

Sewta Rail Strategy Study

Final Report

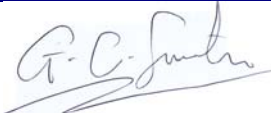







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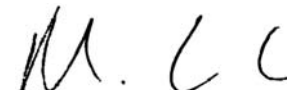

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1 INTRODUCTION

1.1 Background

The South East Wales Transport Alliance (Sewta) has been established as a formal Local Government Committee (Board) responsible for the strategic planning of public transport in South East Wales. The region covers 10 local authorities spreading from Monmouthshire in the east to Bridgend in the west and Cardiff in the south to the Heads of the Valleys in the north. Sewta has 6 topic groups covering policy, bus, rail, finance, communications and public affairs and monitoring, bringing together the previous transport partnerships of SWIFT and TIGER covering South East Wales.

The Sewta Region is the Capital Region and contains 48% of Wales' population. The area is experiencing a decline in traditional manufacturing, has a low employment rate and low average earnings, especially in the Valleys to the North of Cardiff, Newport and Bridgend. There has been a growth in service sector employment in the M4 corridor and coastal area resulting in a growth in commuting into Cardiff and Newport from the surrounding areas.

Rail transport is seen as particularly important in the region. In this part of Wales the rail network, radiating from Cardiff, Bridgend and Newport, provides an attractive alternative to the use of the private car on the congested highway network. In 2002/03 there were around 14 million rail passenger trips per year to / from and within the Sewta area. 68% of these trips were made wholly within the Sewta area, of which 73% were to / from Cardiff. Other key local destinations are Newport, Pontypridd and Caerphilly.

This rail strategy study is being undertaken in parallel to a bus strategy study¹. However, it is recognised that rail services are more reliable than bus services (especially in the peak periods) and serve the longer distance travel market in the region. Where commercial bus services parallel rail services, which generally operate along radial corridors, they often serve different, usually more local, markets.

Sewta is currently implementing a five year improvement programme involving new stations, new services on former freight lines and improved services to half-hourly minimum weekday headways to most parts of the region. This study was required to look beyond at the medium / long term and develop a strategy to take services in South East Wales into the second decade of the 21st Century.



The rail strategy is aimed at taking forward and delivering the Sewta economic, social and transport objectives and the study has focused on defining a strategy that is realistic, practical, and deliverable.

1.2 Study Process

The study follows on from and brings together existing strategies for the former TIGER and SWIFT areas. The study was required to develop the Sewta rail strategy for the period 2009 – 2018 and was undertaken in 2 parts:

¹ Sewta Bus Strategy Study, ongoing to be completed early 2006

Part 1 involved:

- Review of the existing sub-regional transport strategies to identify the objectives for the rail strategy;
- Consultation with stakeholders within the Sewta region;
- Identification of potential scheme options and issues, including an assessment of passenger growth and rail capacity issues;
- An initial sift of the long list of options against the defined objectives; and
- Recommendation of schemes for more detailed investigation in Part 2.

Part 2 involved:

- Development and application of models to assess the passenger demand for the options;
- Engineering and operational assessments including cost estimation;
- Assessment of benefits and financial and economic evaluation;
- Recommendation of the elements for the Rail Strategy;
- Consultation with Stakeholders; and
- Assessment of funding and programming issues and identification of further work to take the recommended strategy forward.

The Sewta Rail Strategy Study, Final Part 1 Report, August 2005, and the Consultation Statement, May 2005, describe the Part 1 study process and results in more detail. This report presents the recommended strategy and a separate Technical Appendix² presents more details of the assessment of the shortlisted options leading to the recommendations.

A further separate report³ presents the results of a more detailed investigation of the potential for a new station at Magor with Undy which was undertaken during Part 2 of the study to inform Network Rail's Newport Area Signalling Renewal Project.

1.3 Report Structure

Following this introduction, section 2 of the report outlines the existing rail network and services and section 3 outlines the short term investment programme. Section 4 highlights the key strategy issues and regional objectives which were used to shortlist options for the strategy. Section 5 describes the processes undertaken to develop the medium term rail strategy and section 6 describes the recommended Sewta Rail Strategy. A separate document provides supporting appendices presenting the detailed appraisal information, which was used to determine the elements of the recommended Sewta Rail Strategy.

² Sewta Rail Strategy Final Report – Technical Appendix, January 2006.

³ Sewta Rail Strategy Study, Severn Tunnel Junction / Magor / Undy Station, October 2005

2 EXISTING RAIL NETWORK

2.1 Introduction

The existing rail network within the Sewta Region (Figure 1) is focused on Cardiff and comprises:

- The South Wales Main Line (SWML) running east-west between Pyle / Bridgend and Severn Tunnel Junction and providing for services beyond the region to Swansea and West Wales, the West Country, South Coast, Midlands and London;
- The Vale of Glamorgan coastal route between Bridgend and Cardiff via Barry, with branches to Barry Island and Penarth;
- The Maesteg Line north of Bridgend;
- The Valley Lines to the North of Cardiff serving;
 - Treherbert via Pontypridd and Porth;
 - Aberdare via Pontypridd and Abercynon;
 - Merthyr Tydfil via Pontypridd and Abercynon; and
 - Rhymney Valley via Caerphilly and Bargoed.
- The Coryton Line serving north Cardiff;
- The Cardiff Bay Branch running south from Cardiff Queen Street Station;
- The City Line providing an alternative route to Pontypridd via west Cardiff;
- The Ebbw Valley Line (former freight only line);
- The Abergavenny (Marches) Line north of Newport, with services to north Wales and north west England; and
- The Gloucester line north of Severn Tunnel Junction, serving Caldicot and Chepstow with services to the Midlands.

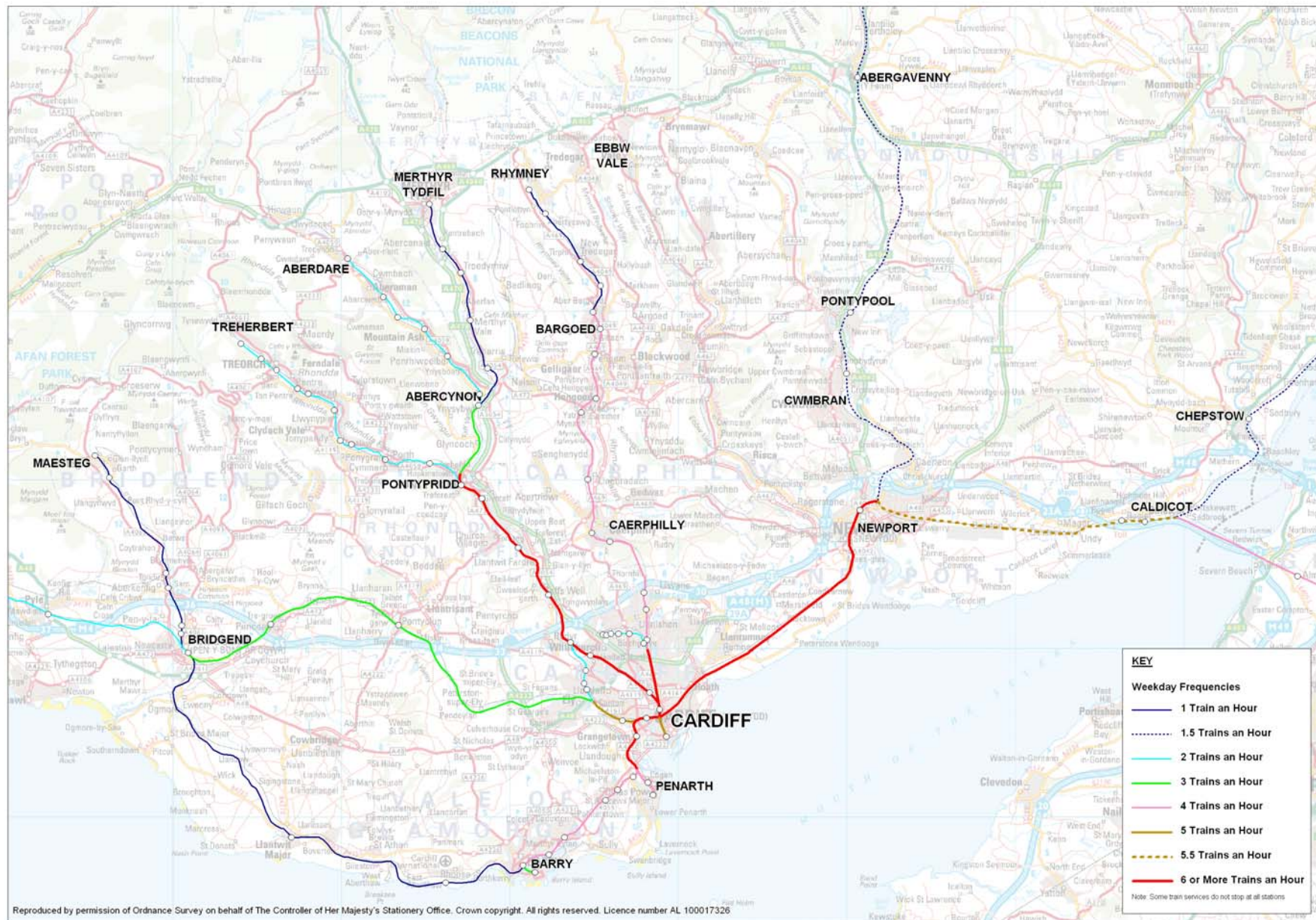
2.2 Capacity Constraints

Capacity for passenger train services within the Sewta area is a function of the rail infrastructure, the mix of train services operated, the running speeds and the calling patterns of the trains.

Assessment of capacity is described in four sections, as follows:

- General issues effecting capacity in the Sewta area;
- The South Wales Main Line that is within the study area, from Bridgend to Severn Tunnel Junction;
- The semi-independent Cardiff Valley Lines network; and

Figure 1 Sewta Rail Network and Service Frequencies at December 2005



- Branches to Ebbw Vale, Abergavenny and the Marches, Chepstow and Gloucester.

2.2.1 General Capacity Issues

The rail routes in the Sewta area involve a wide range of types, from single-track branch lines to multiple-track trunk routes. Route alignments vary from steeply graded and curvaceous routes, originally operated largely for freight traffic, to high-speed alignments.

Where manual signalling exists it is based on the principle of track sections which can only hold one train at a time (so capacity is related to section length and running speed), whereas multiple-aspect colour-light signalling is generally placed at closer intervals thus improving route capacity. The long single track sections on the northern sections of the Valley Lines are key constraints to operations.

Operation is exclusively by diesel traction, with almost all passenger services operated by unit stock capable of being driven from either end. Three morning peak and evening peak journeys from / to Rhymney respectively are currently operated by locomotives with four coaches. These will be replaced with multiple units with increased seating capacity with the introduction of the Standard Pattern Timetable (SPT) in December 2005. In addition, all Marches Line services will increasingly be operated using newer Class 175 trains from December 2006.

A variety of rolling stock is used on Sewta services and some is not well optimised for the steep gradients, frequent stops and crowded conditions often encountered – particularly on the Valley Lines. The older stock which is being replaced in the short term has low power and in most cases insufficient doorways, extending station dwell times. Revenue collection and protection is generally undertaken by the on-train guard, who also has control of the doors at each end of the train on most services. More modern rolling-stock now becoming available by cascade (Class 158) is optimised for longer-distance services, with a longer/narrower body allowing only two abreast seating and only narrow carriage-end doors and vestibules. Speed capability ranges from 75 mile/hr for suburban stock to 125 mile/hr for high-speed passenger trains of up to ten-vehicle length which are used on services to/from London.

The Standard Pattern Timetable committed by Arriva Trains Wales under its franchise for introduction in December 2005 simplifies and enhances the operating pattern to deliver frequency enhancements on a number of routes. Key details include:

- Independent operation of the Cardiff Bay branch.
- 6 trains per hour to / from Pontypridd.
- 4 trains per hour to / from Caerphilly.
- 4 trains per hour to Bargoed, Penarth and Barry.
- 2 trains per hour along the City line throughout the day.

The timetable will operate largely unchanged throughout the day, providing performance benefits of regularity as well as user benefits for off-peak traffic, though an interruption to the sequence occurs during the middle of the day to permit freight trains to run between the Cynon Valley and Aberthaw. Similarly, from December 2005 a new freight service is scheduled to operate between Cwmbargoed and Aberthaw via the Rhymney Line. This will displace two off peak Pontypridd services through Queen Street.

2.2.2 South Wales Main Line

The route has multiple-aspect signalling throughout, which is due for renewal during the early part of the strategy period.

West of Cardiff this route is a fast double-track railway on which capacity is limited by the mix of service speeds. Intermediate stations at Pontyclun and Pencoed (and a proposed station at Llanharan), as well as freight trains, reduce capacity below the theoretical maximum. Local / regional services to Maesteg and to Swansea serve the intermediate stations.

East of Cardiff the route is served by both main and relief lines. The relief lines, on the south side of the alignment matching the majority of freight facilities, are currently mainly used by freight trains as the tracks have comparatively low speed limits of 40 mile/hr. Network Rail's Newport Area Signalling Renewal Project will be examining the potential of upgrading the relief lines – particularly important for accommodation of any new stations and additional services, but also to improve the speed of mainline services during maintenance of the main lines.

Present passenger traffic is therefore timetabled wholly on the high-speed main lines. While theoretical headways permit a maximum usage of 12 trains per hour on the main lines, the current mix of freight, fast and slow trains means it is difficult to find regular paths for any additional trains in peak periods. The limitation may be eased by the scheduled resignalling of the Newport station area, where a complex layout is to be enhanced by restoration of a fourth platform, as the station currently acts as a bottleneck on services from Cardiff.

East of Newport the configuration of the relief lines changes at Bishton where the up relief line is carried over to the north side of the main lines by a flyover which imposes speed limitations to the relief lines in both directions. The flyover leads directly into the sequence of crossovers forming the bifurcation of routes at Severn Tunnel Junction station. From here the number of services towards London / Bristol is currently influenced by the mix of train speeds over the long section through the Severn Tunnel, which is limited to 7.5 trains per hour per direction (subject to various factors and special situations), although possibilities for enhancement are being sought by Network Rail in parallel with resignalling.

The route currently has no stations between Newport and Severn Tunnel Junction and the use of the main lines by two London and up to four regional passenger services per hour, all timed at the full line speed, mean that capacity to create and serve any intermediate stations on the main line is limited, however, new stations could be located on the relief lines which would need to be upgraded in this case.

