MOTT MACDONALD

South Wales Metro

South East Wales (Additional Options) Outline Business Case

15 November 2019

Transport for Wales

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Contents

Executive summary

The reopening of the Ebbw Vale Branch Line in 2008 has been a success story with a steady increase in the number of rail passengers from just over 100,000 in the first year to nearly 1m in 2017/18. This upward trend in demand has been reinforced by improvements such as new stations at Ebbw Vale Town and Pye Corner.

The emergence of the South Wales Metro proposals together with the confirmation of the plans of the new Operator Developer Partner (ODP) agreement (operated by KeolisAmey and known as TfW Rail) represent a further step change in overall service improvement. The contracted improvements will see the introduction of a second train per hour on the Ebbw Vale line offering a new direct service to Newport, although the timing of the new services is dependent upon Network Rail in conjunction with the Welsh Government/Transport for Wales (TfW) delivering additional infrastructure works.

Aspirations to improve the level of services on the Ebbw Vale Branch Line above this baseline have existed for several years and have been reinforced by aspirations 4 trains per hour to each Valley Head, exemplified by TfW's recent consultation with both the relevant MP and AM, in both cases noted an aspiration to achieve 4tph from Ebbw Vale heading westwards only.

This level of change may not be consistent with the ODP's plans, however several studies to date examining permutations to improve services on the Ebbw Vale Branch Line have indicated some further benefits could be achieved, although there are several operational and infrastructure constraints that would have to be overcome.

This study

This WelTAG Stage 2 Outline Business Case (OBC) study seeks to build upon and consolidate the work to date, in particular the 2017 Eastern Valleys Outline Business Case. The OBC provides an assessment and a 'forward map' for the development of the following enhanced services:

- An increase from the committed 2 to 4 trains per hour (tph) on the Ebbw Vale line
- The reopening of the former branch line from Llanhilleth, with a new station in Abertillery
- At least 2 tph to each of Cardiff and Newport (with potential destinations west of Cardiff and east of Newport)

To achieve this level of service, this study has explored options for extending services from Abertillery and Ebbw Vale to destinations east of Cardiff Central and west of Newport. This responds to the significant operational and capacity constraints to terminate additional services at those stations. Turnback at Newport is constrained due to the level of use of the platforms by other services and the required amount of time to turn back (10 to 15 minutes may be required). Similarly, intensive use of platform space at Cardiff Central also presents increased capacity conflicts at that station.

Case for change

The following have been identified as the key drivers for change:

- **A requirement to improve accessibility and connectivity**: Existing poor access and connectivity, particularly to Abertillery and the Ebbw Fach Valley, has partially contributed towards lower levels of economic and development activity in the area.
- **A need to improve public transport provision:** Parts of the Ebbw Valley have relatively poor public transport networks with lower frequencies and lack of direct services. This aspect has been reflected in the newly issued Principles for Connectivity document issued by the Welsh Government and likely to form part of the emerging Wales Transport Strategy.
- **Contribute towards reducing congestion on the M4 corridor and the northern fringes of Newport:** The combination of the cancellation of the M4 Relief Road, the abolition of the Severn Bridge tolls, and new developments such as the Wales International Convention Centre are placing additional strains on the already congested M4 corridor.
- **A need to improve air quality:** Worsening air quality problems in and around Newport are a major challenge. Whilst the likely shift to new technologies and additional measures such as speed controls will improve the situation, increased traffic flows are likely to off-set some of this improvement.
- **Longer-term rail passenger growth on the Ebbw Vale Branch Line may stall if additional improvements are not introduced:** Whilst the ODP will deliver a significant improvement to the current service level and offering, the projected increase in demand in the Ebbw Vale line (205% by 2042 according to the Network Rail 2016 Wales Route Study) are likely to increase the possibility of longer-term overcrowding and may deter additional users.

