

Route Plans 2008
Route 15
South Wales Valleys



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Route 15 South Wales Valleys



Section 1: Today's railway

Route context

The South Wales Valleys route is essentially a busy urban passenger network radiating from the Welsh capital city of Cardiff, and which has been experiencing gradual expansion since the late 1980s. The most recent addition to this local network has been the nineteen-mile long 'Vale of Glamorgan' line which, from June 2005, gained hourly services linking Cardiff with Bridgend via Barry serving two new stations at Rhoose (for Cardiff International Airport) and at Llantwit Major. A key strength of the route is its excellent

penetration of the city centre of Cardiff, for retail and employment purposes, as the majority of trains serve both Cardiff Central and Cardiff Queen Street stations, this enables interchange with longer-distance east-west services on the Great Western Main Line (GWML) at Cardiff Central. The rapidly growing Cardiff Bay area to the south of the city centre is also linked to the Valleys network by means of a shuttle service to and from Queen Street station. The Wales Rail Planning Assessment was published in July 2007, and will be followed by a Wales Route Utilisation Strategy (RUS), which will be published for consultation in May 2008.

Today's route

The arteries of the Valleys route radiate northwards, southwards and westwards from Cardiff. The four main components running northwards are:

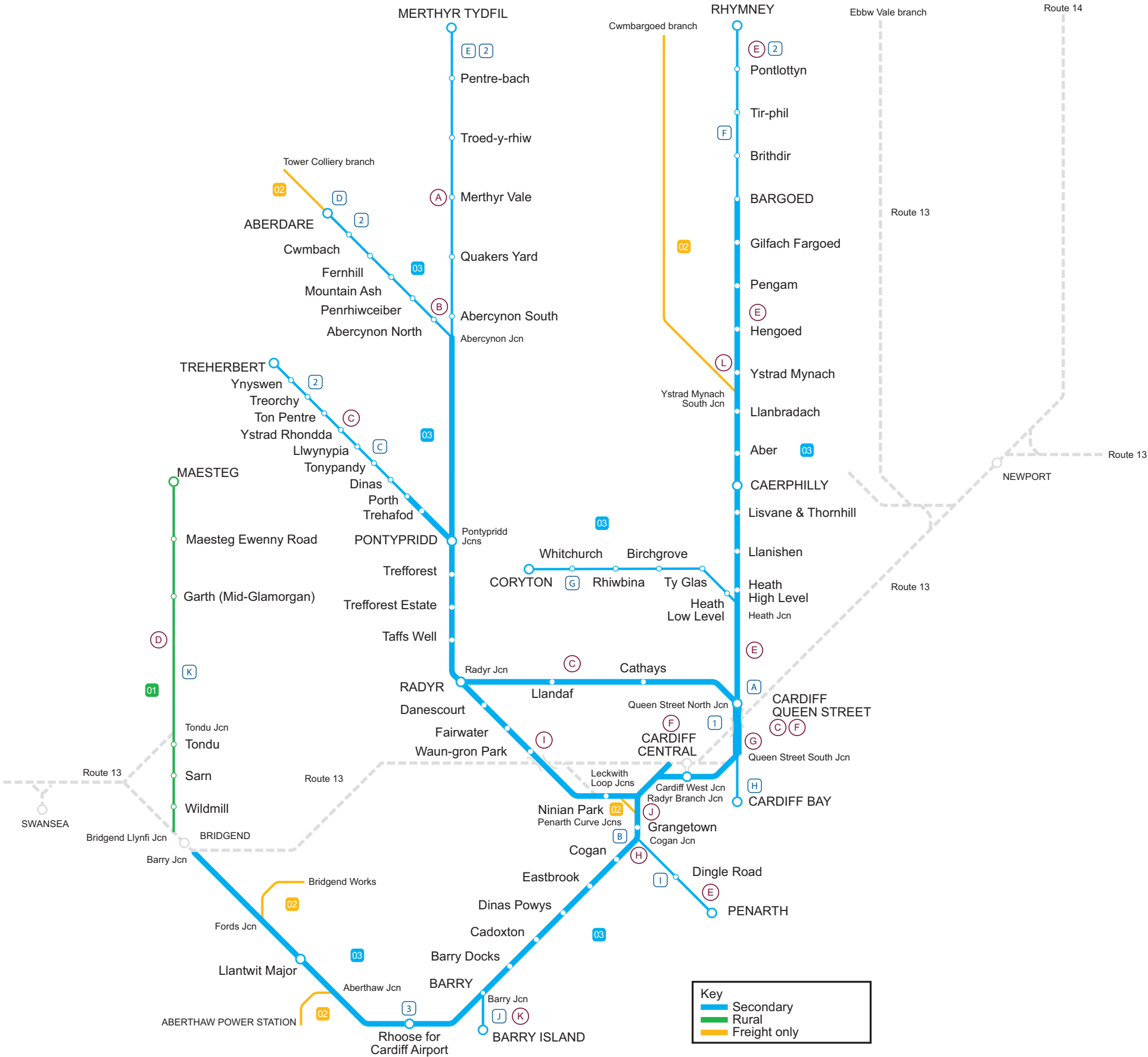
- the 'Taff Vale' section from Cardiff to Pontypridd and Merthyr;
- the Rhondda valley section from Pontypridd to Treherbert;
- the Cynon valley section, from Abercynon to Aberdare, plus the freight-only section beyond Aberdare to Hirwaun; and
- the Rhymney valley section from Cardiff to Rhymney, off 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.