2.2.3 Cardiff Valleys

The Valleys network is focused on Cardiff Queen Street and Cardiff Central stations. Most trains serve all stations and there is little freight traffic, so that frequencies are limited only by signalling densities and by passing facilities on single lines. Most of the branches terminate with single-track sections at the ends of the routes, limiting the maximum frequency. Within the 'rules of the plan' turnround margins at these single-track ends are low, often only three minutes, meaning that the timetable has to be constructed with significantly greater layovers at one of the outer ends of routes to allow recovery from any service disruption.

South of Queen Street the route continues to Cardiff Central station where the Valley Lines services use Platforms 6 and 7 exclusively. The high throughput of Valley Lines services results in limited available capacity and flexibility at Cardiff Central, such as for attaching or detaching units. The number of route destinations south and west of Central station does not equal that north of Queen Street and to the east, so that ideally a facility to turn back trains is required. Existing turnback arrangements provide a capacity constraint and some trains proceeding towards the City Lines (Radyr) and Penarth are currently operated largely to form a convenient turnback mechanism, rather than as a response to market need.

Other than the single track sections, the principal limitations on the Valley Lines capacity are Queen Street station, the junction immediately to the north and signalling on Valley Lines northwards. Peak station dwell times at Queen Street are extended for large numbers of passengers to board or alight. Cathays station, less than a mile north of Queen Street, has significant passenger boarding requirements and also forms a constraint on maximising movements through the junction under current signalling.

The 12 trains per hour in each direction through Queen Street Station, once the SPT is introduced in December 2005, is considered to be the maximum practical capacity. Studies between 1999 and 2003 were examining ways to provide a substantial increase in capacity at Queen Street but were halted in favour of the short to medium term strategy of lengthening existing trains to cope with increasing passenger demands.

South and west of Cardiff services mainly serve routes to Penarth and Barry, diverging at the critical Cogan junction. The single-lead junction leading directly onto the single-track branch to Penarth at the limit of the four track section provides a further constraint to the network as a whole. Beyond Barry the route continues as the Vale of Glamorgan line, re-opened for one passenger train per hour in June 2005. The service operates to a re-instated (east) bay platform at Bridgend ensuring independence of performance of Valley Lines services irrespective of any main line perturbations.

2.2.4 Branches east of Cardiff

(a) Ebbw Valley Line

This branch is in course of refurbishment to support an hourly passenger service to Cardiff from Spring 2007, involving the reinstatement of a length of double track to allow trains to pass on the branch. While the branch also has a direct chord towards Newport, further double track initially proposed to allow a second hourly service to Newport has not been provided under the initial reopening works.

(b) Marches Line

This route diverges immediately east of Newport, and is a two-track railway with 90mph maximum line speed. Colour-light signalling from Newport to Cwmbran is due to be extended to Little Mill (north of Pontypool and New Inn station) from where manual signalling with long signal sections exists. The route is shared with a number of freight trains and capacity north of Cwmbran is fully utilised at certain times of the day, particularly as the freight trains can be slowed by a lengthy incline north of Abergavenny.

Although a turnback facility is currently available at Abergavenny under existing manual signalling, this is only for trains terminating in platform 1 lying on the main northbound line. For a more intensive service to operate it would be preferable for overall route capacity to have flexibility to spend the necessary turnround time more responsively to the needs of other services through an enhanced turnback facility. Such a facility would not be introduced through the planned Newport Area Signalling Renewal scheme without 3rd party funding to Network Rail, though the Signalling Renewal offers the opportunity to implement this measure cost effectively. Sewta is seeking to ensure that the opportunity to add value to the renewals schemes is not lost and is working closely with the Assembly and Network Rail to achieve this.

(c) Chepstow Line

This double-track 90 mph route diverges at Severn Tunnel Junction and continues to Gloucester. The route has multiple-aspect signalling throughout, facilitating its use as a diversionary route to Gloucester in the event of planned or unplanned Severn Tunnel closures. The route is shared with a small number of freight trains, although routing strategies could potentially significantly increase the number of such trains.

A turnback facility at Chepstow already exists under the current power signalling arrangements. This involves running a short distance beyond the station to change direction and subsequently to occupy the Cardiff-bound platform, with an addition of around three minutes to round-trip time compared with direct entry to and reversal in the platform of departure.

3 INVESTMENT PROGRAMME: 2005 – 2009

3.1 Commitments

There is significant ongoing investment in rail in the region, including £50m investment in additional rolling stock through the Wales and Borders Franchise, which is operated by Arriva Trains Wales. This investment will be used to lengthen trains, to provide a 20% increase in passenger capacity into Cardiff in peak periods and regular clock-face timetables.

Arriva Trains Wales is implementing a standard pattern timetable (SPT) from December 2005 as part of franchise commitments to improve services. In the Sewta area this will provide: additional stops at Pencoed, Pontyclun, Pyle and Cwmbran stations; two morning peak arrivals at Cardiff from Maesteg; additional early morning and late evening services to Aberdare; a regular 15 minute service to Cardiff Bay and; changes in rolling stock to relieve overcrowding between Cardiff and Aberganvenny in the evening peaks.

The existing Sewta Rail Improvement Programme covers the period from 2005 to 2010 and includes a number of significant investments and improvements to the rail network and services. A number of commitments are in the course of delivery:

- Enhanced frequencies to Bargoed (4 trains per hour) from January 2006;
- Additional Rolling Stock to reduce peak overcrowding from June 2005;
- Platform extensions (to 4-car) on the Aberdare Line from June 2005;
- Two new services:
 - Vale of Glamorgan Line; the extension of Valley Lines services from Cardiff south-westwards to Bridgend via Barry and with new stations at Rhoose Cardiff International Airport and Llantwit Major (opened on 12th June 2005); and
 - Ebbw Valley Line; Phase I of the Ebbw Valley passenger rail service, from Ebbw Vale Parkway to Cardiff, calling at new intermediate stations at Rogerstone, Risca, Crosskeys, Newbridge and Llanhilleth (due to open in spring 2007).

3.2 Other Planned Improvements

In addition there are a number of programmed improvements which have received indicative support from the Minister of Economic Development and Transport:

- Cynon Valley frequency enhancement to half hourly (largely delivered by the Standard Pattern Timetable);
- Merthyr Tydfil frequency enhancement to half hourly;
- Abercynon Station remodelling and park and ride;

- Platform extensions - Treherbert and Rhymney Lines for 6-car trains, Maesteg Line for 4-car trains;
- New Stations at Llanharan, Brackla and Energlyn;
- Rhymney corridor frequency enhancements (2 tph to Rhymney);
- Maesteg Line frequency enhancement (to 2 tph); and
- Station improvements – Abergavenny, Cwmbran, Severn Tunnel Junction, Cardiff Queen Street and Newport.

The station improvements developed for Pontypool & New Inn Station have been reprogrammed to beyond 2009.

4 STRATEGY ISSUES AND OBJECTIVES

4.1 Regional Economic Objectives

The purpose of this study is to develop a rail strategy for South East Wales which meets the requirements of the region in the period 2009 – 2018. It was therefore important to define relevant evaluation criteria for appraising possible strategy elements and assessing the contribution of the resultant rail strategy.

To define the appraisal criteria a review of National, Regional and Local policy and strategy documents was undertaken. In addition current issues associated with the rail network and passengers' expectations and priorities were also reviewed. The key conclusions of the reviews formed a presentation to the Stakeholders at the consultation event held on 12th April 2005 where further views were taken on board. The key issues are documented in a separate Consultation Statement report and summarised in this section.

4.1.1 National Objectives

The key national objectives were identified from four key documents; 'Wales a Better Country', which sets out the Strategic Agenda for Wales; 'A Winning Wales', which sets out the National Strategy for Economic Development; 'People, Places, Futures', which outlines the Spatial Plan for Wales, and; the Transport Framework for Wales, which defines the transport plan and priorities between modes.

The documents emphasise the importance of transport in providing for the connection between people and jobs and to improve the opportunities for those without jobs to gain employment in the growth areas. Transport should assist the continued growth of the region through delivering the labour supply needed by business. The emphasis should be on the connection between the Valleys and the Coastal Plain. In addition, transport should also aid the regeneration of the Valleys and enhance the potential for inward investment.

The National transport strategy aims to achieve sustainable accessibility and is focused on:

- Improving strategic corridors;
- Improving ports and airports;
- Increasing rail freight;
- Providing for those without access to cars;
- Discouraging car use in urban areas;
- Providing free bus travel to the elderly and disabled; and
- Enhancing public transport access to employment.

A key objective for the Sewta region is to influence the modal split in the urban areas of Cardiff and Newport through encouraging the use of sustainable modes as an alternative to the use of private cars.

Within the Sewta region the rail network provides a strategic transport network segregated from the highway network and offers sustainable travel choices. Improving the rail network and services will help to achieve the transport strategy and national objectives.

The National Transport Framework adopts the Department for Transport (DfT) national transport objectives and appraisal criteria based on the five objectives of Environment, Safety, Economy, Accessibility and Integration.

4.1.2 Regional Considerations

The South East Wales Development Strategy's vision is for the Sewta region to become one of the most prosperous in Europe and provide opportunities for all to share the prosperity. It identifies 'Connectivity' as one of 5 key drivers of competitiveness and aims to secure an Integrated Regional Transport Network.

Between 1981 and 2001 the population of the East and South of the region grew substantially (particularly, Monmouthshire, Cardiff and the Vale of Glamorgan) whilst the populations of the northern Valleys declined – particularly Blaenau Gwent and Merthyr Tydfil. The population of South East Wales is expected to grow by 1% between 2006 and 2011, by 1.2% between 2011 and 2016 and by 1.1% between 2016 and 2021.

Passenger priorities for rail service, train and station improvements have been identified through research by the Oxford Research Company for Arriva Trains Wales. These have been defined in terms of Primary Drivers, Secondary Drivers and other key factors;

(a) Service Factors

- **Primary Drivers:** Punctuality/reliability, value for money and journey time.
- **Secondary Drivers:** Train frequency, train connections.

(b) Train Factors

- **Primary Drivers;** getting a seat, cleanliness.
- **Secondary Drivers;** Seat comfort, ease of access, temperature and announcement of delays.
- **Other key Factors;** Toilets.

(c) Station Factors

- **Primary Drivers;** Staff available.
- **Secondary Drivers;** Toilets, announcements of delays, announcements of arrivals/departures, train time information, CCTV cameras.

Consultation with the regional stakeholder group provided additional views on the priorities and appraisal criteria which are needed when evaluating elements of the rail strategy. The key regional objectives were defined as accessibility and social inclusion. For example; emphasis needs to be placed on providing transport improvements to those areas where accessibility is important, even though these routes may not be as profitable as busy commuter routes. The strategy should make provision for the less advantaged, and for economically deprived areas.

4.1.3 Strategy Appraisal Criteria

Within the overall framework of the National Transport Objectives ten appraisal criteria were defined as outlined below.

(a) Environment

A key sustainability objective for transport is to preserve or enhance the environment – taking account of the direct and indirect impact on the physical environment and also air quality and noise.

(b) Safety

Improving safety and security through investment in transport is a key national objective. Public Transport investment encourages a switch from congested highways with a resultant reduction in the incidence of accidents.

(c) Economy

An objective of transport investment is to enhance the economy and it should also represent good value for money.

Improving the economy of the Sewta region is a core regional and national objective. It was agreed that investment in transport directed at improving the economy through improving access to jobs and widening labour market catchment areas would lead to the achievement of other national and regional sub-objectives related to employment, health and education.

It was agreed that the strength of the business case, which influences the likelihood of funding, was a key criteria within the development of the rail strategy.

(d) Integration

At a National level the integration objective relates to integration between modes and integration between policies including land-use.

Integration with the Regional Spatial Strategy is an important objective for determining the rail strategy. A regional distinction can be drawn between needs in the core 'journey to work' area and the needs of the communities beyond.

- The core Cardiff and Newport journey to work areas extend out to Barry, Pontypridd, Caerphilly and Cwmbran. Here there is a need to provide attractive rail services to access jobs in Cardiff and Newport, and to reduce use of the highway network.
- Towards the Heads of the Valleys the social impact of the railway is more important, although peak commuting from the lines north of Pontypridd and Caerphilly is important in the Sewta Strategy.

While there is a need for better integration of transport with land use policy (e.g. in employment areas in Newport and Cardiff, major residential areas and tourist areas), this policy should involve locating development at rail-accessible locations, rather than extending the rail network.

(e) Accessibility

Enhancing accessibility is a key National Objective and improving access to the rail network is a key regional objective – specifically between the Valleys and Coastal Plain employment areas (including Cardiff Airport). Dimensions of the Sewta Rail Strategy include:

- In the Mid-Valleys there is housing development and population growth with a need for access to jobs in Newport and Cardiff, which rail can influence;
- Other employment locations - including important developments around motorway junctions - are remote from stations and will require integration with the bus network; and
- Reverse flows of people from the region to other areas should also be provided for.

A key measure is the change in spatial accessibility of locations determined by the Spatial Strategy, and particularly of employment locations. Sewta is prepared to pay a premium price to secure the 'option value' of accessibility, where necessary.

(f) Connectivity

Improving connectivity is an important regional objective. The railway should serve the polycentric development of the region, in which a core rail network would provide frequent fast services between the main centres. Further integration with 'social' rail routes and bus routes would serve other corridors and catchments.

Key targets for rail connectivity included:

- east – west movements, especially between the key centres and along the M4 corridor (including preserving international routes);
- movements to the Midlands and to Bristol; and
- movements along the valleys.

(g) Reducing Car Travel

Traffic congestion is a key regional problem where rail can have a significant impact, particularly where additional park and ride capacity is provided. The key congested areas within the region were defined as in and around Cardiff and Newport, which are the focus of the rail network.

(h) Making Best Use

Optimising the use of infrastructure in the region was identified as an important objective. Preserving and enhancing reliability is a key passenger priority and an important objective for the rail industry. This was seen as especially important on the Main Line.

Adequate capacity, both of train services and of car parks, needs to be provided. Reducing the barriers to rail travel is important through investment in stations and improved rolling stock. Usage is influenced by the pricing of transport as well as by physical accessibility. Introduction of smart cards could help change fares structures and ease of use.