Recommendation

It is clear the scheme will deliver a range of accessibility and connectivity benefits which would be conducive to tackling some of the underlying low levels of economic inactivity and development. The analysis also indicated a scheme can be delivered although there are several major risks that would need to be managed. However, whilst this WelTAG Stage 2 OBC Report has **sought to identify a preferred option**, the assessment that has been undertaken to date confirmed there are **currently no option that can deliver the 4 tph aspiration** without major operational issues and trade-offs.

The assessment has confirmed that the economic case for delivering the additional trains is challenging. One of the key factors for this is the high operating costs associated with adding new services that extend beyond Cardiff and Newport. In this context, sensitivity tests have been undertaken to consider how reducing the operating costs of the service affects value for money. This analysis indicates that further option refinement has the potential to strengthen the economic case.

Based on this, this WelTAG Stage 2 OBC Report recommends:

- Further work on option development with the aim of reducing capital and operating costs
- Further economic testing of options around development levels and passenger growth rates
- Calculation and inclusion of the wider economic benefits
- Consideration of additional measures to improve demand such as further station improvements and better public transport integration
- Phasing of enhanced frequencies towards the 4 tph aspiration which would maximise the benefits and minimise the disbenefits, helping match service uplifts and future local growth

- Consideration of other interdependencies and impacts such as upgrades to the SWML relief lines, other South Wales Metro proposals and other studies for service improvement including the Newport to Chepstow corridor, as emerging from the City Region strategy

WelTAG Stage 2 OBC: Approach

The approach involved consolidating previously reported evidence, consideration upfront of a working list of options that are operationally realistic and deliverable, and to put these options and outputs through a WelTAG Stage 2 OBC process.

The Strategic Case

The assessment for the Strategic Case has shown that there is a **good strategic case for enhanced public transport provision in the Ebbw Valleys**. Whilst the ODP contractual commitment will bring about much needed capacity improvements including a direct service to Newport, other changes such as the cancellation of the M4 Relief Road Scheme, mean the pressure points on the transport network will remain.

The Strategic Case confirms the underlying economic underperformance and social deprivation particularly in the upper Ebbw Valley which can be partially attributed to poor levels of accessibility and connectivity.

Following stakeholder consultation, objectives have been developed and these now have a stronger emphasis on strategic connectivity, the need for modal shift to assist with environmental improvement, and to sustain and promote the quality of the public transport offer.

Generation and development of the options

This report used an operational and infrastructure assessment led approach to the development of the options. This was reinforced and moderated by an assessment of each against the scheme objectives.

The option generation process confirmed that there are a range of operational and infrastructure challenges to delivering the proposed services. In the context of these challenges, three core options were identified for further assessment testing:

- **Option 1 - Minimum infrastructure:** 2 tph from Ebbw Vale Town to each of Cardiff and Severn Tunnel Junction. 2 tph from Abertillery to Bridgend (via SWML) and Gloucester via Newport. The additional infrastructure includes new platforms at Abertillery, Llanhilleth, Newbridge and Rogerstone with extended passing loops at Llanhilleth and Newbridge and Rogerstone
- **Option 2 - Medium infrastructure:** 2 tph from Ebbw Vale Town to each of Cardiff and Bristol Temple Meads via Newport. 2 tph from Abertillery to Maesteg and Gloucester via Newport. The additional infrastructure includes one further platform at Ebbw Vale Town, two platforms at Abertillery, Llanhilleth, Newbridge and Rogerstone with extended passing loops at Ebbw Vale Town, Abertillery, Llanhilleth, Newbridge and Rogerstone
- **Option 3 – Maximum infrastructure:** 3 tph form Ebbw Vale Town to Cardiff, Bristol Temple Meads and Gloucester. 1 tph from Abertillery to Maesteg. The additional infrastructure includes one further platform at Ebbw Vale Town, new platforms at Abertillery, Llanhilleth, Newbridge and Rogerstone with extended passing loops at Ebbw Vale Town, north of Aberbeeg, Llanhilleth, Newbridge and Rogerstone

The Transport (Economic) Case

Preliminary economic assessment suggested that each of the options delivers **relatively poor value for money**, with benefit to cost ratios (BCRs) falling below 0.5 for all options, i.e. less than half the investment value being recovered in benefits. In addition, the financial performance of these options suggested there would be an increase in subsidy requirements falling onto the Welsh Government.