Southwards and westwards components comprise:

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

The route comprises Strategic Route Section 15.03, with the exception of the Bridgend to Maesteg branch (15.01) and the freight only lines (15.02).

Route 15 South Wales Valleys



Current passenger and freight demand

The number of passengers carried has grown by 62 percent over the period between 1998 and 2004. The two main stations at Cardiff (Central and Queen Street) account for 67 percent of all passenger demand on the route, with significant secondary volumes carried to Pontypridd, Caerphilly, Barry and Bridgend. The underlying basis of demand has been that as heavy industry in the Cardiff Valleys has declined; the freight traffic which once dominated movements has virtually disappeared. This makes possible the expansion of passenger services on routes where demand for travel to Cardiff has grown in line with increased job/leisure opportunities in the capital, and employment loss in the valleys themselves.

Steadily growing passenger volumes in recent years have led to gradual fleet expansion which has put pressure on the main Cardiff Canton depot both for maintenance and stabling purposes.

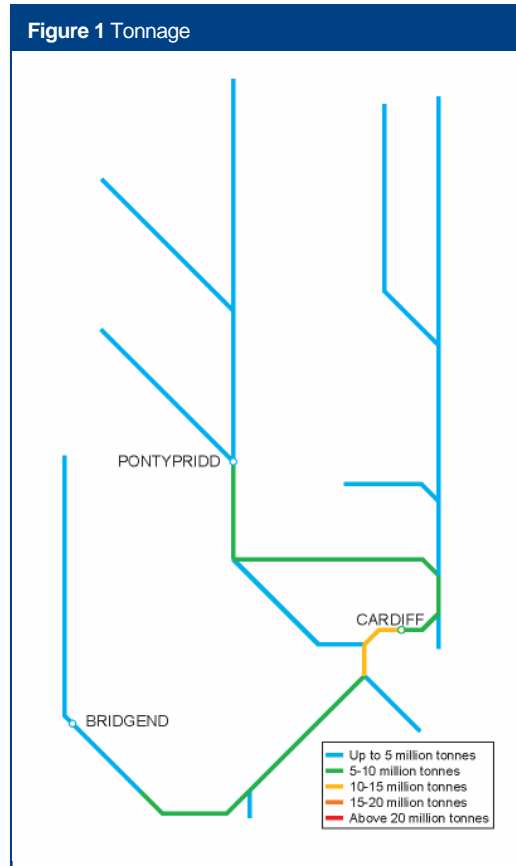
The coal-fired power station at Aberthaw continues as a key power generator in Wales, and attracts traffic from a variety of sources which include Tower Colliery, on the freight line north of Aberdare, Onllwyn on the freight line north of Neath, and off the route from Avonmouth. After a period of disuse, coal traffic from Cwmbargoed to Aberthaw restarted in January 2008 over the freight-only branch line from the Rhymney Valley at Ystrad Mynach.

Current services

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 simplified range of pairings of north-south origins and destinations further. The bulk of services are self-contained to the local network, radiating from Cardiff Queen Street, although Maesteg services run over the GWML from Cardiff Central to Bridgend and are provided in conjunction with other secondary main line services. 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 Pontypridd, Bargoed, Penarth and Barry. Some 'outer' sections have two trains per hour, namely Treherbert and Aberdare, as well as the City Line and Coryton branches. The others (Maesteg, Bridgend via the Vale of Glamorgan line, Rhymney and Merthyr) have hourly services.