The Assembly has specified a minimum rail service level in Wales of 1 tph, and 2tph in journey to work areas. Within the expanding journey to work areas of Cardiff and Newport the basic passenger frequency expectation is for at least a half-hourly service, with higher 'turn-up-and-go' service frequencies in the core journey to work area.

There is a potential conflict between freight trains and passenger services and the interpretation of regional objectives suggests that the Sewta rail network strategy should emphasise movement of people rather than of freight. However, freight operators have pathing rights in the region and therefore investment should seek to balance both needs and provide capacity that would enable both markets to grow together.

(i) Passenger Impact

The impact of journey quality on the strategy will be important in terms of existing travellers who would be influenced by changes in journey time, train capacity and crowding. The demand modelling takes specific account of these impacts in terms of assessing value for money.

Overcrowding has been identified as a key regional issue which diminishes the quality and attractiveness of rail services. Overcrowding is particularly evident for those passengers boarding at the mid valleys and outer Cardiff urban stations on inbound journeys. For passengers on return journeys there is an added issue that those destined for outer stations would seek, as a result of overcrowding at City Centre stations, to join the train at Cardiff Central rather than risk not being able to board a specific peak train at Cardiff Queen Street. Similarly, some users of Cathays station join the trains at Cardiff Queen Street in the peak.

The SRA's national overcrowding standards are based on London and the South East of England and are not appropriate for South East Wales. Despite peak road congestion, driving to Cardiff and Newport is still an option for many commuters and door-to-door journey times can be similar to rail. Rail must offer a comfortable and stress-free alternative to driving to be successful at influencing the modal split for trips into the urban centres. Passenger research has shown that getting a seat is a key passenger priority for train services and is defined as a primary driver of demand.

(j) Deliverability

A key criteria for development of the rail strategy is the practicality of schemes and their interdependence.

4.2 Passenger Growth and Capacity Issues

4.2.1 Valley Lines

There has been considerable growth on Valley Lines services within the Sewta region over the last few years – leading to peak period overcrowding and investment in additional rolling stock to lengthen trains to accommodate demands.

The current Sewta rail improvement plan to 2010 includes considerable investment in longer platforms throughout the region to enable further train lengthening to meet even greater demand growth.

There are two key issues for the Sewta Rail Strategy to address for the period between 2009 and 2018:

- The requirement for additional rolling stock – with additional subsidy requirements; and
- Whether the investment in longer trains will accommodate anticipated demand on the Valley Lines north of Cardiff. If not there might be a need for additional frequency – requiring additional capacity in the Cardiff Queen Street/ Cardiff Central area. This would involve a major infrastructure investment which would need to be a key part of the Sewta Strategy.

These key questions were examined by the application of growth factors to observed peak train counts⁴ and an assessment of the future demand against the planned maximum line capacities. The analysis concentrates on selected Valley Lines routes within the Sewta region where capacity problems are forecasted during the Strategy period.

4.2.2 Newport Services

Table 1 shows the recent change in demand for regional services on the lines serving Newport. Train count and rolling stock data supplied by Arriva Trains Wales revealed that there was 64% - 80% spare capacity (standing/seating) on Chepstow Line peak trains. Marches Line services will increasingly be operated using class 175 trains from December 2006 and there will be between 32% and 47% spare seating capacity. There is significant scope for lengthening trains on these services with the only constraint to 4-car length trains being at the down platform at Caldicot (3-car).

Table 1 Other Sewta Stations Patronage Change

Line	Average Annual Growth 2003 – 2005
Marches Line (Abergavenny, Pontypool&New Inn, Cwmbarn)	2%
Chepstow Line (Chepstow, Severn Tunnel Junction, Caldicot)	8%
Average	5%

4.3 Passenger Growth Forecasts

Table 2 shows the growth in patronage on Valley Lines services between 1998 and 2004 and between 2001 and 2004 by line. There was little growth in 2001/2002 probably as a result of the network disruption following the Hatfield accident. The table shows that there was an average growth of 10% per annum between 1998 and 2004 with all lines growing by at least 5% per annum on average and most lines growing between 7% and 10% per year.

The table also shows that between 2001 and 2004 there was significantly less growth – 5% per annum on average across all lines. The Aberdare line frequency was increased from hourly to half hourly (throughout most of the day) in September 2003 and this line grew at 3% per annum before this change. Some lines may already be capacity constrained – affecting the potential for demand to grow – particularly the Barry Line. Other lines have significant spare capacity and potential to grow – such as the Cardiff Bay, Penarth, Coryton and City Lines, however, individual peak hour trains are heavily used.

⁴ Spring 2005 data, figures subject to change as a result of the introduction of the SPT December 2005

Table 2 Average Growth per Annum, Valley Lines

Line	1998 - 2004	2001 – 2004
Bay	28%	15%
City	6%	5%
Aberdare	17%	11%
Barry	8%	0%
Penarth	10%	5%
Coryton	5%	5%
Merthyr	8%	-1%
Treherbert	7%	1%
Rhymney	7%	3%
Maesteg	-	11%
All Lines	10%	5%

To estimate the potential impact of passenger growth on the Valley Lines throughout the evaluation period the 2004 peak train counts provided by Arriva Trains Wales were summed for the 2 hour AM peak (0730 – 0930 arrivals at Cardiff) and for the 2 hour PM peak (1630 – 1830 departures from Cardiff) for the most heavily used lines.

Two demand forecasts were applied:

- Central Demand based on GDP Growth; and
- High Demand – using the average Valley Lines Growth between 2001 and 2004 (5% per annum).

The Central GDP based forecast is the approach recommended in the Rail Passenger Demand Forecasting Handbook (PDFH) used in the rail industry. The Forecast GDP growth was derived from the Royal Bank of Scotland Quarterly Economic Update (5th April 2005) for the period between 2004 and 2007 and the long term GDP growth forecast was taken from the Treasury Budget March 2005 report. The GDP rates applied were 2.6% to 2005, 2.7% to 2006, 2.5% to 2007 and 2.25% per annum between 2008 and 2018.

The impact of planned frequency increases between 2004 and 2010 were also taken into account on the Rhymney Line, Merthyr Line and Maesteg Line.

In addition Cardiff Council is considering the introduction of a congestion charge for the Capital – to improve traffic flows and generate income to invest in transport projects. Such a scheme would probably be integrated with the current Severn Bridge Tolls and possible tolls on an M4 relief road planned to be constructed around Newport. A congestion charge would alter the relative generalised costs of travel between road and rail in the region and would be expected to have a significant impact on the demand for rail services.

The estimated impact of a Congestion Charge on rail demand used the procedures recommended within the Rail Passenger Demand Forecasting Handbook (PDFH) assuming a flat rate congestion charge of £2.50 per day introduced in 2013. For a typical trip (Pontypridd – Cardiff) the scale of impact on the total journey costs for car users was estimated by applying a cross elasticity of rail demand to car cost of 0.4 (a 100% increase in car costs would lead to a 40% increase in rail demand). The resultant factor was an 18% increase in rail demand.

4.4 Capacity Analysis

The increase in rail demand was compared with the base capacity for each line and also the planned maximum capacity taking account of the maximum train length and frequency for each line, assuming all peak period trains are lengthened to the maximum possible. Both capacity measures took into account seating and standing. In addition, the impact on the 'peak train' on each line was examined through analysis of the difference between the peak train count and the average peak period count for each line.

On the Marches and Chepstow Lines there will be sufficient capacity to accommodate anticipated growth in passenger demand on the planned services. However, the analysis suggests that there will be a requirement for additional rolling stock on Valley Lines services if peak period demand increases are to be accommodated without overcrowding or demand suppression. We have estimated the additional rolling stock requirements over and above 2008. This assumes that rolling stock increases are funded between now and 2008 to meet the needs of demand growth identified in the current short term improvement programme. The analysis concentrated on the period between 2009 and 2018.

The capacity analysis for each line was included in detail in the Part 1 report⁵, based on 4-car trains on the Aberdare, Barry Island and Merthyr Lines and 6-car trains on the Treherbert and Rhymney Lines. The conclusions are:

- Under the high growth forecast there is a need for a frequency increase (at least to relieve the peak train) on the following lines;
 - Aberdare PM peak (2018);
 - Barry Island AM peak (2016) and;
 - Rhymney Line AM peak (2014).
- Assuming the high growth scenario the additional impact of the possible Congestion Charge could result in the need for;
 - Additional rolling stock to strengthen trains on the:
 - Aberdare Line;
 - Barry Island Line;
 - Maesteg Line;
 - Merthyr Line;
 - Rhymney Line; and
 - Treherbert Line.
 - Additional need to increase peak frequencies on the:
 - Aberdare Line around 2016;
 - Barry Island around 2014;
 - Merthyr Line around 2018; and
 - Rhymney Line in 2013 and 2018.

When peak periods train loads are high it may be difficult for the train guard to undertake the passenger count which might result in an under-reporting of train usage. It is recommended that additional independent surveys are undertaken to validate the peak period train counts for the purpose of rolling stock planning and the further assessment of capacity requirements.

⁵ Sewta Rail Strategy Study, Final Part 1 Report, August 2005

An under-prediction in the train counts would result in the need for additional service frequency through Cardiff Queen Street station earlier than suggested above.

4.4.1 Capacity Analysis Conclusions

In conclusion, if rail demand grows at the Central Growth rate (based on GDP) there will be a significant need to invest in additional rolling stock to lengthen trains on the Valley Lines services – making use of the investment in longer platforms in the region.

However, demand on the Valley Lines has been growing at a rate significantly above GDP – possibly as a result of the economic changes in the sub-region, including the growth of the Capital City in providing jobs, retail and leisure activities at a greater rate than other centres in South East Wales resulting in its widening area of influence. If this high rate of growth in rail demand is continued and overcrowding is to be avoided, there will be a need for:

- Significant investment in additional rolling stock, providing the opportunity to secure increased benefits to the region from a new build of trains for the region; and
- A moderate frequency increase on the Valley Lines north and south of Cardiff Queen Street / Central of around 2 trains per hour (tph) in the peak, with additional operating costs in the order of £2.5m per annum.

Within the SPT, Barry Island trains run to Merthyr Tydfil and Aberdare, where platforms are designed for 4-cars. This means that the line will be unable to accept trains from Rhymney which limits timetabling flexibility. Under the high growth scenario the Barry Island peak trains will be unable to cope with demand and there will therefore be a need to lengthen platforms on the Barry Line to 6-cars. This will have a knock on impact for platform lengths on the Merthyr and Aberdare Lines or will require the SPT to be recast.

In addition, the congestion charge could result in a significant transfer of trips to rail, placing additional pressure on heavily loaded services and requiring additional train strengthening on most if not all Valley Lines. This impact would require further detailed analysis but could be in the order of:

- 6 + additional vehicles⁶, with annual operating costs of £3.0m for lengthening existing trains; and
- Additional frequency increases (with further additional operating costs in the order of £2.5m per annum) and increasing the number of trains through Queen Street station by a further 2 trains per hour in the peak.

As Queen Street station is considered to be operating at capacity in December 2005 when the SPT is introduced, there will be a need for a significant investment in additional capacity for both trains and passengers to be made at the station if the high growth demand forecast is to be realised. There would be a need for further additional capacity if the Congestion Charge was introduced.

⁶ Many trains in the region are currently operated with 2-car (vehicle) sets.

Assessment of the appropriate infrastructure scheme would need to take account of the long term requirements for capacity and performance as this is a critical section of the Sewta Rail network. An ongoing study for the Assembly is reviewing capacity issues at Cardiff Queen Street station, capacity between Queen St and Cardiff Central and the operation of the Cardiff Bay branch.

Network Rail is currently at the early stages of optioneering for the Cardiff Area Signalling Renewal Scheme. If enhancements for growth are to be built into the resignalling Network Rail will require commitments from Sewta / WAG to enhance the scheme if the marginal cost opportunity for frequency increases is not to be lost.

5 DEVELOPMENT OF THE SEWTA RAIL STRATEGY

5.1 Introduction

The development of the rail strategy for 2009 – 2018 was undertaken in two stages. Firstly a long list of aspirations was examined against the Sewta Objectives / Criteria and, using available data, a short list of schemes was produced for detailed assessment. The more detailed evaluation involved the development and application of new demand forecasting models, the application of an operating cost model, site visits, an engineering review, capital cost estimates and economic analysis. Alternative options were compared and emphasis was placed on the strength of the business case in selecting the elements for the recommended strategy.

5.2 Operations, Engineering and Costs

Delivery of the timetable is a complex combination of many elements that are managed separately by Network Rail and the Train Operating Companies. The practicality of proposed schemes depends on whether track layouts are available, and whether appropriate resources are proposed for rolling stock and staff diagrams. Local passenger services need to be accommodated on infrastructure, which is shared in part with significant high speed long distance, regional passenger and freight traffic.

Whilst it was not possible to undertake detailed timetable analysis for the wide range of schemes that needed to be assessed in the study within the study resources available, we have taken account of network capacity issues and, where necessary, included initiatives to ensure that the performance of existing services is not compromised.

Operating cost estimates were based on the latest Jacobs Consultancy model developed over a wide range of projects including franchise replacement and past bids through the Strategic Rail Authority's (SRA) Rail Passenger Partnership funding. We have adapted the model to reflect the Arriva Trains Wales operations. The model takes on board the length and proposed timetable of services, the assumed rolling stock and a range of other factors including staffing, maintenance and Network Rail costs and produces base level estimates at Q1 2004.

An experienced rail engineer has estimated the infrastructure requirements for the various schemes through site visits and the use of in-house experience of rail scheme development and costing. We have liaised with Network Rail included provision for a robust – first order – estimate of the costs (at Q1 2005), taking account of the Guide to Railway Investment Projects (GRIP) and a qualitative assessment of risks.

5.3 Passenger Demand Forecasting

Demand forecasting procedures were adopted for the assessment of changes to the existing rail network and services, for additions to the network and new services. To ensure that the various schemes under consideration were assessed on a common basis, with common understanding of the level of underlying passenger demand growth, the rail industry "Passenger Demand Forecasting Handbook" (PDFH) techniques, inputs and assumptions have been used.

The base demand estimates developed using PDFH methods over a 15 year horizon are based on:

- Available forecasts for regional GDP (taking into account Government projections); and
- Analysis of trends in passenger growth, which have been higher than the GDP forecasts would have predicted.

Scheme assessments were undertaken using the regional GDP forecast – of underlying long term growth of 2.25% per annum. The appraisal of the Valley Lines North / Queen Street capacity improvement scheme assumed 5% growth per annum – which would trigger the need for the scheme.