The preliminary analysis was undertaken on a conservative basis. In practice it is considered that there could be potential to generate higher demand and revenue (for example, introducing new stations to the line and by employing revised operating strategies to control costs). To gain a better understanding of this latent potential, a number of sensitivity tests were carried out. Optimising the operation of services to reduce costs resulted in the BCR increasing to over 0.5 before any additional patronage was factored in. By including the wider economic benefits of improved productivity in the Welsh economy (linked primarily to the agglomeration benefits of bringing settlements in the Ebbw Valleys closer to Cardiff and Newport), the scheme's BCR increased to over 1.0. Similarly, the subsidy requirements of the new services were significantly reduced.

The conclusions are that a 'big bang' introduction of a 4 trains per hour service to the Ebbw Valley in the mid-2020s may not be the most effective strategy in value for money terms, with a more nuanced approach being more economically justifiable.

The Management Case

The Management Case has sought to assess whether the scheme can be delivered. The assessment indicates that the scheme could be notionally delivered**, but there are several major risks to be considered.**

The major risks include the extent of interdependencies, securing capital funding, increase in public subsidy, the need to procure rolling stock and land acquisition. The level of interdependencies is a major feature, with the availability and timing of pathways particularly on the South Wales Main Line being critical. Balanced against this are other Welsh Government aspirations including use of the South Wales Main Line and the major stations at Cardiff Central and Newport for other desired service improvements.

Other aspects of the Management Case such as project governance and stakeholder engagement, suggest there are no major significant issues although the approach will need to be strengthened and refined as the scheme is developed further.

The Financial Case

The Financial Case confirms that the **capital costs between the three main options are within the range of £98.5m to £138.1m** with an optimism bias (contingency) applied between 40% to 66% applied to certain elements of the costs of each option. These costs include the remaining elements of the existing Ebbw Vale Line Branch Frequency Enhancement Scheme which have yet to be completed.

The Financial Case also indicated the likely level of additional operating subsidy above and beyond the planned 2 tph service as part of the ODP could be a minimum of £11.6m per annum based on 2015 prices. The sensitivity tests undertaken around reducing operating costs suggests that there are good possibilities to reduce that figure.

The Commercial Case

It is common practice at OBC stage that an only outline assessment of the Commercial Case is undertaken. Nevertheless, the outline analysis indicates that **many of the procurement components are already in place and a framework exists for the delivery for the scheme**.

The main issues arising from the Commercial Case revolve around the need for fully integrated working between a number of stakeholders. Notably, the Welsh Government, TfW, DfT, Network Rail and the ODP.

The analysis indicates that existing mechanisms around the approval and construction of infrastructure can be deployed in this instance. Procurement of additional services including rolling stock could potentially utilise the existing ODP grant agreement, although bespoke and specific variations are likely.

1 Introduction

1.1 Context

1.1.1 Since the reopening of the Ebbw Vale Branch Line in 2008 there has been a steady increase in the number of rail passengers using the line, reinforced by improvements such as the opening of additional stations at Ebbw Vale Town and Pye Corner. Within the same period, the emergence of the South Wales Metro proposals together with the confirmation of the plans for the Core Valley Lines (CVL) has meant there is a greater impetus to improve rail services in other parts of South Wales.

