales. This network supports the movement of freight from branch lines and a number of freight only lines. Steel, coal and petrochemicals are the predominant traffic in south Key freight markets and traffic flows.

Steel, coal and petrochemicals are the predominant traffic in south Wales, and there is also a moderate flow of container traffic between Cardiff and the midlands and Southampton.

In west Wales, the oil refineries near Milford Haven generate long distance flows to Westerleigh and to Theale. The Central Wales Line is very occasionally used for freight diversionary purposes.

The RWE coal-fired power station at Aberthaw on the Valley Lines network continues as a key power generator in Wales, and it attracts traffic from a variety of sources in south Wales, such as Cwmbargoed on the freight line north of Ystrad Mynach and Onllwyn on the freight lines north of Neath, and off the route from Avonmouth. RWE has invested in flue gas desulphurisation and selective catalytic reduction technology at the plant. This has extended the life of the power station and means that freight traffic will continue at current levels (as a minimum) in CPS.

The Vale of Glamorgan line offers a freight diversionary route to the South Wales Main Line between Cardiff and Bridgend. The principal traffic over the Swansea District line is steel traffic to and from the TATA works at Trostre in Llanelli. A new flow has started for Tesco from Daventry to Wentloog in Cardiff, for fast moving consumer goods into the retailers regional distribution centre at Magor.

The Marches line between Newport and Shrewsbury has experienced recent freight traffic growth and offers an alternative option to routeing traffic to the north via the busier, steeply graded Lickey route through Bromsgrove and Birmingham. The majority of the traffic is steel, scrap metal, coal and intermodal containers. Traffic volumes on this route will continue to be high during CPS, and as part of the improved timetable produced as part of the Newport to Shrewsbury resignalling scheme, an hourly off-peak freight path has been included.

The rail freight business in north Wales is mostly concentrated on the corridor in south east Wales and along the North & West Border Counties line. Steel traffic from TATA Llanwern in south Wales passes over the Marches line via Shrewsbury and Wrexham (for Deeside). This route is also used by coal traffic from Portbury Docks (Bristol) to Fiddlers Ferry and Rugeley power stations. The principal drivers of freight traffic in north Wales are the TATA steelworks at Deeside.

**Signalling Renewal**

The Cardiff Area Signalling Renewal (CASR) This has been the biggest enhancement scheme in the Route which commenced in CP4. The scheme has modernised the layout and signalling to provide more operational flexibility, resilience and capacity.

The scheme includes additional turn-back platforms at Pontypridd, Caerphilly and Barry, funded by the Welsh Government, which will enable more peak hour shorter distance services to operate, and additional platforms at Cardiff Queen Street and Cardiff Central to provide more operational flexibility and resilience. A new passing-loop has been constructed at Tir Phil (midway between Bargoed and Rhymney) to enable train service frequencies to Rhymney to be doubled to become half hourly, in line with all the other heads of the valleys services.

The upgrade of the City Line between Cardiff Central, Ninian Park and Radyr creates further additional capacity on the South Wales Valleys local network. This will allow additional peak services to be accelerated.

CASR also includes enhanced main line turn-back capability (from the east) at Cardiff Central station, together with rationalisation of its eastern approaches and improved throughput for passenger and freight movements.

Further signalling renewals planned for CPS include the North Wales Coast Main Line Phase 1 between Rockcliffe Hall and Llandudno Junction, and Port Talbot West Phase 1.

**North – South**

Welsh Government is funding a scheme that improves journey times and capacity on this route which is being delivered in Control Period 5. The scheme involves redoubling part of the route between Wrexham General and Saltney Junction which will enable a reduction in significant station dwell times at Chester for southbound trains and Shrewsbury for northbound trains.

**South East Wales**

The Welsh Government has funded an extension of the recently opened line from Ebbw Junction (near Newport) beyond its interim terminus at Ebbw Vale Parkway to a station serving the Ebbw Vale Town in 2015, as well as an additional station at Pye Corner which opened in December 2014. These lines are both served by through trains, from Cardiff Central to Maesteg, and from Cardiff Central to Ebbw Vale Parkway respectively.

Welsh Government is also funding enhancement of this route to provide additional network capacity which will enable a higher frequency of service to operate between Cardiff Central and Ebbw Vale Town. During CPS this enhanced network capability will also provide the ability to operate services between Ebbw Vale Town and Newport.

As part of the procurement of the next Wales and Borders franchise, which will commence in October 2018, Welsh Government and Transport for Wales are assessing options for how they will modernise the Core Valley Lines network north of Cardiff Central including the line to Cardiff Bay. It is anticipated that the programme of work will be announced in early 2018, with modernisation works being delivered during CP6.

**National Stations Improvement Programme (NSIP) Plus for Wales**

A programme of prioritised station improvement works within Wales is ongoing during CPS.

**Electrification**

Control Period 5 will see the electrification of the Great Western Main Line from London Paddington to Cardiff. Intercity Express Programme (IEP) services will be introduced between Swansea, Cardiff and London Paddington.
Beyond Control Period 5
As part of the Long Term Planning Process, the Welsh Route Study, published in March 2016, set out a number of ‘choices for funders’ for the medium term. The Route Study firstly focused on optimising the existing network capacity, and the choices which were presented typically require investment in more trains, more services, and/or more capacity in the rail infrastructure. The choices are set out to meet future growth in demand or to provide better connectivity.

The Welsh Route Study also set out a longer term strategic vision for the next 30 years, which enables identification and subsequent development of future priorities for the railway in Wales and the Borders.

The Welsh Route Study and other documents relating to the Long Term Planning Process can be found here:
https://www.networkrail.co.uk/running-the-railway/long-term-planning/

Digital Railway
The Digital Railway is a rail industry-wide programme designed to benefit Great Britain’s economy by accelerating the digital enablement of the railway. The programme is integrating digital modernisation of the railway with industry planning and spans technology, business change and commercial innovation offering a more cost-effective and higher-performing railway that delivers a bigger economic benefit.

The digital modernisation of the railway is one part of the package for delivering a sustainable and growing railway meeting passengers’ and freight customers’ needs. As part of a package of measures the Digital Railway is a vital enabler for long-term growth because it releases latent capacity in the GB rail infrastructure to support the economy.

In most areas, work to develop technical capability is underway. The programme will seek to determine what is required to align and accelerate different initiatives to bring them into a single road map underwritten by the whole industry.
Wales

Route map
Wales

Capabilities maps

Linespeed
Wales

Capability maps

Gauge