English, Welsh and Scottish Railway operates freight services on the route.



Traffic volumes are summarised in Figure 4.

Figure 1 shows the total annual tonnage levels on the route.

Figure 2 and Figure 3 show the current levels of service.

Figure 2 Current train service level (trains per hour)

Valley Lines service	
Treherbert – Cardiff Central	2 peak/2 off peak
Aberdare – Barry	2 peak/2 off peak
Pontypridd – Barry	4 peak/4 off peak
Merthyr Tydfil – Bridgend (via vale of Glamorgan)	1 peak/1 off peak
Coryton – Cardiff Central	2 peak/2 off peak
Rhymney – Penarth	2 peak/1 off peak
Bargoed – Penarth	4 peak/4 off peak
Cardiff Queen St – Cardiff Bay	4 peak/4 off peak

Figure 4 Current use

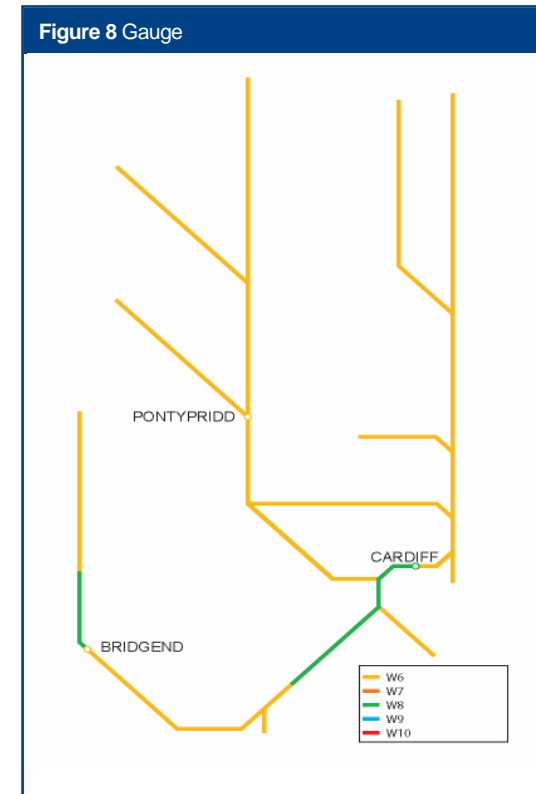
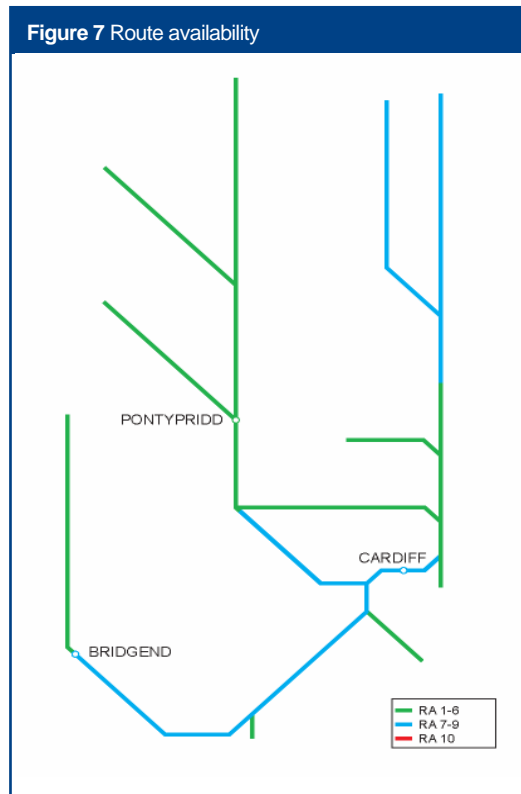
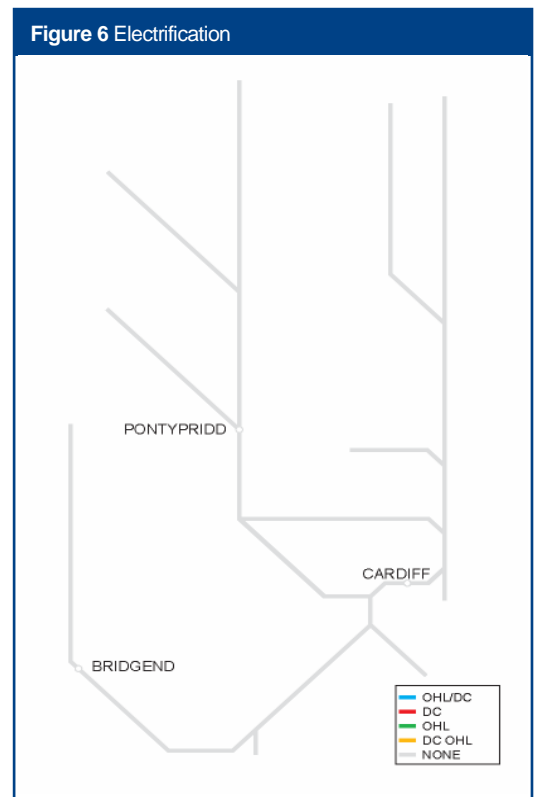
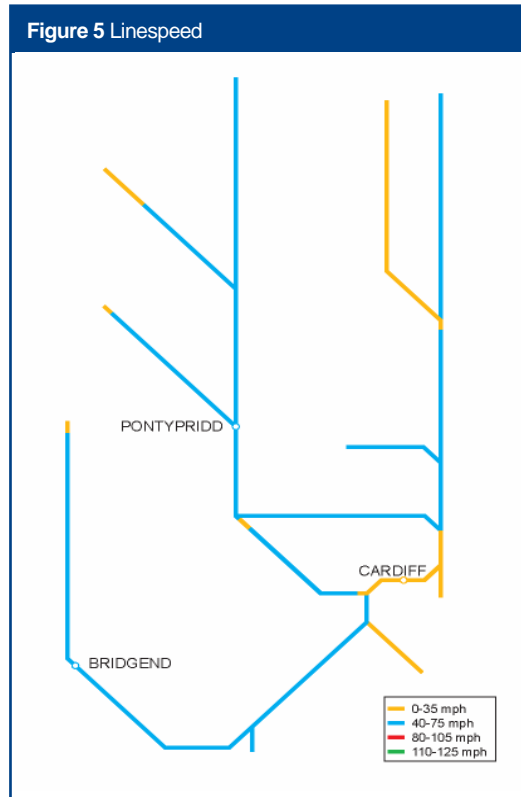
	Passenger	Freight	Total
Train km per year (millions)	5	0	5
Train tonne km per year (millions)	408	220	627