(a) Moira modelling

For service changes between existing stations we used a “Moira” model⁷ provided by Arriva Trains Wales as:

- It was ready to use with the latest available rail industry passenger volume and timetable data;
- It uses the industry accepted PDFH procedures and values;
- It models individual train service departure times, unlike many other models which consider only journey time and frequency. This is useful when considering relatively infrequent train services or particularly peaked demand profiles e.g. commuting into Cardiff; and
- The model contains zoned data for the whole of the UK, providing adequate detail for the study area, but also covering other areas including stations on the routes to Swansea, Hereford, Gloucester and Bristol for local services, and stations as far afield as the North West of England and Cornwall for the long distance inter-regional services which strengthen the local services in the Sewta area.

A 2009 base model was developed by updating the timetable from that which was in place in June 2005, firstly to the Standard Pattern Timetable for December 2005 and, secondly, to include the proposed service level increases on the Maesteg, Merthyr and Rhymney Lines.

(b) New stations and routes

Where base data does not exist, as in the opening of a new station, we developed an ‘analogous trip rate’ model using SPSS⁸ to calibrate the model against existing station flows. The model takes account of the catchment characteristics as well as travel times and costs. Demographic data was taken from the 2001 Census, including population numbers and car ownership and GIS techniques were used to produce the information for concentric zones around new and existing stations at 800m and 2km.

⁷ An integrated elasticity based demand forecasting model for rail services, combining passenger journey, network, timetables and earnings allocation between train operators.

⁸ Statistical Analysis Package for the Social Sciences, a data management and statistical analysis computer programme.

For the majority of stations account was taken of the overlapping of catchment areas with the data being allocated to the nearest station. The journey details included distances, times and fares (and in combination as forecasts of generalised travel times). The database also took account of station characteristics such as parking availability and competitive bus operations.

Models were developed for the key flows - to Cardiff and Newport - and expanded to all flows using an average uplift factor for the whole network and by analogy with trips from existing 'shadow' local stations with similar characteristics and service levels.

More detail on the development and form of the model is provided in the Appendix to the separate Technical Appendix to this report.⁹ This model was applied to new stations in Part 2 of the study, however, for stations previously assessed in detail and recommended in the earlier TIGER study¹⁰ those forecasts have been used.

5.3.2 Economic Evaluation.

The economic evaluation has been undertaken in line with the latest government guidance including the SRA bidding guidance and business case manual and the DfT's New Approach to Appraisal of Transport schemes.

(a) User benefits

Journey time benefits were derived from the generalised time outputs taken from the Moira model, combined with values of time and value of time growth as specified by DfT in their Transport Appraisal Guidance. Additional user benefits associated with other features of the investment schemes, such as reductions in crowding were calculated based on PDFH guidance.

(b) Non-user benefits

The main non-user benefit associated with rail service changes, new stations and related schemes is the impact on road congestion costs associated with passengers switching between road and rail. The passenger demand calculations provided the estimate of the changes in rail passenger demand volumes. This was combined with estimates of the proportion of passengers transferring to / from car, based on available data. Suitable values for road user congestion benefits associated with net changes in vehicle kms on the road were taken from the SRA bidding guidance. In addition accident benefits were added by factoring up decongestion benefits and air quality benefits were calculated based on the reduced car trip kilometres and appropriate rates/values derived from appraisal guidance.

5.3.3 Appraisal

The economic evaluation brought together the capital and operating costs with revenues and forecast user and non-user benefits using procedures in line with DfT/SRA guidance. The price base and discounting base is 2002 and all capital costs included risk and contingency and a general 'optimism bias' factor of 57%.

⁹ Sewta Rail Strategy Final Report – Technical Appendix, January 2006.

¹⁰ TIGER Rail Strategy Study Final Report 2001, Updated TIGER Rail Strategy Final Report September 2005

In determining the business case of schemes account was taken of the DfT's guidance¹¹ on value for money for transport schemes. Specifically most schemes with a quantified benefit cost ratio (BCR) of 2.0 or above would be supported, some schemes with BCR between 1.5 and 2.0 would be supported and few schemes with BCR below 1.5 would be supported.

However, where a scheme has significant non-monetised benefits, such as providing economic regeneration benefits to an assisted area, the BCR and funding decision could be raised by one category - i.e.: a scheme with BCR above 1.5 would be likely to be supported subject to available funds.

¹¹ Guidance on Value for Money: Explanatory Note, DfT, 15.12.04

6 RECOMMENDED STRATEGY FOR 2009 – 2018

6.1 Introduction

The Sewta Rail Strategy for 2009 to 2018 should build on Sewta's current and ongoing investment in the capacity and performance of the network. The current investment programme includes:

- Longer platforms to accommodate longer trains;
- Improved junctions, reduced signal spacing and dynamic passing loops to improve journey times and reduce delays;
- Improved access to stations – including investment in car parking at key locations; and
- Improvements in station environments including safety measures.

The **recommended** Sewta Rail Strategy for the period 2009 – 2018 is designed to achieve three core objectives to; make better use of existing rail services; provide for passengers' needs, and; achieve the regional economic and social objectives.

In summary the strategy (shown in Figure 2) includes:

- **Additional rolling stock** to strengthen peak trains to provide for passenger growth and to avoid overcrowding and **rolling stock renewal**;
- **Station improvements** including improved station facilities, information, security and access - including additional parking;
- **Reliability and capacity improvements**; changes to the network to reduce delays and improve the ability to cope with performance problems; specifically at Cardiff Central, Cardiff Queen Street, Barry, Cogan Junction and Llandaff;
- **Frequency enhancements on existing lines**; improving the levels of service on selected routes to meet passengers' expectations and increase the transfer of car trips to rail; specifically new services on the Abergavenny, Chepstow, Ebbw Vale, Rhymney Valley, Taff Vale and Vale of Glamorgan Lines. Additional services to the north of Cardiff are required to cope with the growth in passenger demand and will require a significant investment in the capacity of the network **at and between Cardiff Queen Street and Cardiff Central stations**;
- **New stations on existing lines**; improving access to the rail network and integrated with the development of improved services; specifically at Caerleon, Magor with Undy, Llanwern, Coedkernew and St Mellons. With those on the main line between Cardiff and Severn Tunnel sited on the Relief Lines;
- **Network extensions and new stations**; to investigate further improving access to the rail network through extending to Ebbw Vale Town and from Pontyclun to Beddau (with stations at Talbot Green, Llantrisant, Gwaun Meisgyn & Beddau); and
- **Rail – Link Bus Services**; to extend the reach of the rail services to communities remote from the network, specifically providing access to the Valleys to the north of Cardiff and Newport.

Figure 2 Recommended Sewta Rail Strategy 2018



A summary appraisal of the strategy against the identified National / Regional objectives is provided in Appendix A.

6.2 Additional Rolling Stock and Rolling Stock Renewal

6.2.1 Additional Rolling Stock Requirements

The passenger demand growth and capacity analysis presented in sections 4.2 to 4.4 highlighted that if rail demand within the Sewta area continues to grow there will be overcrowding of peak trains and a need for additional rolling stock to enable demand to continue to grow. Table 3 shows the rolling stock requirements and subsidy issues under the high growth assumptions (5% per annum). Under central growth assumptions the additional rolling stock required at 2018 would be 4 vehicles¹².

The analysis assumes train strengthening using Class 150 vehicles which are available as 2 and 3 car trains and can be used in combinations. The operating costs assume a 50% 'bounce-back' – i.e.: that half of the additional rolling stock would be on trains that complete more than 1 journey into Cardiff in the peak period. Performance and operational constraints at Cardiff Central and Queen Street Stations limit the opportunity to couple / decouple trains to reduce off-peak operating costs. As a result the evaluation has assumed an average operating cost of £250,000 per vehicle.

Table 3 Rolling Stock Requirements, Subsidy and Benefits 2009 – 2018

Year	Additional Rolling stock (Vehicles) (High Forecast)	Subsidy Required £k	Decongestion Benefits £k
2009	2	£327	£261
2010	3	£467	£429
2011	4	£590	£621
2012	5	£706	£822
2013	7	£1,066	£1,034
2014	8	£1,169	£1,256
2015	10	£1,504	£1,507
2016	12	£1,814	£1,794
2017	14	£2,101	£2,117
2018	17	£2,589	£2,513
Totals		£12,332	£12,353

The demand released by the provision of additional rolling stock would generate revenues which would only serve to partially offset the additional operating costs and would result in a subsidy level growing from £0.3m in 2009 to £2.6m in 2018. However, the assessment of non-user benefits alone shows that the subsidies are justified with a ratio of benefits to net costs of around 1.2. In addition there would be significant additional user benefits associated with crowding relief and also wider regional benefits associated with the journey to work opportunities taken up as a result of the capacity provided, particularly to the Valleys to the north of Cardiff.

¹² Many trains in the region are operated with 2-car (vehicle) units.

It is **recommended** that additional rolling stock is funded for lengthening the Valley Lines services over the strategy period to meet the rising demand for peak rail travel. It is also **recommended** to investigate the potential to encourage peak spreading to make best use of peak period train capacity. In addition it is **recommended** that the strategy should examine the need for further platform lengthening to increase train lengths to meet peak demand needs and increase the flexibility to operate 6-car trains – specifically on the Barry Line.

6.2.2 Rolling Stock Renewal

There is an opportunity to secure new rolling stock instead of cascading old rolling stock from elsewhere. Arriva Trains Wales have identified that there will be a lack of suitable (Class 150 ‘Sprinter’) rolling stock available for the additional Valley Lines operations and that modification of available Class 158 stock is impractical for a more intensive urban operation. In addition, the Class 14x (Pacer) rolling stock will be at least 30 years old by the end of the strategy period and, coupled with the need for significant investment in capacity to allow for passenger growth, there is a need to secure new rolling stock for the Sewta services.

There would be a number of possible advantages of rolling stock renewal:

- Positive image impact for the region;
- Specification of Valley Lines stock;
 - Faster acceleration for journey time savings / performance benefits;
 - Large number of doors for faster access / egress; and
 - 3-car sets designed for improved capacity / lower operating costs / revenue protection (conductors).
- Possible link with technological development, such as Fuel Cells to provide the benefits of regenerative braking.

It is strongly **recommended** that the opportunity to secure new rolling stock rather than cascaded rolling stock is evaluated in detail in the negotiations for the second half of the Arriva Trains Wales franchise. The fleet strategy needs to be developed in the short term.

6.3 Station Improvements and Park and Ride

It is **recommended** to improve the attractiveness of rail service through investments in the quality of stations and improves access to the rail network. These suggested measures include:

- Station Facility improvements – such as improved waiting shelters and, at larger staffed stations, toilets;
- Station access improvements – such as improved pedestrian and cycle access;
- Customer information improvements;
- Security measures, including CCTV; and
- Park and ride expansion.

The measures are designed to make better use of the existing infrastructure and services, encouraging more rail use, attracting extra revenue and encouraging modal shift. They would tend to be packages of small schemes which can be funded and delivered through the annual Transport Grant bidding process and / or future franchise specifications. They are likely to be relatively good value for money and could be targeted to meet the objectives of the spatial strategy and to provide improved access to jobs.

Station improvement schemes could be developed as line improvements, where the investment involves line-side / whole route measures, such as provision of electronic Customer Information Systems and upgrading and extending CCTV systems. Otherwise station improvements would have more overall impact when delivered as a package of measures, improving all aspects of the journey through the station to provide maximum impact. This is currently envisaged in the existing Sewta rail improvement programme which specifies:

- Improved opportunities for interchange and integration between modes (car, rail, bus, taxi, cycling and walking);
- Equality of accessibility for mobility impaired people;
- Improved waiting facilities;
- Measures to increase throughput of passengers;
- Up-to-date real time information; and
- Maximising personal security.

6.3.1 Station Improvements

Station improvement schemes within the current 5 year rail improvement programme include several of the larger stations in the Sewta area including, Abergavenny, Cwmbran, Severn Tunnel Junction, Barry, Bridgend, Merthyr Tydfil and Porth. The programme needs to be further developed to ensure that these first order (based on passenger throughput / strategic importance) stations are all meeting a specified standard and then addressing further locations based on a combination of passenger throughput and regional importance. This could take into account station roles, such as interchange, as well as local factors, such as neighbouring land-uses and the spatial strategy to support redevelopment and regeneration.

Account should also be taken of other investment programmes and initiatives – for example the SRA/DfT 'Access for All' fund could include fully staffing some stations in the region, possibly Penarth and Pontypridd. However, many stations in the region are not fully accessible. It would be necessary to undertake audits of stations and to develop a programme of accessibility improvements schemes for individual locations.

We **recommend** a systematic process of audit, design and development to develop a programme of station quality improvement schemes based on stations that generate over 100,000 passenger journeys a year and taking account of the regional objectives including the spatial economic strategy.

We would envisage that CIS schemes could be important in some other locations, such as where there are interconnecting bus services, stations with various services / routes, stations where more than 1 platform is used to serve the same destination and where significant other investment is proposed and the combined investment could produce greater benefits (eg Park and Ride expansions). However, we also recognise that provision of CIS increases passenger confidence in using rail services, which can be particularly valuable even where service frequencies are low.

Some suggested priority locations for general station facility improvements within the strategy are;

- Aberdare
- Abergavenny
- Bargoed
- Barry
- Cadoxton
- Caerphilly
- Cathays
- Chepstow
- Cwmbran
- Llandaff
- Merthyr Tydfil
- Penarth
- Porth
- Pontypool & New Inn (when service frequency is increased)
- Radyr
- Taffs Well
- Treherbert
- Ystrad Mynach

The SRA Minimum Facilities at Stations (MFAS) programme categorised stations according to their level of use, specified facility levels for each station category and defined station improvements required to meet the standards. Design work has been undertaken and a pilot scheme was implemented at Trefforest Station.

Funding for the programme has been curtailed, however, there are approved designs for facility improvements such as waiting rooms, toilets, customer information systems and public address systems at a number of the stations listed above.

The SRA 'Access For All' programme aims to improve access for mobility impaired travellers and has recommended customer information and public address system improvements at some stations in the Sewta region. This programme has funding and Sewta could therefore work in partnership with the DfT / Welsh Assembly to develop jointly funded station improvement packages within the strategy.