1.1.2 Mott MacDonald has been commissioned by Transport for Wales (TfW) to undertake a WelTAG Stage 2 Outline Business Case (OBC) to examine options to introduce up to 4 trains per hour for the Ebbw Valley, including a new spur to Abertillery. This business case should utilise and build upon previous studies undertaken to date, including the 2017 Eastern Valleys Rail Enhancement OBC. This OBC should take on board:

- The aspiration to run 4 trains per hour (tph) to each South Wales Valley Head
- Reopening the railway line between Llanhilleth and Abertillery
- The suggested operating pattern of 2 tph running towards Cardiff Central and 2 tph towards Newport (with destinations west of Cardiff and east of Newport)
- The new Operator and Development Partner (ODP) contractual commitments for the new Wales and Borders rail service which will include a new additional Newport to Ebbw Vale service (one train per hour), intended to be delivered by 2021 together with the introduction of new and longer rolling stock
- Confirmation of the plans around the CVL including the asset transfer from Network Rail to TfW
- Other plans to improve services such as on the South Wales Main Line/Great Western Main Line between Cardiff and London.

1.1.3 One of the major reasons to explore services east and west of Cardiff Central and Newport relates to the significant operational and capacity constraints at those stations. Turnback at Newport is constrained due to the level of use of the platforms by other services and the required amount of time to turn back (10 to 15 minutes may be required). Similar intensive use of platform space at Cardiff Central also presents increased capacity conflicts at that station.

1.2 Aims

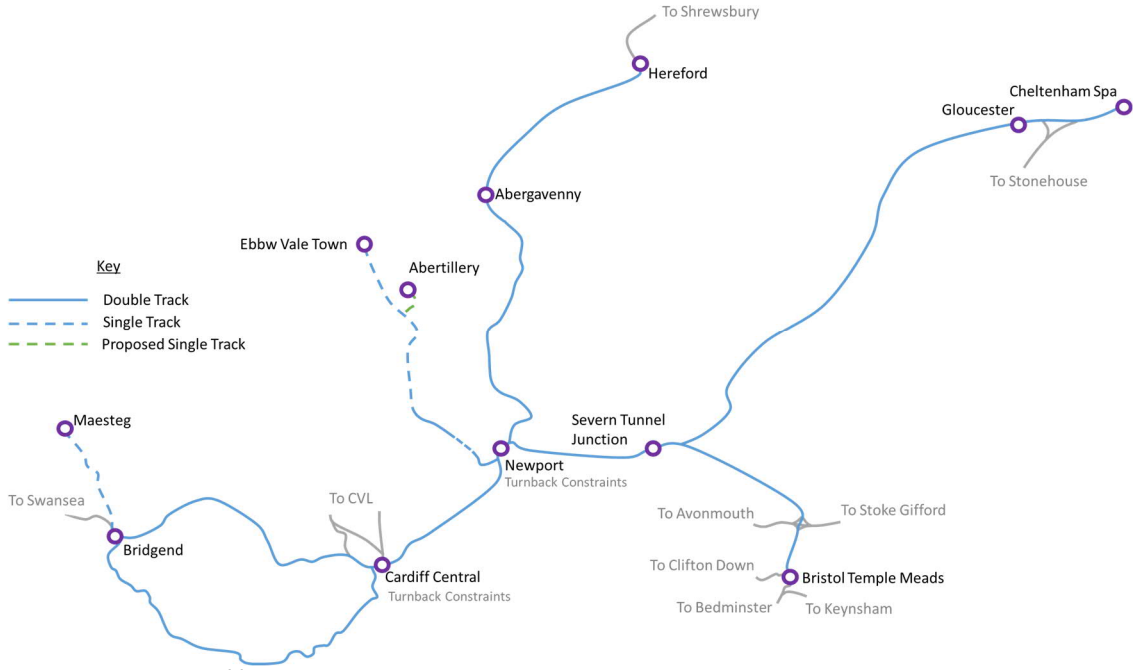
1.2.1 As a result, this OBC has the following aims:

- To determine operationally the most suitable destinations, other than Cardiff and Newport, for rail services running from Abertillery and Ebbw Vale
- To identify the Infrastructure requirements to achieve 4 tph along the Ebbw Valley line
- To outline the optimum service pattern for Abertillery, Ebbw Vale to/from the Cardiff and Newport directions
- To determine the infrastructure requirements at potential termini to facilitate turnarounds.