Figure 3 Current train service level (trains per hour)

Regional/Rural Services	Trains per hour each way
Maesteg – Bridgend (to Cheltenham Spa via GWML)	1

Current infrastructure capability

The following maps set out the capability of the current network:



Current capacity

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 (Maesteg, 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. Freight traffic generated in the area has declined but regular coal and aggregates flows remain in the Cynon valley, whilst the major power station at Aberthaw receives coal from within the route as well as from further afield.

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 9 shows the peak trains per hour trains on key sections of the route.

Current performance

2007/08 has seen a significant improvement in Arriva Trains Wales' overall performance with the PPM target of 90.1 percent consistently bettered.

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

Figure 9 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	4
Maesteg to Bridgend	1

Figure 10 Current PPM MAA (2007/08)

TOC	MAA	As at period
Arriva Trains Wales	92.3%	12

Section 2: Tomorrow's railway

HLOS output requirements

Figure 11 Total demand to be accommodated by Strategic Route

Routes	Annual passenger km forecast in 2008/09 (millions)	Additional passenger km to be accommodated by 2013/14 (millions)
South Wales Valleys	153	13

Figure 12 Peak hour arrivals to be accommodated by Strategic Route

City	Peak three hours			High- peak hours		
	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)	Forecast 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

Future demand

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 next regulatory control period (CP4) in 2014.

At the rate of growth projected within the Sewta strategy, five percent year on year, the need for more paths is expected to become a critical issue by 2013-2014, beyond the committed platform lengthening scheme due for completion in 2008 and which will permit widespread 6 car operation. The principal options under consideration are for additional platforms at both Cardiff Central and Cardiff Queen Street stations and greater operational flexibility for services between these two key stations. Development of these options within the Cardiff Area Signalling Renewal scheme will enable Sewta objectives to be implemented in conjunction within the planned renewals in 2010-2012 in a cost-effective manner, subject to agreement with the Welsh Assembly Government over incremental funding arrangements.