From the number of stations within the Sewta Area over the specified threshold, and assuming a number already meet the standards or will be improved between 2005 and 2009, it is recommended that a programme of investment of 2 stations per annum through the period 2009 to 2018 is developed.

6.3.2 Park and Ride Expansion

Park and ride schemes could have a greater impact on the objectives of the spatial strategy by providing improved access to jobs for residents of the valleys. Table 4 shows the available data for use of the existing park and ride sites. Note that some stations may have low parking demand as a result of low service frequency and / or security problems, (eg: Pontypool & New Inn and Maesteg).

From this information the priorities for expansion of existing car parks have been determined as:

- Taff Vale Line, between Radyr and Pontypridd;
- Rhymney Line, South of Bargoed;
- Aberdare Line;
- Between Bridgend and Cardiff; and
- Barry Station.

Park and ride expansion schemes within the station improvement packages in the existing Sewta rail improvement programme are currently planned for Abergavenny, Cwmbran, Severn Tunnel Junction, Abercynon, Pentrebach and Wildmill. Also, further park and ride opportunities will be provided in association with the new stations proposed at Brackla and Llanharan. A further expansion of Caerphilly Station is planned alongside an improved access scheme. This programme could deliver in the order of 1,000 additional spaces which will assist the continued growth in use of the rail network between 2005 and 2010.

From the assessment of the greatest pressure for parking, and where there could be latent demand, it is **recommended**, taking account of the current programme, that a further programme of park and ride expansions is developed within the Strategy between 2010 and 2018. This could include expansions at;

- Aberdare (and other stations along this branch where possible)
- Barry
- Cadoxton
- Llanbradach
- Pontyclun
- Pontypool and New Inn (when the service frequency is improved)
- Radyr
- Taffs Well
- Treforest

Modal shift is a key objective of the Transport Strategy for Wales and the regional Spatial Strategy. In addition there would be an increased need for a greater supply of parking to access rail if a congestion charge or other form of road pricing were introduced in the region. It is **recommended** that parking spaces are provided at any new stations implemented in the strategy, where possible. Also, that the business cases for other stations that could provide park and ride opportunities are reviewed if a congestion charge is introduced during the strategy period.

Table 4 Park and Ride Capacity and Occupancy¹³

Line/ Station	Capacity	Observed Peak Weekday Occupancy
Rhymney Valley Line		
Rhymney	23	18
Pontlotyn	10	8
Tir-Phl	8	5
Pengam	42	85
Hengoed	40	46
Ystrad Mynach	102	93
Llanbradach	10	10
Aber	130	53
Caerphilly	210	232
Lisvane & Thornhill	100	50
Llanishen	21	24
Merthyr Tydfil/ Aberdare Lines		
Merthyr Tydfil	36	32
Aberdare	47	47
Cwmbach	19	19
Mountain Ash	5	5
Abercynon North	8	13
Treherbert Line		
Treorchy	14	9
Ystrad Rhondda	28	6
Llwynpia	12	7
Dinas	10	6
Trehafod	13	2
Trefforest	117	134
Taffs Well	93	90
Radyr	130	162+
Llandaf	108	58
Maesteg Line		
Maesteg	29	8
Tondu	14	0
Sarn	10	8
Bridgend	100	100
Pontyclun	23	22
Barry Line		
Llantwit Major	78	*
Rhosee	61	*
Barry	130	132
Cadoxton	31	41
Eastbrook	31	5
Cogan	55	21
Abergavenny Line		
Abergavenny	67	61
Pontypool and New Inn	16	6
Cwmbran	121	121
Chepstow / Severn Tunnel Line		
Severn Tunnel Junction	59	59
Newport	181	181

* stations opened 12 June 2005

¹³ Based on available information supplied by the client group

6.4 Reliability and Capacity Measures

Measures to improve the reliability of the rail network are important to make best use of the network, provide a robust timetable and to provide the ability to cope with problems to minimise delays to passengers. Four specific measures have been identified; Barry Station, Cogan Junction, Cardiff Central and Llandaf.

6.4.1 Barry Station

At Barry station a signal is required to enable trains to start back from the down platform. In the event of service delays this would allow trains to recover up to 8 minutes running time compared with turning back at Barry Island. Initial appraisal of train running suggests that the facility could be extensively used, and notional estimated costs appear broadly in line with the anticipated benefits. This is one of a number of schemes which Network Rail are currently evaluating which could enable performance related enhancements to be brought forward ahead of its signalling renewal schemes.

6.4.2 Cogan Junction

Cogan junction is an additional network constraint where the Barry Lines reduce from four tracks to two, combined with a single lead junction directly onto the single-track Penarth branch. Greater practical capacity could be delivered by measures to allow southbound Penarth trains to operate independently through the junction and / or to allow trains for the branch to await entry clear of the main line, or by more extensive junction modification.

As demand for Barry line services is greater than for the Penarth Line it might initially be possible to secure additional capacity towards Barry by a corresponding reduction in the service to Penarth. However this would raise concerns in moving away from the Standard Pattern Timetable. The study examined extending the down goods loop to the Penarth Branch. However, in the short term converting the goods loop to passenger train operation would enable holding a late running Penarth train clear of other trains. These options need to be examined further in the Cardiff Area Signalling Renewal Project.

6.4.3 Cardiff Central Platforms 6 / 7

At Cardiff Central Platforms 6/7 there would be significant benefits if services from the west could reverse in the platform, for example by means of a west-facing bay. This would, in the event of partial or full blockage of the lines to Queen Street, enable services to continue to be provided to Penarth, Barry/Bridgend, and Pontypridd/Valleys. This scheme would be delivered by the installation of full bi-directional working as part of the Cardiff Area Signalling Renewal Project and should be examined within that process.

6.4.4 Llandaf

At Llandaf an intermediate signal section on the up line would allow northbound trains to proceed closer to the junction at Radyr. Northbound trains cannot proceed through the junction when the section is occupied by a preceding train or a southbound City Line train. Should either route be running slightly off timetable this measure would reduce overall delays.

6.4.5 Evaluation Results

The Barry, Cogan Junction and Llandaf schemes were evaluated using Arriva Trains Wales information on passenger performance benefits for the Barry scheme. The Moira model was used to assess the benefits of Cogan Junction and Llandaf schemes, where an indicative 0.5 minutes time-saving to existing passengers was assumed. The results are shown in Table 5.

Table 5 Illustrative Evaluation of Reliability Measures.

Measure	Capital Cost	Net Present Value	Benefit Cost Ratio
Barry	£0.5m	£13.8m	26.0
Cogan Junction	£2.7m	£3.5m	4.4
Llandaf	£0.5m	£1.2m	4.0

The analysis suggests that all schemes would provide a high level of benefits if the indicative time savings can be achieved. For inclusion in the rail strategy an average time saving of at least 0.25 minutes each way at Cogan Junction and 0.25 minutes northbound at Llandaf would need to be achieved. This requires assessment of the level of incidence of delays and scale of each delay from monitoring data at the next stage.

It is **recommended** that all three schemes are examined in detail in the Cardiff Area Signalling Renewal Project. Also, it is recommended that the Barry Turnback is provided sooner if funding is obtained as a result of a bid for performance related enhancements. The strategy may require additional capacity between Barry and Cardiff which should be taken into account in determining the appropriate scheme.

6.5 Frequency Enhancements on Existing Lines

New services on existing lines were evaluated across the network and those **recommended** for inclusion in the strategy are summarised in Table 6.

Table 6 Summary Economic Evaluation New Services

	Capital Cost	Operating Cost	Subsidy (year 1)	Subsidy/ Pass	Net Present Value	Benefit Cost Ratio
Abergavenny/ Chepstow Lines #	£34m	£5,173k	£2,114k	£2.33	£154m	4.5
Vale of Glamorgan (Bridgend – Cardiff)	£0m	£1,526k	£1,426k	£32.76	£18.6	1.75
Valley Lines North (Pontypridd – Cardiff and Energlyn – Cardiff)	£30m	£1,463k	£1,320k	£11	£23m - £26m	1.5 – 1.6

note includes Tiger Strategy development assumptions for new stations.

It is **recommended** that the Cardiff Queen Street remodelling be developed to provide capacity for additional services on the Rhymney and Taff Vale Lines to enable peak period passenger growth during the strategy period. The recommended strategy is to implement the major capacity improvement with additional hourly services between Cardiff and Pontypridd and Energlyn via Caerphilly in 2012 and a further frequency increase in 2017. This will be required to meet the forecast peak train service capacity requirements assuming continued growth at 5% per annum – particularly on the Rhymney Line.

The Valley Lines scheme would provide additional benefits in terms of increased peak period frequency to relieve overcrowding, capacity for further growth in rail trips from the Valleys to the north, accommodate additional freight traffic and provide the opportunity to fill in the gaps created by freight trains. There is an opportunity to integrate the development of the scheme with Cardiff Area Signalling Renewal Project. Hence it is **recommended** that the scheme should be developed for implementation between 2009 and 2012.

There are two options for increasing the frequency of service to half hourly to the new stations at Rhoose Cardiff International Airport and Llantwit Major. Although the Greater Western franchising exercise examined the cost of extending Bristol to Cardiff services to / from Rhoose Cardiff International Airport, it would appear from this study that the best approach for both options would be to do so as part of the Valley Lines network. Extending a current Cardiff – Barry service would be cheapest but would lead to increased overcrowding of peak trains between Barry and Cardiff. The next best and **recommended** option is a new Cardiff – Bridgend service as an extension of the Valley Lines network which could have the advantage of reducing overcrowding between Barry and Cardiff, but may require additional capacity between Cardiff and Cogan junction. Switching a Penarth Line service would be an option but would lead to an irregular timetable on that line.

It is **recommended** that further analysis of the timetable options on the Barry and Penarth lines is undertaken to identify the most efficient scheme whilst maintaining the benefits of a standard pattern timetable. Also, that further capacity analysis of the route is undertaken to ensure that the scheme can be introduced without additional measures to preserve performance.

The **recommended** Abegavenny / Chepstow Lines package of measures was developed in the TIGER strategy and involves a half hourly service between Cardiff and Abergavenny, an additional two hourly service to Gloucester and an additional hourly service to Chepstow. New stations are proposed at Caerleon, Magor with Undy (possibly as a replacement for Severn Tunnel Junction station), Llanwern, Coedkernew and St Mellons and, in the longer term, at Llantarnam and Sebastopol.

Whilst the Vale of Glamorgan and Valley Lines North schemes have monetised benefit cost ratios of between 1.5 and 2.0, the wider economic and social benefits of the schemes – improving access to Cardiff International Airport from both the east and west, improving the performance of the network and improving access to the Valleys to the north of Cardiff – suggest that these schemes could receive Government funding support.

It was not recommended to improve the frequency of the Swan Line Service, nor to extend the Vale of Glamorgan service beyond Bridgend to Swansea – due to the poor value of money assessments of these options.

6.6 New Stations on Existing Lines

Most of the aspirations for new stations on existing lines were not shortlisted for detailed investigation. This was because of the negative impact of the increased journey times experienced by other passengers as a result of additional station stops.

It is **recommended** that the schemes which have the potential for inclusion in the strategy are:

- **Caerleon station on the Newport – Abergavenny Line should be introduced with the new services being proposed.**

- **Magor with Undy station** on the relief lines of the South Wales Main Line between Newport and Severn Tunnel Junction stations, with the improvement of the Gloucester – Cardiff service and possibly as a relocation of Severn Tunnel Junction Station.
- **Llanwern and Coedkernew stations** on the relief lines of the South Wales Main Line between Cardiff and Magor with Undy station with the introduction of additional services to Chepstow. The timing of the stations is related to the timescale for development within their catchment areas.
- **St Mellons station** to be developed in parallel to the other stations on the relief lines of the South Wales Main Line east of Cardiff and to be served by the proposed Abergavenny and Gloucester / Chepstow local services.

In addition it is observed that:

- **Sebastopol and Llantarnam** stations in the longer term should be developed to be served by the proposed enhancement to the Abergavenny local services. They have no significant impact on the economic evaluation for the frequency improvement as they increase rail demand and revenue but increase the capital costs of the investment package. It is **recommended** that these schemes could be developed to relieve parking pressures at Cwmbran and to provide more capacity to remove car traffic from the main A4042 route coming north from west Monmouthshire and Torfaen. Further development in their catchment areas would improve their forecast demand. Third party funding could also be secured to enhance their affordability.
- **Bridgend College station** could be developed on the Vale of Glamorgan Line – however, it had a negative impact on the benefit cost ratio and would be difficult to construct.
- **Upper Boat station** could be developed on the Valley Lines to the south of Treforest station but has some practical difficulties to be overcome. It may conflict with the Beddau network expansion scheme and (depending on timetable planning) may have a negative impact on existing passengers. In addition, as a remote park and ride station, security could be a problem. It is therefore **recommended** to expand the parking facilities at Treforest and Taffs Well stations before providing a new park and ride station at this location.

It is **recommended** that Torfaen Council consider the future of land allocations in the catchment areas of the proposed stations at Sebastopol and Llantarnam and consider protecting the station sites including land for car parking and access routes. This would enable the business case for these stations to be reassessed in the future. Opportunities for securing private sector finance should be sought in line with new developments to reduce the call on Government funding and the impact of the stations on the affordability criteria.

The **recommended** strategy for the Ebbw Vale Line is to provide an hourly service between Ebbw Vale Town and Newport and to extend the initial hourly Cardiff service to Ebbw Vale Town from Ebbw Vale Parkway. The Cardiff service could not stop at additional stations and the demand forecasts for stopping the hourly Newport service are low, therefore the stopping at further new stations (Cwm, Crumlin, Pye Corner) would not be justified bearing in mind the impact on the journey times for users of the other stations on the Line.

It is **recommended** that local planning authorities in the Sewta region safeguard the sites for new stations highlighted in this report (both for development within the strategy period and those suggested as longer term options), including sufficient land for platforms, accesses and car parking. They should also consider land use allocations within the catchment areas of the stations and seek developer contributions towards the infrastructure.

If other stations are to be developed in the longer term it is **recommended** that local authorities review the reasons for the deferment of the scheme in this strategy period and assess whether these could be overcome in the future – such as through appropriate land use allocations. The stations that were evaluated but have not been highlighted and which are not recommended to be taken forward in the period to 2018 are covered in the corridor evaluations within the Part 1 study report¹⁴ and final report technical appendix¹⁵ and summarised in the strategy decision matrix in Appendix B.