1.3 Study area

1.3.1 For the purpose of this business case, the focus is on improving passenger rail services along the Ebbw Vale line including a new spur to Abertillery. However, there is a need to consider the destination and routeing of potential services. Figure 1 shows the extent of the potential origins and destinations of these services.

Figure 1: Study area



Source: Mott MacDonald

Previous Eastern Valleys Rail Enhancement OBC

1.3.2 This document builds upon the previous Eastern Valleys Rail Enhancement OBC which was issued in the latter part of 2017. This OBC had a marginally different focus and included aspirations to improve rail services on the Newport to Abergavenny section of the Marches Line in addition to the Ebbw Vale line. The OBC assessed a sliding scale of options for increased trains per hour with additional new stations and included a possible new spur to Abertillery. These options were grouped around 5 set of options as follows:

- Ebbw Vale – two trains per hour (1 via Newport)
- Ebbw Vale – three trains per hour (1 via Newport and 1 Llanhilleth - Cardiff only)
- Eastern Valleys medium investment (as per above 3tph scenario + Gaer & Maesglas new station + 1 tph Cardiff – Abergavenny service)
- Eastern Valleys core package (3 tph scenario 1x Ebbw Vale-Cardiff, 1x Ebbw Vale – Chepstow, 1x Abertillery-Cardiff + Gaer & Maesglas station + 2 tph Cardiff – Abergavenny + new stations at Caerleon and Sebastopol)
- Eastern Valleys full package (As per core package + Crumlin and Usk Vale Parkway new stations)

1.3.3 As a result of the assessment, the list was rationalised down to three final options identified as better performing and delivering better value for money:

- Option 1 – Increasing to two trains per hour on the Ebbw Vale line, with one routed via Newport and both terminating at Ebbw Vale Town
- Option 2 - Increasing to two trains per hour on the Ebbw Vale line, with one routed via Newport, with one terminating at Ebbw Vale Town, and the other at Abertillery
- Option 3 – In addition to either Option 1 or Option 2, delivering a new station at Caerleon on the Marches line along with an additional direct train per hour between Cardiff and Abergavenny.

1.3.4 Following the outcome of the OBC, some further refinements were requested in the first part of 2018. These examined the following proposed enhancements on the Ebbw Vale line:

- Two trains per hour from Ebbw Vale Town by 2021, with one direct to Cardiff (existing service) and one via Newport (new service)
- Four trains per hour from Ebbw Vale Town by 2024 (or earlier if possible), with three direct to Cardiff and one via Newport
- Two services per hour to Abertillery, potentially involving interchange between services
- Journey times between Ebbw Vale Town and Cardiff Central (for direct services) to be around 40 minutes, which is comparable with the upgraded Core Valleys Lines (CVL) journey times to the heads of the valley termini
- At least one service per hour must stop at all stations on the Ebbw Valley line.

1.4 Approach

1.4.1 Given the extent of the previous studies undertaken to date, and the Welsh Government's desire for 4 trains per hour to each South Wales Valley head, there has been a need to adopt a slightly different and focussed approach to this OBC. Effectively, there is a need to consolidate previously reported evidence, to consider upfront a working list of options that are operationally realistic and feasible, and to put these options and outputs through a WelTAG Stage 2 OBC process.

1.4.2 As part of the WelTAG work, an economic assessment is carried out to determine the value for money of each option, enabling a further stage of refinement to be carried out if needed.

1.4.3 This OBC has been prepared in accordance with the principles of WelTAG, which provides a framework for structured thinking about proposed changes to the transport system. WelTAG was revised in 2017 and is aligned to the seven national well-being goals set out in the Well-being of Future Generations (Wales) Act 2015. These goals encompass prosperity; resilience; health; equality; cohesive communities; vibrant culture and thriving Welsh language; and global responsibility.