The immediate aspiration for frequency increase north of Cardiff on the Merthyr line, will be met by remodelling at Abercynon and the construction of a

passing loop between there and Merthyr Tydfil (due for completion in 2008). South of Cardiff, Sewta anticipates improved frequencies on the Vale of Glamorgan section in the medium term between Barry and Bridgend. These changes to cater for long term demand growth are consistent with the basic Standard Pattern Timetable and will build on the recent programme of platform lengthening.

The establishment of a new Defence Training Academy at RAF St Athan with a potential 5,000 new jobs would increase demand on the already successful Vale of Glamorgan line services.

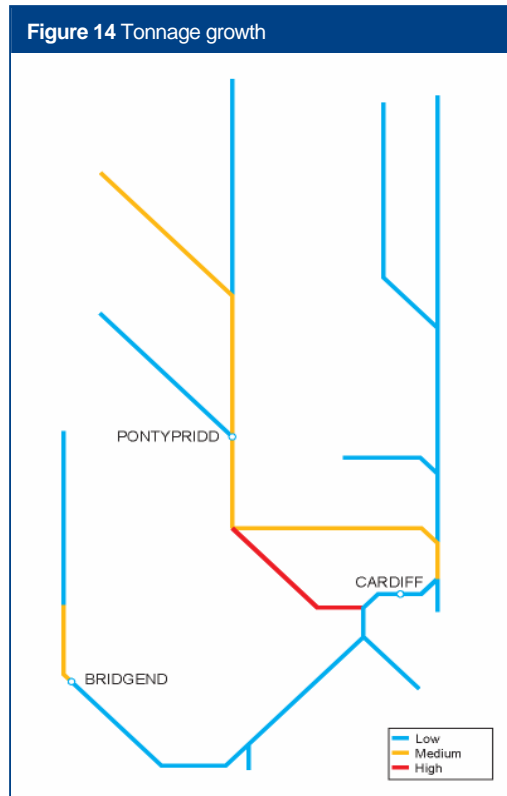
The DfT and Welsh Assembly Government (WAG) jointly commissioned Wales Rail Planning Assessment (WRPA) recognised that growth in traffic levels were mainly in South Wales. A forecast of future passenger demand undertaken for the WRPA indicates an increase of 35 percent by 2016 and to 48 percent by 2026.

The WRPA informs the Wales RUS, led by Network Rail which is due to be published in May 2008 providing a view of the next ten years.

Section 3: Proposed 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		Cogan Junction enhancement	Additional capacity – improved reliability
2011-13		Cardiff Area Signalling Renewal (CASR)	Improved reliability – facilitates remodelled track layout throughout the Cardiff area and additional platforms at Cardiff Central and Queen Street – signalling controls migrate to new South Wales signalling centre – signal box closures
2010-13		Cardiff Queen Street station area – remodelled track layout and additional platforms	Additional capacity – improved reliability
2012/13		Ninian Park – Radyr (City line)	Reduced journey times – improved reliability
2012/13		Trefforest Curve doubling of single line	Additional capacity – improved reliability
2012/13		Barry station additional platform	Additional capacity for Vale of Glamorgan line – improved reliability



Strategic direction

The Department for Transport and Welsh Assembly Government's (WAG) joint Wales Rail Planning Assessment (WRPA), published in July 2007, evaluated rail traffic and infrastructure requirements for the next twenty years. The WRPA recognised the constraints on infrastructure capacity in south east Wales and endorsed the need for development of schemes to address the most heavily utilised section through the centre of Cardiff. The WRPA has informed Network Rail's Wales Route Utilisation Strategy (RUS) for which baseline work began in January 2007. The Wales RUS will be published for consultation in May 2008.

Sewta (South East Wales Transport Alliance) is a consortium of ten unitary authorities and works in partnership with the Welsh Assembly Government and Network Rail and the transport operators towards the development of transportation strategies for the region, and coordinates third party enhancement schemes on the route. There is continuing interest in providing greater capacity and reduced journey times, to offer improved frequencies as an attractive alternative to road, particularly in the congested A470 corridor between Pontypridd and Cardiff and thereby seeking to actively increase rail market share. During 2005 a strategic review of Sewta rail policy was started, in order to create a framework for future investment over the period 2009-2018.

Future train service proposals

The current Arriva Trains Wales franchise specification does not provide for additional services within the term of the franchise. However, to meet forecast growth provision the need for longer trains will continue.