6.7 Network Extensions and New Stations.

Table 7 shows the summary results of the network extension options that were evaluated in the study. From these results it is **recommended** that the following schemes are included in the rail strategy:

- **Ebbw Vale Town to Newport and Cardiff** - Extensions to Ebbw Vale Town and / or Abertillery could provide a better business case for the introduction of the additional Ebbw Vale to Newport service than if it were to run only as far as Ebbw Vale Parkway. The recommendation to run to Ebbw Vale Town is based on the objective to provide at least half hourly services to key stations in the Sewta region and the increased capital costs compared to extending the network to Abertillery.
- **Cardiff – Beddau** half hourly service - with new stations at **Talbot Green, Llanstrisant, Gwaun Meisgyn** and **Beddau (Tynant)**. This provides a new rail link to a growing area needing improved access to Cardiff, as well as providing rail operational benefits for through running services from Cardiff Central. However, this service would operate on a congested section of the network (the Great Western RUS¹⁶ reported that 90% of the capacity was utilised), though the Cardiff Area Signalling Renewal Project presents opportunities to relocate conflicting movements at the west end of Cardiff Central to improve performance and capacity. A capacity review of the South Wales Main Line west of Cardiff (possibly in partnership with SWITCH) needs to be undertaken in parallel with the optioneering for the signalling project.

It is **recommended** that the Ebbw Valley Phase 2 scheme is developed in parallel to the implementation of the Phase 1 scheme but that the economic evaluation is checked when the Phase 1 demand is known. Ideally the implementation of the scheme should be integrated with the Masterplan for Ebbw Vale.

It is **recommended** that the proposed Rail-link bus service between Abertillery and Llanhilleth station should be integrated with the train services and ticketing system and financially supported through a partnership between the train operator and local authorities funded by the Assembly.

¹⁴ Sewta Rail Strategy Study, Final Part 1 Report, August 2005

¹⁵ Sewta Rail Strategy Final Report – Technical Appendix, January 2006

¹⁶ Great Western Main Line Route Utilisation Strategy, SRA, June 2005

The Council should protect the alignment to Abertillery and seek to secure a station location at the town through the local planning process to enable that scheme to be developed in the longer term. In the interim consideration could be given to developing a cycle route on the formation to increase access to the train services.

It is **recommended** that further assessment is undertaken of identified critical factors on the Cardiff - Beddau route in the near future given the urgency of a decision on plain-lining the route through Pontyclun.

Table 7 Summary Economic Evaluation Network Extension Options

Scheme	Capital Cost	Operating Cost	Subsidy (year 1)	Subsidy/ Pass	Net Present Value	Benefit Cost Ratio
Hirwaun – Aberdare	£22m	£676k - £1,058k	£361k - £501k	£2 - £5	£-5m - £20m	0.8 – 1.8
Ebbw Vale Parkway - Newport	£29m	£1,307	£833k	£2.80	£15m	1.38
Ebbw Vale Town	£36m	£1,500k	£290k	£0.38	£54m	2.1
Ebbw Vale & Abertillery	£46m	£1,307k	£0	£0	£108m	3.45
Cardiff – Beddau Hourly	£20m	£1,236k	£728k – £898k	£2 - £4	£-0.3m - £22m	1.0 – 1.8
Cardiff – Beddau Half Hourly	£23m	£2,017k	£804k - £1,152k	£1 - £2	£49m - £91m	2.3 – 4.2
Queen St + Cardiff – Energlyn and Pontypridd Phased #	£30m	£1,463k	£1,320k	£11	£26m	1.5
Queen St Phased + extended to Bedlinog #	£46m	£2,193k	£1,728k	£4	£36m	1.2 – 1.5

Note these schemes evaluated assuming 5% passenger growth compared to 2.25% GDP based growth for other schemes.

It is also **recommended** that, instead of extending the rail line to Hirwaun (which would have a relatively high cost compared to forecast benefits), the rail strategy provides improved access to Aberdare station through maintenance of the Rail-link bus service and increased parking provision.

A Cardiff – Bedlinog service requires more capacity at Cardiff Queen Street and is compared with the option of Cardiff - Energlyn shuttle (without the network extension) in Table 7. The lower forecast benefit cost ratio suggests that the additional demand and benefits of the service extension and new stations would not cover the additional costs. It is therefore **recommended** that the scheme is deferred and assessed again at a later date, with a Rail-link bus service to either Abercynon Station or Ystrad Mynach station being provided from the Bedlinog corridor during this strategy period to 2018.

It is **recommended** that the potential for development of the Bedlinog Corridor rail service in the future is protected by safeguarding the station sites including land for the platforms, accesses and parking. It is also recommended that Caerphilly and Merthyr Tydfil Councils consider future land use allocations in the station catchment areas to provide an opportunity to review the business case in the future. The councils should also seek private sector contributions towards the infrastructure to improve the affordability of the scheme and thereby improve the business case.

6.8 Rail-link Bus Services

The parallel Sewta Bus Strategy study is ongoing and will be examining how to improve the bus network to deliver the economic and social objectives in the region. That study recognises the role of rail in providing reliable strategic public transport services to the core city centres especially over longer distances. The largely complementary bus network serves more local markets and locations which are remote from the rail network.

Rail-link bus services currently provide access to communities in the south east Wales Valleys between Maesteg and Caerau, Ystrad Rhondda and Ferndale / Maerdy, Aberdare and Hirwaun / Rhigos and Ystrad Mynach and Blackwood. These services require significant subsidy and provide increased access to rail for social and economic reasons as well as in some cases enabling a direct rail connection to replace those that have been lost or are impractical. When the Ebbw Vale Parkway – Cardiff services are introduced in 2007 further Rail-link bus services are planned for access to Ebbw Vale Town and Abertillery / Brynmawr.

When the train service frequencies are improved within the next 5 years there are aspirations to extend the Caerau service to Cymmer and to increase the frequency of the Blackwood service. There are also aspirations to develop a Pontypool and New Inn to Abersychan and Blaenavon service when the train service frequency is improved between 2009 and 2018. It is also recommended to consider introducing Rail-link buses between Pontyclun and Llantrisant / Beddau as a pre-rail service and between Abercynon and Bedlinog to improve access to that corridor within the strategy period.

These services extend the influence of the rail network and would perform best if integrated with rail ticketing and information systems. It is therefore **recommended** that they are incorporated into the Rail Franchise process through a partnership between the train operator and local authorities with dedicated funding from the Assembly. If not Sewta will require a significant additional revenue budget to maintain the existing services and securing the new services. It is therefore also **recommended** that other opportunities to secure the bus services are sought including integration with commercial and other subsidised services and that developer contributions to pump-prime service development are secured.

6.9 Strategy Summary and Effectiveness

The recommended rail strategy elements for the period 2009 – 2018 and, where calculated within the study their value for money, are summarised in Table 8. The recommended rail strategy for 2009 to 2018 will result in:

- At least half hourly rail services to most stations in the region;
- Turn – up – and – go service frequencies in the Cardiff Journey to work area;
- Improved reliability and improved ability for the rail industry to cope with delays to minimise secondary impacts for passengers;
- Improved connectivity by rail between main centres including, Cardiff, Newport, Pontypridd, Caerphilly, Barry, Ebbw Vale, Cwmbran, Abergavenny, Chepstow and Rhoose Cardiff International Airport;
- Five new stations on existing lines at Caerleon, St Mellons, Magor with Undy, Llanwern and Coedkernew - providing improved access to existing communities and to serve important development areas;

- Improved access between the Valleys and employment centres in Cardiff, Newport and new employment locations;
- Extension of the network to Ebbw Vale Town and to the housing growth area between Pontyclun and Beddau, including 4 new stations; and
- Improved stations, improved and new Rail-link bus services and additional station parking supply to reduce car trips and relieve congestion on the radial routes into Cardiff and Newport.

Table 8 Summary of Recommended Rail Strategy Elements

Scheme	Value for Money (BCR)
Additional Rolling Stock and rolling stock renewal	1.2
Station Improvements	-
Park and ride expansion	-
Rail-link Bus Services	-
Barry Station Turnback	26.0
Cogan Junction Capacity improvement	4.4
Llandaf additional signal	4.0
Cardiff Central station turnbacks	-
Queen Street Station Capacity Improvement and additional services to Pontypridd and Energlyn	1.5 – 1.6
Half Hourly Vale of Glamorgan Service	1.75
Additional hourly Abergavenny Service and Caerleon Station	7.8
Improved Gloucester Service and Magor with Undy and St Mellons Stations and Relief Line Upgrade	3.1
Further additional Abergavenny Service	Over 10.0
Additional Hourly Cardiff – Chepstow Service + Llanwern + Coedkernew stations	3.27
Ebbw Vale Phase 2 – additional hourly service between Ebbw Vale Town (new station) and Newport	2.09
Cardiff – Beddau half hourly service and new stations at Talbot Green, Llantrisant, Gwaun Meisgyn and Beddau (Tynant)	2.33

Appendix A summarises the assessment of the recommended strategy against the identified National / Regional Objectives. This shows that, in combination, the strategy improves the environment and contributes to road safety, the reduction of accidents, provides significant economic benefits and is integrated with the regional spatial strategy through its improvement of connectivity between main centres. Most measures improve accessibility to jobs from the Valleys and / or encourage significant modal shift to Newport and Cardiff. The strategy contributes to making best use of the network and provides positive impacts for existing passengers as well as increasing access to rail in a manner that encourages new rail use.

For schemes not recommended for the Rail Strategy for the period 2009 to 2018 local authorities need to assess the evaluation results and give consideration as to whether the reasons for deferring the scheme can be overcome in the future, such as through providing additional housing development within station catchment areas, providing park and ride and whether therefore to preserve opportunity for the scheme through the land-use planning process.

7 STRATEGY IMPLEMENTATION

7.1 Introduction

This section summarises the key issues related to the delivery of the rail strategy, the programme and funding issues.

7.2 Strategy Delivery

Table 9 summarises the key strategy schemes and deliverability issues including dependency and identified critical success factors. In addition to the continued growth in passenger demand driving the need for additional rolling stock and the frequency increases through Cardiff Queen Street and the business case for the capacity improvement at that location, the table reveals significant dependency on available route capacity. The opportunity presented by Network Rail's planned signalling renewal projects during the strategy period must not be missed as these are major projects, within which there can be a significant integration of additional infrastructure measures.

In addition it should be noted that all schemes will need to be designed to maintain or improve service performance in accordance with the Arriva Trains Wales performance thresholds.

7.2.1 Newport Area Signalling Renewal Issues

The Newport Area Signalling Renewal Project is to be implemented in 2 phases, east of the Severn Tunnel (Patchway) towards Cardiff including the Abergavenny Line, as far as Llantarnam, in 2008 and east of Severn Tunnel Junction to Chepstow / Gloucester, the south end of the Ebbw Vale Line (Park Junction and north of Llantarnam to Little Mill in 2011). The signalling renewal project needs to take account of the recommended Sewta Strategy and to seek to maximise the efficiency of investment in the short term for the delivery of later programmed projects. Specifically:

- Turn-back facilities at Abergavenny and Chepstow;
- New Stations at Caerleon, Sebastopol and Llantarnam, Magor with Undy (possibly as a replacement for Severn Tunnel Junction Station), Llanwern and Coedkernew Stations – and in the longer term at Sebastopol and Llantarnam;
- New half hourly services between Cardiff and Abergavenny;
- Improved Gloucester service (to hourly) and additional Cardiff – Chepstow hourly service; and
- Ebbw Valley Phase 2, hourly Newport to Ebbw Vale Town service.

This part of the strategy requires upgrading of the relief lines to supply the capacity for the additional services and new stations on the South Wales Main Line. Specifically, its line speed needs to be increased, and the track upgraded to passenger standard.

Network Rail are undertaking the Newport Area Signalling Renewal scheme on a like for like basis so the inclusion of additional measures that provide for increased services will need to be justified and the associated funding agreed between Sewta, the Assembly and Network Rail.

Table 9 Critical Success Factors

Scheme	Dependency	Other factors
Rolling Stock Strategy/ renewal	Continued passenger growth.	Available rolling stock / new build programme. WAG funding for new or cascade stock. Depot capacity for stabling and maintenance. Platform lengthening implemented.
Station Improvements	-	Possible linkage with DfT/NR 'Access for All' funds and MFAS designs available for some.
Park and ride expansion	-	Land available + Planning permissions.
Rail-link Bus Services	Continued Funding.	Additional revenue funding available.
Barry Station Turnback	-	Cardiff Area Signalling Renewal.
Cogan Junction Capacity improvement	-	Land Availability and Cardiff Area Signalling Renewal.
Llandaf additional signal	-	Cardiff Area Signalling Renewal.
Cardiff Central turnbacks	-	Cardiff Area Signalling Renewal.
Queen Street Station Capacity Improvement and additional services	Continued high demand growth. Capacity north and south of Cardiff. Rolling Stock.	Cardiff Area Signalling Renewal. Securing land through Transport and Works Act. Final Scheme design and acceptable implementation programme.
Half Hourly Vale of Glamorgan Service	Route Capacity. Rolling Stock.	Further growth in demand at Llantwit Major and Rhoose Cardiff International Airport.
Additional Abergavenny Service and Caerleon Station	Turnback at Abergavenny. Redevelopment of Hospital site. Rolling Stock.	Newport Area Signalling Renewal. Ability to turnback at Cardiff or integration of services. Detailed location of St Mellons station re: freight terminal access.
Improved Gloucester Service and Magor with Undy and St Mellons Stations and Relief Line Upgrade	Relief Lines Upgrade. Protection of Station Sites. Rolling Stock.	Newport Area Signalling Renewal. Ability to turnback at Cardiff or integration of services.
Further Additional Abergavenny Service	Route Capacity. Rolling Stock.	Newport Area Signalling Renewal. Ability to turnback at Cardiff or integration of services.
Additional Hourly Cardiff – Chepstow Service + Llanwern + Coedkernew stations	Turnback at Chepstow. Development at Station Sites. Rolling Stock.	Newport Area Signalling Renewal. Ability to turnback at Cardiff or integration of services. Development demand forecast assumptions. Confirmed location / access re: Llanwern.
Ebbw Vale Phase 2	Route Capacity. Development at Ebbw Vale. Rolling Stock.	Newport Area Signalling Renewal. Demand forecast assumptions and Performance of Ebbw Vale Phase 1 service. Protection of alignment to Ebbw Vale Town and station location.
Cardiff – Beddau Service	Route Capacity. Scheme details. Rolling Stock.	Cardiff Area Signalling Renewal. Practicality of relocation of junction w. Pontyclun and retention of branch access.