1.5 Report structure

1.5.1 The report is structured as follows:

- **Section 2: Strategic Case** - provides a summary of the baseline issues and changes to strategy and policy. It identifies the case for change, and tests the options against the study objectives
- **Section 3: Option Development** – provides an overview of how the options were developed given the requirements of the study, and the extent of the existing network and operational constraints

- **Section 4: Transport (Economic) Case** - this will largely replicate the methodology undertaken to date with certain elements, such as the economic cost of accidents, excluded from the assessment.
- **Section 5: Management (Delivery) Case** - many of the elements around delivery will have already been covered by the option development process. As such, it is proposed to limit the management case to the following headings: Technical Risk; Level of Interdependencies; Public and Stakeholder Acceptability; Benefit Realisation
- **Section 6: Financial Case** - again, a large element of this process is based on the evidence review and option development together with elements of the economic sub-case of the transport case. It is proposed to focus on: estimates of likely capital and revenue costs including life-time costs; estimates of subsidy liabilities and funding sources.
- **Section 7: Commercial Case** - typically at OBC stage, the commercial case is high level and is developed in more detail through the business case process. The narrative distinguishes whether options can be developed through existing mechanisms or whether bespoke procurement methods could be deployed.
- **Section 8: Conclusions and Recommendations** - the final section of the OBC brings together the assessment from stages 1 to 3 of this study and seeks to identify a preferred option. However, it is recognised that a preferred option may have variants that may require further refinement and assessment after this business case.

1.5.2 Supporting this report is a **WelTAG Impacts Assessment Report**. Effectively this contains the supporting technical evidence that underpins the assessment and analysis within this document. Where appropriate, reference is made to the Impacts Assessment Report throughout the document.

2 Strategic Case

The Strategic Case provides a refresh of the previously presented problems, constraints, opportunities and aspirations in the Eastern Valleys Rail Enhancement OBC. The focus of the analysis here is on the material changes and the implications these have on the need for intervention. These material changes, coupled with feedback from the stakeholder workshop, have informed an update to the objectives.

2.1 Approach

2.1.1 A feature of this OBC is the extent of overlap with previous studies coupled with the Welsh Government's aspiration to achieve 4 tph to each South Wales Valley Head and ongoing thinking of how this might be achieved. As a result, a 'lighter' touch has been applied to assessing the case for change, with the focus on the most recent briefings and strategy position.

2.1.2 It is also important to note, as of October 2019, that many of the interdependencies affecting this report have not been confirmed or fully finalised. These include:

- Confirmation of the new Great Western timetable from December 2019, which will see a considerable reshaping of services on the SWML and GWML
- Clarity around how the ODP will deliver the new 1 tph Ebbw Vale to Newport service given the existing constraints on the Ebbw Valley line itself and at Newport station. The timing of additional works by Network Rail in conjunction with Welsh Government/TfW have yet to be confirmed which will allow the ODP to deliver this new contractual commitment
- Ongoing business case work being undertaken by Network Rail into upgrading the capacity of the relief lines of the SWML, particularly between Newport and Cardiff Central
- Emerging work by the new Welsh Government Commission looking into alternatives to the M4 Relief Road
- Other emerging proposals such as improving operational capacity at Cardiff Central and a new stopping service between Swansea and Bristol Temple Meads
- Forthcoming publication (as of October 2019) of an updated Wales Transport Strategy

2.1.3 On this basis, the assessment and analysis presented within the Strategic Case represents a snap shot as of October 2019, and there will be a need to update further as some of the above elements are confirmed.

2.2 Baseline headlines

2.2.1 Whilst the key driver for the intervention is the aspiration for 4 tph for each South Wales Valley Head, there are several other drivers. The **Policy, Strategy and Study Review Update**, **Review of Baseline Issues and Accessibility Mapping Technical Notes** in the **Impacts Assessment Report** provide further information and analysis of these issues.

Policy drivers

2.2.2 The policy, strategy and study analysis indicated the following:

- There are specific policy drivers around improving public transport access and connectivity along the Ebbw Valley corridor, encouraging mode shift and supporting economic development.