Arriva Trains Wales is exploring further opportunities for developing services on the Vale of Glamorgan line, in line with the emerging employment opportunities at locations on the route.

There is clear recognition within the Sewta strategy that for enhanced service frequencies to be offered through the Cardiff Queen Street bottleneck then additional infrastructure capacity will be required to move beyond the currently saturated position. In the short to medium term demand is expected to be catered for by adjusting train length within existing frequencies.

Figure 14 indicates the forecast percentage change in tonnage to 2017.

Future capability and capacity

In order to meet any proposal for an increase of train paths, from 12 per hour currently to 16 per hour through the Cardiff Queen Street – Cardiff Central corridor, remodelling of both stations would be necessary. This is likely to involve the reinstatement of the upside disused platform, increased bi-directional signalling through the station area and the reconfiguration of Queen Street North Junction. Separation of Cardiff Bay shuttle services by the provision of an additional bay platform at Cardiff Queen Street may provide further capacity gains through the station by freeing up the existing platform 3 for through services only.

We believe that the provision of an additional platform and connection to a main line platform at Cardiff Central would act as a pressure release for Queen Street and provide the capacity and operational flexibility required to accommodate the forecast number of trains required.

Remodelling of Cardiff Queen Street station platform buildings will improve passenger comfort during peak hours.

The reinstatement of a west-facing bay platform at Cardiff Central between existing platforms 4 and 6 will be required to accommodate additional services from Maesteg.

Provision for these works will be made in the Cardiff Area Signalling Renewal planned for 2012.

A programme of 42 platform extensions throughout the route is due for completion in 2008.

A new station at Abercynon is being implemented enabling provision for frequency enhancements on the Merthyr Tydfil to Cardiff route.

Network Rail is undertaking a national programme for station improvements and car park expansion. Working in conjunction with our customers we have shortlisted a number of stations for modernisation as part of the Government's £150m funding initiative.

Additional vehicles will be required to strengthen services to meet future demand. This is likely to further impact on the capability of the restrictive Cardiff Canton depot to maintain a greatly increased fleet.

Future performance

Figure 15 sets out the planned PPM for the train operator. Figure 16 sets out the trajectory we propose as local commitments with the operator. These are lower than planned given the need for flexibility in achieving the HLOS targets and to reflect the greater uncertainty and risk associated with projecting performance at a disaggregated level. Reasonable requirements will finally be established for CP4 in our 2009 Business Plan.

In addition to continued improvement in asset reliability, a major focus of attention will be the work necessary to devise more robust train timetables. Network Rail is working closely with Arriva Trains Wales to gain operational experience of its Standard Pattern Timetable and to support and improve its performance. Resource plans that are robust in terms of recovery from incidents are being developed.

The introduction of a new signalling control centre for South Wales in 2008 is expected to deliver greater operational and performance management benefits for all our customers.

Arriva Trains Wales

The performance of the ATW franchise is currently 92.3 percent PPM MAA and the forecast for April 2009 is to improve to 92.5 percent PPM. The improved PPM is an outcome of Network Rail and Arriva Trains Wales working together to improve the PPM performance across the whole franchise, and with the Standard Pattern Timetable benefiting performance. Route Improvement Groups are focused on individual service groups, particularly the Cambrian, to sustain PPM improvements.

The key performance issues and opportunities for this route have been identified as:

- construction works risk due to the re-signalling works in South Wales;
- operational benefits from ERTMS on the Cambrian;
- reduction in the impact of trespass, vandalism and fatalities; and
- Autumn management.

The Network Rail route plan is being developed around these key points and currently suggests that performance on ATW by April 2014 will be around 93.5 percent. This includes an allowance for passenger/traffic growth and an increase in engineering work. ATW is willing to work closely with Network Rail to develop detailed year-by-year plans for delivery of a higher level of sustained performance.

The steps we are taking to achieve these performance improvements are detailed in the Performance section of the Strategic Business Plan.