7.2.2 Cardiff Area Signalling Renewal Issues

The Cardiff Area Signalling Renewal Project is to be developed and implemented in 2010 / 2011. Cardiff Central station presents a capacity constraint on the network. There is an imbalance between the number of services approaching Cardiff from the east (including the Valley Lines to the north) compared to the West (and south). The Cardiff Bay branch offers potential for turning back services from the Valley Lines to the North but increases train conflicts at Queen Street Station, and misses the station stop at Cardiff Central.

The additional train services from each direction are summarised as:

- **From the East;**
 - 2 trains per hour to Abergavenny
 - 0.5 trains per hour to Gloucester
 - 1 train per hour to Chepstow

Plus later in the strategy period and possibly running from Cardiff Bay;

 - 2 trains per hour to Energlyn via Caerphilly
 - 2 trains per hour to Pontypridd

- **From the West;**
 - 2 trains per hour to Beddau
 - 1 train per hour to Bridgend via Barry

Therefore there is a need for additional turn-back facilities to be provided at Cardiff Central to implement the strategy. There is a need to maximise flexibility in operations by enabling trains to turn back at platforms 6 and 7, which cater for the Valley Line services, and at platforms 3 and 4 which cater for main line services. A new turnback platform should also be considered.

The Cardiff Area Signalling Renewal Project covers the area of the network where schemes in the strategy period are recommended for implementation at Cardiff Queen Street, Barry, Llandaf and Cogan Junction. There is also a need to provide at least passive provision for these aspirations in the Signalling Renewal plans, to minimise subsequent implementation costs. Ideally, the Signalling Renewal plan will take account of the likely improvements required over the next 30 years.

The Great Western Franchise process is ongoing and could include a reduction in the Cardiff – London service and / or an extension of services from Bristol to Rhoose Cardiff International Airport. The Sewta Rail Strategy and Cardiff Area Signalling Renewal options may need to be re-examined if these service decisions have an impact on the capacity assumptions.

Network Rail will be undertaking the Cardiff Area Signalling Renewal Project on a like for like basis so additional measures that improve performance and provide for increased services will need to be justified and associated funding agreed between Sewta, the Assembly and Network Rail. In the short term Network Rail require commitment from Sewta and the Assembly of their aspirations for increasing train frequencies – by April 2006. It is recommended that Sewta continues to work closely with Network Rail in modernising the rail network to meet the future needs of the region.

7.3 Implementation Programme

The development of the Implementation Programme needs to take account of the dependency between schemes and investment programmes and the development timescale for design and implementation. Interdependency issues are principally between re-signalling programmes and new services and capacity measures but also between new services and new stations, integrated land-use development and integrated transport measures such as Rail-link bus services, park and ride expansion and other station improvements.

The scheme development timescale needs to take account of Network Rail's GRIP¹⁷ Stages:

- Stage 1 – Output Definition
- Stage 2 – Pre-feasibility
- Stage 3 – Option Selection
- Stage 4 – Single Option Development
- Stage 5 – Detailed Design
- Stage 6 – Construction, Test and Commissioning
- Stage 7 – Scheme Handback
- Stage 8 – Project Close Out

Stages 1 to 4 can be combined and taken forward under the framework agreement between the Assembly and Network Rail. Projects should be taken through to GRIP Stage 3/4 to enable the risks to be identified and to develop the programme for delivery.

The development of schemes to level 4 is dependent on the availability of resources, interface with other projects and perceived risks. However, the minimum development timescale range between 28 weeks for a new station and 40 weeks for a line re-opening. At this stage the development lead times for schemes to be implemented between 2009 and 2018 are not considered critical to programming. However, it will be important to initiate projects with Transport and Works Act implications and land requirements that are required early in the strategy period within the next 4 years. This applies particularly for the remodelling of Cardiff Queen Street.

Table 10 shows a proposed implementation programme for the Rail Strategy. Several schemes require enhanced investment as part of the Newport Area Signalling Renewal projects in 2008 and 2011 and Cardiff Area Signalling Renewal Projects in 2010/11.

It is recommended that the programme is further developed through a detailed economic investigation before the successful schemes are developed through the GRIP stages towards implementation. The programme needs to be developed in more detail and reviewed in particular in relation to the land-use development changes within the new station catchments at Caerleon, Llanwern and Coedkernew. Also a more detailed programme would include phasing and integrating schemes within the strategy, such as improving station facilities, expanding parking capacity and / or integrating rail-link bus services when rail service levels are improved.

¹⁷ Guide to Railway Investment Project

Table 10 Proposed Sewta Rail Strategy Programme 2009 - 2018

Scheme	2009 - 2011	2012 - 2013	2014 - 2018
Rolling Stock (train lengthening)			
Station Improvement Schemes, Park and Ride and Rail-link Bus services			
Reliability Improvement Schemes, Barry, Cogan Junction, Llandaf			
Cardiff Queen Street and Additional Services to Pontypridd and Energlyn			
Vale of Glamorgan Half Hourly			
Abergavenny 1 additional train per hour (inc Caerleon Station)			
Abergavenny 2 nd additional train per hour			
Cardiff – Gloucester (inc Magor with Undy and St Mellons Stations)			
Cardiff – Chepstow (Inc Llanwern and Coedkernew stations)			
Ebbw Valley Phase 2			
Cardiff – Beddau			

7.4 Funding Implications

Rail services and infrastructure in the Sewta Region is funded through:

- Revenues from fares and parking charges;
- DfT Rail and the Assembly through the Rail Franchise and local agreements;
- Network Rail – in terms of maintenance and route modernisation programmes and their discretionary fund;
- Local authorities through local taxes;
- Welsh Assembly Transport Grant funding;
- EU Objective 1 funding – though the current programme finishes in 2008 and the budget and funding arrangements for 2009 – 2013 are not yet agreed; and
- Private sector – 3rd party – funding for transport improvements related to new development secured through the planning process.

In addition, some schemes have been funded through special funds such as the former Strategic Rail Authority's Rail Passenger Partnership (RPP) fund – which enabled the introduction of the Vale of Glamorgan scheme, and the Assembly's Corus Special Fund – which is enabling the restoration of passenger rail services in the Ebbw Valley.

Future funding for transport in the region could include the development of Road User Charging Schemes (RUC's) or a Congestion Charge. These would be focused on urban areas and seek to encourage sustainable travel choices and more reliable highway journey times. The impact on rail and therefore funding implications would need more detailed investigation.

Rail fares in the Sewta area are low – especially in the Valley Lines part of the network where average fares are currently around £1.50 per journey. These fares reflect the low income for the communities in the Valleys. This is untypical for urban and suburban rail services elsewhere in the UK where the more affluent population tends to live further away from the Centre and can afford to pay higher costs for greater travel distances and for the benefits of faster services. The growth in rail fares is prescribed by DfT Rail – currently rising at a rate of RPI +1% per annum. This limits the extent to which the benefits of service improvements can be realised through the fare box.

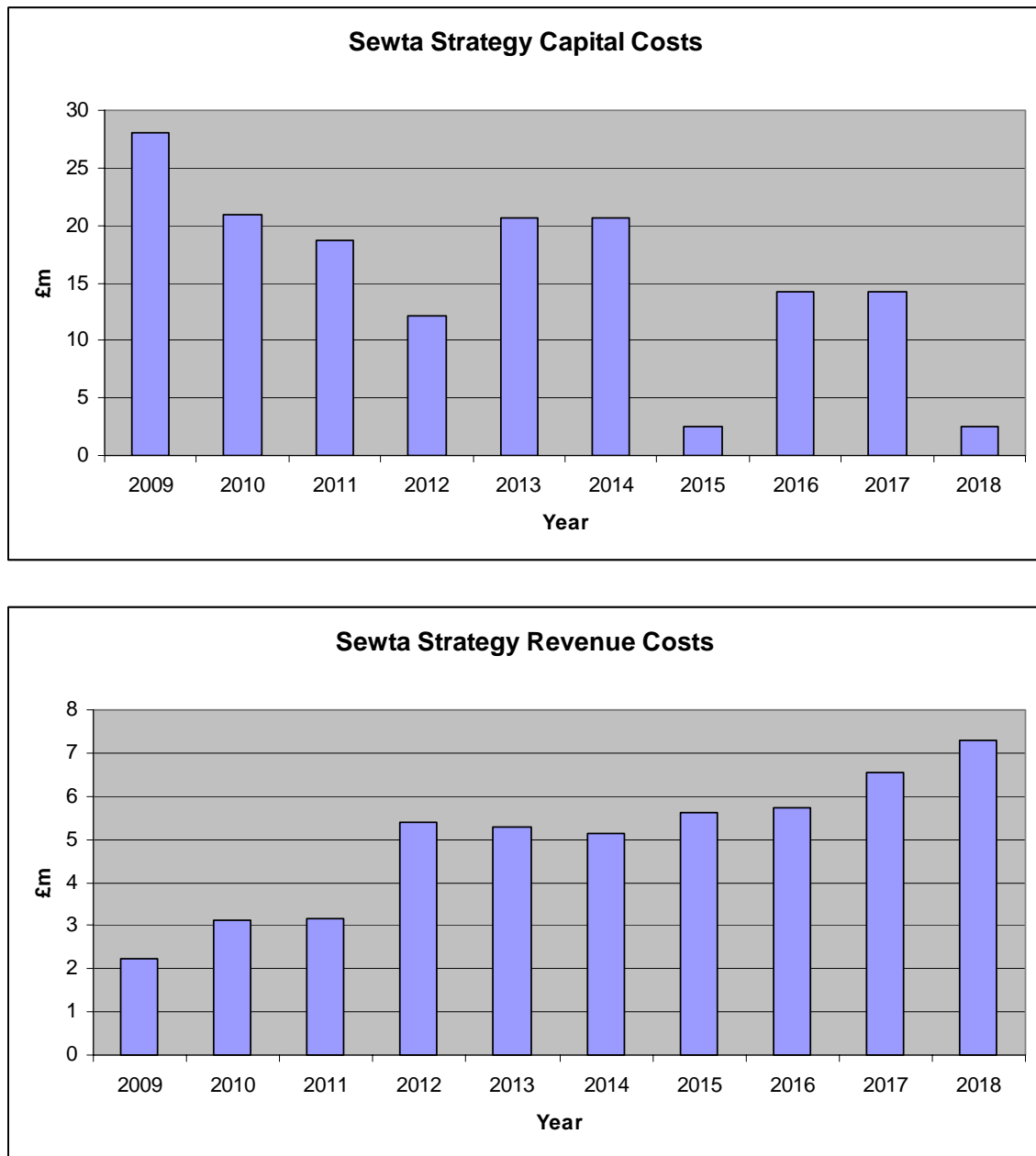
The Capital and revenue funding implications of the recommended strategy are shown in Table 11 and Figure 3. The funding assessment assumes that the Station Improvements Programme and Park and Ride expansion programme would require funding of around £2m and £0.5m per annum respectively. The programme assumes train lengthening and Rail-link bus service funding throughout. Table 11 highlights other specific schemes.

The capital cost of the recommended strategy is estimated as around £155m over the 10 years in 2005 prices. The funding profile needs to be developed in more detail as the construction timetables become known as each scheme progresses through the design stages. If annual funding is restricted some schemes may need to be reprogrammed / delayed to smooth the funding profile. If the overall level of funding is restricted, deferring the Beddau Scheme to beyond the strategy period and halving the annual investment in station improvements would reduce the overall capital cost to around £120m. However the programme is still relatively 'front loaded'.

Table 11 Capital and Revenue Costs (2005 prices)

Year	Capital Funding	Revenue (Subsidy) Requirement	Schemes
2009	£27.993m	£2.247m	Barry, Abergavenny, Gloucester line (Magor with Undy, St Mellons)
2010	£20.975m	£3.115m	Queen Street, Cogan
2011	£18.761m	£3.149m	Queen Street, Llandaf
2012	£12.134m	£5.386m	Chepstow, Llanwern, Coedkernew
2013	£20.606m	£5.287m	Ebbw Vale Phase 2
2014	£20.606m	£5.135m	Ebbw Vale Phase 2
2015	£2.500m	£5.632m	
2016	£14.237m	£5.719m	Beddau
2017	£14.237m	£6.562m	Beddau
2018	£2.500m	£7.298m	
Totals	£154.550m	£49.531m	

Figure 3 Capital and Revenue Funding Profiles



The additional revenue (subsidy) costs of the recommended strategy rise from just over £2m per annum to just over £7m per annum over the strategy period. This equates to an increase in the current ATW franchise costs of between 2% and 10%.

An assessment of the potential for EU funding of schemes within assisted areas in the region was undertaken. The replacement for EU Objective 1 funding is not yet confirmed, however it has been assumed that it would run between 2009 and 2013 inclusive. The assessment assumed an EU grant funding rate of 35% of the Capital costs and it was assumed that the Ebbw Vale, Beddau schemes and 50% of the Station Improvements and Park and Ride expansions would be eligible and that the Ystrad Mynach – Bedlinog Line extension scheme would also be brought forward as a result. This would lead to a capital programme of £142m (without the EU element). However, the majority of funding would be required in the first 5 years of the strategy period.

8 NEXT STEPS

8.1 Introduction

This study has reviewed the issues influencing the rail network for the period between 2009 and 2018, examined the aspirations of improvements to infrastructure and services and provided recommendations for the rail strategy for the Sewta Region. This now needs to be taken forward in parallel with other strategies, such as the Sewta Bus Strategy and Sewta Cycle Strategy, to form the Regional Transport Plan.

In addition, the development of the regional transport plan will need to take into account a number of other studies and programmes as it seeks to merge them into a coherent and fully integrated strategy. These include:

- The forthcoming Wales Regional (Rail) Planning Assessment - to be undertaken by the Assembly;
- Franchise replacement plans – in particular Great Western but also Central Trains (2007); and
- The strategies of neighbouring authorities and regions, including south west England and SSWITCH.

8.2 Recommended Further Work

It is recommended that the schemes shortlisted for inclusion within the Sewta Strategy for 2009 – 2018 are examined in more detail and the following evaluation be undertaken as follows:

- The economic evaluation should move to a more detailed level – in line with Major Scheme Assessment Guidance upgrading the initial evaluations in line with the revised information from more detailed engineering, timetable and costs assessments. It is expected that the level of risk and optimism bias will reduce as the level of detailed engineering and cost estimation increases. Revised economic evaluations would take into account when each scheme is to be introduced, more detailed investigation of user and non-user benefits and calculation of market value and tax implications.
- More detailed demand and revenue forecasting, such as explicit consideration of mode choice at proposed new stations. The evaluations would benefit from the production of more information on the users of the new Vale of Glamorgan services and, in due course, the Ebbw Vale Service.
- The Appraisals should be taken to a more detailed level including assessment of the environment impacts and wider economic benefits.
- Further assessment of the performance benefits of Cogan Junction and Llandaf reliability schemes should be undertaken. Specifically assessment of train delay information to establish the incidence and scale of delays. Further assessment of Cogan Junction improvement options and phasing needs to be undertaken.

- More detailed timetable and operations assessment including the assessment of pathing constraints, the requirement and impact of new infrastructure and interworking with other services.
- More detailed engineering, design and costing. This would involve on-railway site assessments (including lookouts) to establish the existing infrastructure constraints in detail. Outline drawings of key infrastructure elements and more detailed costing would be prepared.
- A detailed review of Main Line Capacity is required between Severn Tunnel and Bridgend (and possibly beyond in partnership with SWITCH) – especially west of Cardiff to plan for the Sewta required passenger services and freight services, whilst ensuring a high level of reliability. This could include more detailed engineering assessments of the Beddau Line connection and St Mellons station location to confirm their practicality.
- It is recommended that the impact of rail services on parallel bus services is assessed (starting with the results of the Vale of Glamorgan scheme) and that further analysis of the implications of the Rail Strategy is undertaken including bus network change planning as schemes are evaluated and implemented.
- It is recommended that further work is undertaken in relation to the proposed new station at Magor with Undy and implications for services calling at Severn Tunnel Junction station.
- Further assessment of the impact of Cardiff Congestion Charge/ Road Pricing impacts on rail demand growth should be undertaken if / when that initiative progresses, to ensure that the rail network can continue to meet passengers' needs.

Whilst more detailed investigation of the costs and benefits of the Sewta Rail Strategy will refine the evaluations we would not expect the conclusions drawn within this study to differ widely.

In addition to a more detailed study of major infrastructure elements of the strategy – key elements need to be further developed and / or monitored over time. Specifically:

- The packages of **station improvement schemes** and the programme for investment in the accessibility and quality of the network infrastructure.
- The growth in rail patronage, the resultant increase in crowding and the programme for **rolling stock increases**. In particular a review of peak period loadings at Central Cardiff needs to be undertaken to establish any under-reporting of on-train counts.
- The growth in rolling stock provision and the capacity of the network – particularly **Cardiff Queen Street** and Cardiff Central and therefore the need for the development of this major scheme which is a key element of the Sewta rail network impacting on the reliability of all routes.

It is recommended that the current Sewta Rail Improvement Programme is further developed to include the further work which is required to develop the elements of the longer term programme identified in this report and that further stakeholder consultation is undertaken.

APPENDIX A - SEWTA RAIL STRATEGY SUMMARY APPRAISAL

Sewta Rail Strategy Study - Recommended Strategy Appraisal

Scheme	National Objectives			Sewta Regional Objectives						
	Environment	Safety	Economy	Integration with Spatial Strategy	Accessibility Valleys - Jobs	Centre - Centre Connectivity	Mode Shift	Making Best Use	Existing Passenger Impact	Deliverability
Rolling Stock										
Train Lengthening	+	+	+	+	+	+	+	++	++	++
Rolling Stock Renewal	++	+	++	++	0	0	+	++	++	+
General Measures										
Station Access (Ped/Cycle)	+ / -	0	+	+	+	0	+	++	++	++
Customer Information	+ / -	0	+	+	0	0	+	++	++	++
Security/CCTV	+ / -	++	+	+	0	0	+	++	++	++
Park and Ride	+ / -	+	+	++	++	0	++	++	+	++
Service Reliability Measures										
Barry Town	+	+	++	+	0	0	+	++	++	++
Cardiff Platforms turnbacks	+	+	++	+	0	0	+	++	++	Cardiff Re-signalling
Llandaff Signal	+	+	++	++	+	0	+	++	++	Cardiff Re-signalling
Cogan Junction	+	+	++	+	0	0	+	++	++	Cardiff Re-signalling
Cardiff Queen Street	+	+	++	++	++	++	++	++	++	Cardiff Re-signalling + TWA
Bus Connections										
Cymmer - Maesteg	0	0	0	++	+	+	0	+	0	Revenue Funding Availability
Blackwood frequency	0	0	0	+	+	+	0	+	0	Revenue Funding Availability
Penalta - Ystrad Mynach	0	0	0	+	+	+	0	+	0	Revenue Funding Availability
Blaenavon - Pontypool	0	0	0	++	+	+	0	+	0	Revenue Funding Availability
Ebbw Vale Town - EV Parkway	0	0	0	++	+	+	0	+	0	Revenue Funding Availability
Brynmawr - Abertillery - Llanhilleth	0	0	0	++	+	+	0	+	0	Revenue Funding Availability
Bedlinog - Treharris - Abercynon	0	0	0	++	+	+	0	+	0	Revenue Funding Availability
Additional Services										
Abergavenny + Caerleon	+ / -	+	++	+	+	+	++	+	+	+ (Depends on Cardiff turnback)
Abergavenny 2nd tph	+	+	++	+	+	+	++	+	+	+ (Depends on Cardiff turnback)
Gloucester + Magor + St Mellons	+	+	++	++	0	+	++	+	++	+ (Depends on Cardiff turnback)
Chepstow + Llanwern + Coedk'w	+ / -	+	++	++	0	+	++	+	++	+ (Depends on Cardiff turnback)
Ebbw Vale Town - Newport	+	+	+	++	++	+	++	+	++	+
Vale of Glamorgan Bridgend	+	+	+	++	+	+	++	+	+	+
Pontypridd - Cardiff 10 tph	+	+	+	+	+	++	++	0	+	Dependent on Queen St and Phasing
Energlyn - Caerphilly - Cardiff 6 tph	+	+	+	++	+	++	++	-	+	Dependent on Queen St and Phasing
New Stations										
St Mellons	-	0	+	+	0	-	++	0	0	+
Caerleon	-	+	++	++	0	-	++	+	0	+
Coedkernew	-	0	+	++	+	-	++	0	+	Depends on Main Line Upgrade + Development
Llanwern	-	0	+	++	+	-	++	0	+	Depends on Main Line Upgrade + Development
Magor/Undy	-	0	+	+	0	-	+	0	+ / -	Possible Relocation of Severn Tunnel J
Line Extensions										
Ebbw Vale North	+	+	+	++	++	++	+	+	+	+
Beddau	+ / -	+	++	++	+	+	++	0	-	Dependent on Main Line Capacity

APPENDIX B - SCHEME DECISION MATRIX

Scheme	National Objectives			Sewta Regional Objectives						Scheme progression			
	Environment	Safety	Economy	Integration with Spatial Strategy	Accessibility Valleys - Jobs	Centre - Centre Connectivity	Mode Shift	Making Best Use	Existing Passenger Impact	Deliverability	Part 1	Part 2	Final Strategy to 2018
Rolling Stock													
Train Lengthening	+	+	+	+	0	+	+	++	++	++	→	→	Yes
Rolling Stock Renewal	++	+	++	++	0	0	+	++	++	+	→	→	Yes
General Measures													
Station Facility Improvements	+	+	+	+	0	0	+	+	++	++	→	→	Yes
Station Access (Ped/Cycle)	+/-	0	+	+	0	0	+	++	++	++	→	→	Yes
Customer Information	+/-	0	+	+	0	+	+	++	++	++	→	→	Yes
Security/CCTV	+/-	++	+	+	0	0	+	++	++	++	→	→	Yes
Park and Ride	+/-	+	+	++	++	0	++	++	+	++	→	→	Yes
Service Reliability Measures													
Stormstown Loop	+	+	++	++	0	0	+	++	++	Short Term with Abercynon	→	→	pre 2010
Barry Town	+	+	++	+	0	0	+	++	++	+	→	→	Yes
Cadoxton	+	+	+	0	0	0	+	++	++	+	x	x	No
Cardiff Platform 6	+	+	++	+	0	0	+	++	++	Cardiff Re-signalling projects			Yes
Llandaff Signal	+	+	++	++	+	0	+	++	++	+	→	→	Yes
Cogan Junction	+	+	++	+	0	0	+	++	++	0	→	→	Yes
Cardiff Queen Street	+/-	+	++	++	++	++	++	++	++	0	→	→	Yes
Rail - Link Bus Connections													
Cymer - Maesteg	0	0	0	++	+	+	0	+	0	+	→	→	Possible
Blackwood frequency	0	0	0	+	+	+	0	+	0	+	→	→	Possible
Penalta - Ystrad Mynach	0	0	0	+	+	+	0	+	0	+	→	→	Possible
Blaenavon - Pontypool	0	0	0	++	+	+	0	+	0	+	→	→	Possible
Ebbw Vale Town - EV Parkway	0	0	0	++	+	+	0	+	0	+	→	→	Possible
Brynmarw - Abertillery - Llanhilleth	0	0	0	++	+	+	0	+	0	+	→	→	Possible
Bedlinog - Treharris - Abercynon	0	0	0	++	+	+	0	+	0	+	→	→	Possible
Faster Services													
Merthyr Tydfil	+	+	+	+	-	0	+	0	--	-	x	x	No
Vale of Glamorgan	+	+	+	+	-	0	+	0	--	-	x	x	No
Additional Services													
Abergavenny hourly	+	+	+	+	+	+	++	+	+	Dependent on Cardiff Capacity	→	→	Yes
Abergavenny half hourly	+	+	+	+	+	+	++	+	+	Dependent on Cardiff Capacity	→	→	Yes
Gloucester Hourly	+	+	+	+	0	+	++	+	++	Dependent on Cardiff Capacity	→	→	Yes
Chepstow half hourly	+	+	+	+	0	+	++	+	++	Dependent on Cardiff Capacity	→	→	Yes
Ebbw Vale - Newport	+	+	+	++	++	+	++	+	++	+	→	→	Yes
Rhoose - London	+	+	-	++	0	+	+	+	0	0	→	x	No
Rhoose - South West England	+	+	-	+	0	+	+	+	0	0	→	x	No
Vale of Glamorgan Bridgend	+	+	+	++	+	+	++	+	+	+	→	→	Yes
Vale of Glamorgan - Swan Line	+	+	-	++	+	+	++	+	+	+	→	x	No
Pontypridd - Cardiff 10 tph	+	+	++	+	+	++	++	-	+	dependent on Queen St	→	→	Yes
Porth - Cardiff 4 tph	+	+	++	+	++	+	++	-	+	dependent on Queen St	→	x	No
Pontypridd - Cardiff additional	+	+	++	+	++	+	++	-	+	dependent on Queen St	→	→	Yes
Swansea - Cardiff	+	+	-	++	0	+	++	-	+	dependent main line capacity	→	x	No
Caerphilly - Cardiff 6 tph	+	+	+	++	+	++	++	-	+	dependent on Queen St	→	→	Yes
Energlyn - Cardiff additional	+	+	+	++	+	++	++	-	+	dependent on Queen St	→	→	Yes
New Stations													
Cwm	-	0	-	++	++	-	+	-	-	-	→	x	No
Crumlin	-	0	-	++	++	-	+	-	-	-	→	x	No
Darran Rd/ Risca	-	0	--	+	+	-	+	-	-	-	→	x	No
Pye Corner	-	0	-	0	0	-	+	-	-	-	→	x	No
Upper Boat	-	0	-	+	+	-	++	0	--	-	→	x	No
Ynysboeth	-	0	-	++	++	-	0	0	-	-	x	x	No
Abercwmboi	-	0	-	++	++	-	0	0	-	-	x	x	No
Glyncoch	-	0	-	++	++	-	+	0	--	Timetable impact	x	x	No
Pontypridd North	-	0	-	+	+	-	+	0	--	Timetable impact	x	x	No
Hopkinstown	-	0	-	++	++	-	0	0	--	-	x	x	No
St Mellons	+	+	+	+	0	-	++	0	0	+	→	→	Yes
Llangynwyd	-	0	0	++	++	-	+	0	0	+	x	x	No
Bridgend College	-	0	0	+	0	-	+	0	0	+	→	x	No
St Fagans	-	+	0	++	0	-	++	0	-	Route Capacity	→	x	No
Gilston / St Athan	-	0	0	+	+	-	+	0	-	0	x	x	No
Ely Bridge	-	+	0	+	0	0	+	-	-	Timetable impact	x	x	No
Caerleon	+	+	++	++	0	-	++	+	0	+	→	→	Yes
Coedkernew	+	+	++	++	+	-	++	0	+	Depend on Main Line Upgrade + Dev't	→	→	Yes
Llanwern	+	+	++	++	+	-	++	0	+	Depend on Main Line Upgrade + Dev't	→	→	Yes
Magor/Undy	+	+	++	+	0	-	+	0	-	Possible Relocation of Severn Tunnel J	→	→	Yes
Sebastopol	0	+	0	+	0	-	+	0	-	When local services introduced	→	→	Longer term
Llantarnum	0	+	0	+	+	-	++	0	-	When local services introduced	→	→	Longer term
Line Extensions													
Ebbw Vale North	+/-	+	+	++	++	++	+	+	+	+	→	→	Yes
Abertillery	+/-	+	+	+	+	+	+	+	++	Timetable and route capacity	→	x	Longer term
Hirwaun	+/-	+	+	++	++	+	+	+	0	++	→	x	No
Bedlinog	+/-	+	0	++	++	+	++	+	0	+	→	→	Longer term
Beddau	+/-	+	++	+	+	+	++	0	-	Main Line Capacity	→	→	Yes
Creigiau/ Llantrisant	--	0	-	+	+	+	+	0	-	--	x	x	No
Caerphilly - Machen - Newport	--	0	-	+	+	+	+	0	-	--	x	x	No
Circle Line	--	0	-	0	0	0	+	+	+	-	x	x	No
Line Conversions (to LRT)													
Coryton Line	-	0	+	0	0	0	+	+	++	Rail line impact	x	x	No
City Line	0	0	0	0	0	0	+	0	+	Rail line impact	x	x	No
Bay Branch	+	0	-	-	--	-	0	0	--	-	x	x	No