Figure 15 Forecast PPM MAA- CP4 plan

	2009/10	2010/11	2011/12	2012/13	2013/14
Arriva Trains Wales	92.7%	92.9%	93.2%	93.4%	93.5%

Figure 16 Forecast PPM MAA - proposed local commitments

	2009/10	2010/11	2011/12	2012/13	2013/14
Arriva Trains Wales	91.7%	91.9%	92.2%	92.3%	92.5%

Engineering access

For engineering access purposes the Cardiff Valleys route divides broadly into two sections, north and south of the Great Western Main Line at Cardiff Central. On the northern sections, from Cardiff up the Rhymney, Taff, Cynon and Rhondda valleys, midweek night access can generally be granted. The main route from Cardiff Queen Street to Radyr (via Llandaff) is not generally closed at the same time as the City Line (via Fairwater) between Penarth Curve North and Radyr, which offers a diversionary capability. On that part of the South Wales Valleys route between Cardiff, Barry and Bridgend (via the Vale of Glamorgan line) closure is not permitted when diversions from the GWML between Cardiff and Bridgend via Pontyclun are planned, although midweek nights access can also generally be granted on the branches to Cardiff Bay, Penarth and Barry Island, as well as on the detached Bridgend to Maesteg section. In any event access to Aberthaw Power station, on the Vale of Glamorgan line, must be maintained either from the east or the west.

Long term opportunities and challenges

To address future growth beyond 2014 the introduction of replacement rolling stock with high density seating may be considered to provide additional capacity. Selective door operation may also reduce the need for further major infrastructure enhancement.

Enhancements to be completed by end of CP3

Figure 17 CP3 enhancements

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2008/09	Ⓐ Pontypridd – Merthyr	Frequency enhancement	Increased train service frequency to meet demand	Welsh Assembly Government	6
2008/09	Ⓑ Abercynon North and South stations	Combined to form one station	Improved connectivity	Welsh Assembly Government	6
2008/09	Ⓒ Treherbert – Cardiff Queen Street	Platform extensions	Accommodation for 6 cars trains to meet demand	Welsh Assembly Government	6
2008/09	Ⓓ Maesteg – Bridgend	Platform extensions	Accommodation for 4 cars trains to meet demand	Welsh Assembly Government	4
2008/09	Ⓔ Rhymney – Penarth	Platform extensions	Accommodation for 6 cars trains to meet demand	Welsh Assembly Government	6

Proposed enhancements in CP4

Figure 18 Proposed enhancements in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010-13	Ⓕ 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 Renewals	3
2010-13	Ⓖ 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
2012/13	Ⓚ Barry station additional platform	Additional platform	Improved reliability and additional capacity for Vale of Glamorgan line	Welsh Assembly Government (subject to agreement)	1
2012/13	Ⓜ Trefforest Curve	Doubling of single line	Improved reliability and additional capacity	Welsh Assembly Government (subject to agreement)	3

NRDF candidate schemes in CP4

Figure 19 NRDF candidate schemes in CP4

Implementation date	Project	Project description	Output change	Funder	GRIP stage
2012/13	① Ninian Park – Radyr (City line)	Linespeed improvements	Reduced journey times – additional capacity	Network Rail Discretionary Fund	3
2010/11	Ⓜ Cogan Junction	Remodelled junction	Improved reliability and additional capacity	Network Rail Discretionary Fund	3
2011/12	Ⓛ Ystrad Mynach loop	Repositioned loop	Improved reliability and additional capacity	Network Rail Discretionary Fund	3

Maintenance and renewals activity

Figure 20 shows the estimated maintenance and renewal 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 & 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 small proportion of the activities in these areas will slip to subsequent years.

Figure 20 Summary of estimated maintenance & renewals costs and activity volumes

£m (2006/07 prices)						Control Period Totals			
	2009/10	2010/11	2011/12	2012/13	2013/14	CP4	CP5	CP6	CP7
Maintenance expenditure									
Track	4	4	4	4	3	19	17	16	17
Signalling	1	1	1	1	1	4	4	4	4
Electrification	0	0	0	0	0	0	0	0	0
Telecoms	1	0	0	0	0	2	2	2	2
Plant and Machinery	0	0	0	0	0	1	1	1	1
Other (overheads / indirect)	4	3	3	3	3	17	15	15	15
Total	9	9	9	8	8	43	39	37	37
Renewals									
Track	6	6	5	5	5	26	14	19	31
Signalling	19	19	8	3	1	50	3	11	8
Civils	4	4	4	4	4	21	19	19	18
Operational Property	3	3	3	3	3	13	13	13	13
Electrification	0	0	0	0	0	0	0	0	0
Telecoms	3	3	1	1	0	9	3	3	4
Plant and Machinery	1	1	1	1	1	4	4	4	4
Total	36	36	22	16	13	123	56	69	78
Renewals Volumes									
Rail (KM)	3	3	3	3	2	14	21	12	12
Sleepers (KM)	4	4	4	4	4	22	10	34	61
Ballast (KM)	4	4	4	4	4	21	9	34	61
S&C Units	8	10	5	7	8	38	15	11	18
SEUs commissioned	0	153	85	39	0	277	0	27	44

Appendix

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets) ELR is Engineers Line Reference and RA is Route Availability

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
15.01	Maesteg – Bridgend	BAL	Rural	DfT	No	W6A	6	40	none	TCB/OTW	(AB)	1
15.02	Freight Lines			DfT	No				none			
15.03	South Wales Valleys	(Multiple)	Secondary	DfT	No	W6A		50	none	TCB/mech	3-6	1 / 2

Capacity and operational constraints

- A Capacity constraint at Cardiff Queen Street station
- B Capacity constraint at Cogan Junction
- C Single line between Porth and Treherbert
- D Single line between Abercynon and Aberdare
- E Single line between Abercynon and Merthyr Tydfil
- F Single line between Bargoed and Rhymney
- G Single line between Heath Junction and Coryton
- H Single line between Cardiff Queen Street and Cardiff Bay
- I Single line between Cogan Junction and Penarth
- J Single line between Barry and Barry Island
- K Single line between Bridgend, Tondy and Maesteg

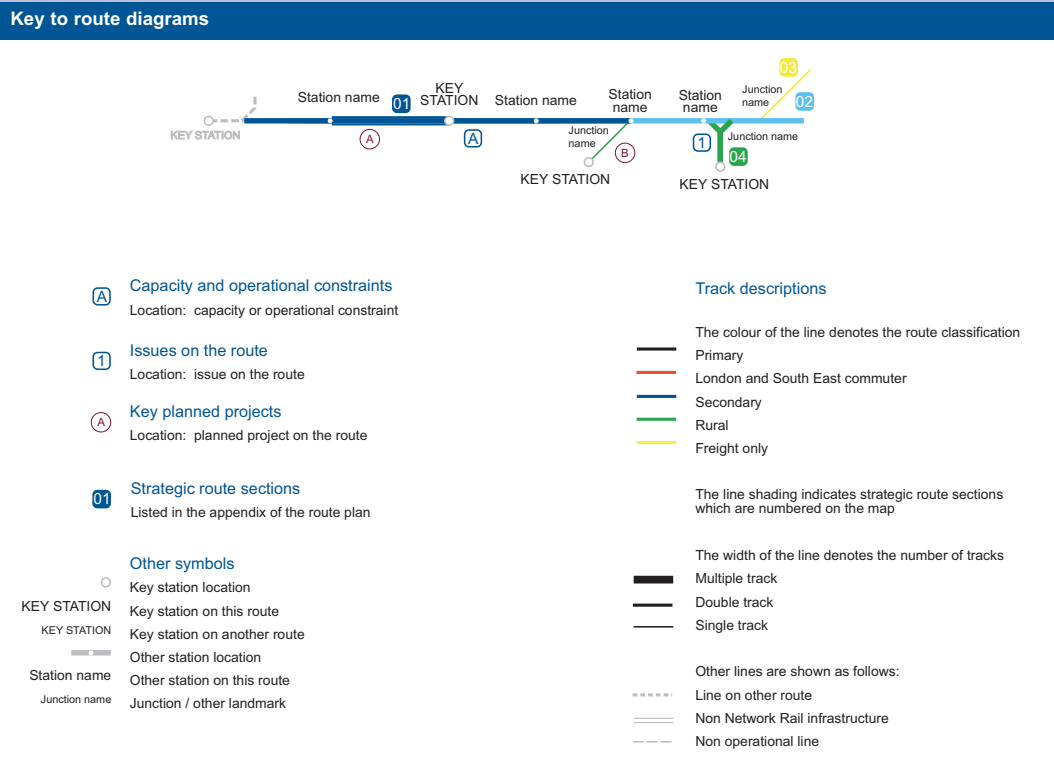
Other issues on the route

- 1 City of Cardiff expansion and road congestion
- 2 Employment profile changes throughout the south Wales valleys
- 3 Expansion of Cardiff Airport

Note

This Route Plan forms part of the April 2008 update of Network Rail's Strategic Business Plan. The Route Plan supersedes the version published on 1 November 2007.

Other documents in the Strategic Business Plan can be found on the Network Rail website www.networkrail.co.uk



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

**This Route Plan is part of a set.
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