- In September 2019, the Minister for Economy and Transport published a new document outlining the Principles for Public Transport, which are likely to form part of the forthcoming new Wales Transport Strategy. This document confirms the aspiration for 4 tph on lines on the South Wales Metro, including Ebbw Vale.
- Existing plans and strategies would see a step-change in rail provision in South Wales, including the Ebbw Vale Line. The ODP plans cover an increase in the capacity of trains, an increase to 2 tph and a direct connection to Newport, although the latter two are dependent upon infrastructure improvement works to be delivered.
- There has been a number of studies into rail service improvements for the Ebbw Valley in recent years. They indicate a new spur to Abertllery is feasible though requiring a certain level of reinstatement works, and provision of a new footbridge. Other studies indicate the economic case for running more than 2 tph becomes weaker, but there are a wide range of interdependencies that could make the case stronger.

Review of baseline issues

2.2.3 The main issues that have emerged from the review of baseline issues include:

- Existing journey to work Origin-Destination trips vary from north to south along the Ebbw Vale. In Blaenau Gwent itself, the journeys are more localised to the area, with a lower level of trips to/from Newport and Cardiff. Further south, there are more movements along the M4 corridor, particularly to/from Newport and Cardiff.
- Modal share journey to work data indicates that Blaenau Gwent had a higher reliance on car commuting than the Welsh average, with a lower level of trips by public transport.
- Demand for the existing rail service along the Ebbw Vale line has risen over recent years, boosted by the opening of two additional stations.
- Along the Ebbw Valley, current bus service frequencies are low, typically 1 per hour. Also, a number of settlements do not have direct connections by bus, so direct journeys involve changes of service.
- Accessibility mapping confirms the relative poor accessibility by public transport particularly from the upper Ebbw Valley to the main cities of Cardiff and Newport.
- Data for the M4 shows that the annual traffic flows on the M4 have fluctuated around 60,000 in each direction for the past four years, having recovered from a drop after a previous peak in the mid-2000s.
- The Ebbw Valley area is socio-economically varied with large parts of Blaenau Gwent and northern Torfaen experiencing rates of multiple deprivation in the bottom 20% in Wales. By contrast, outer parts of Newport and southern Torfaen experience much lower rates of multiple deprivation.
- Blaenau Gwent has higher levels of both unemployment and long-term sickness/disability than the Welsh average. There are also a higher proportion of retired people.
- A 50mph limit was introduced on a 1.4km section of the M4 between junctions 25 and 26 at Newport in December 2018, to cut nitrogen dioxide emissions.

2.3 Identified problems, constraints and aspirations

2.3.1 Based on the review and the previous Eastern Valleys Rail Enhancement OBC, there are a number of problems, constraints and aspirations as outlined in Table 1.

Table 1: Identified problems, constraints and aspirations

Category	Issue	Evidence
Problem	Traffic congestion between the Eastern Valleys and Newport	M4 Junctions 25/25A, 26, 27, 28, A467, A4051, B4591
	Slow journey times by public transport compared to car, particularly at off-peak times	Ebbw Vale to Newport: Car 45 mins, bus/rail 1 hour, rail only 1 hour 12 mins
	Overcrowding of rail services between the Eastern Valleys, Cardiff and Newport	15% of passengers standing on the previous Wales and Borders rail franchise
	Lack of public transport connectivity between the Ebbw Valley and Newport	No direct bus or rail services between Ebbw Vale town centre and Newport City Centre
	Lack of public transport connectivity between Abertillery and Cardiff	No direct bus or rail services between Abertillery and Cardiff City Centre
	Public transport frequencies are not able to encourage or accommodate modal shift	1 tph service between Ebbw Vale and Cardiff, although this will be increased to 2 tph as part of the ODP contract
Constraints	Topography of steep-sided valleys running north -south	Road and rail links run along the line of the river at the valley bottom. East-west connectivity is limited, leading to bottleneck locations where north-south and east-west routes meet, particularly at the M4 junctions but also the A4042/A472 in Pontypool
	Capacity constraints on the rail network	Limited available train paths on the SWML, single line sections on the Ebbw Valley line and capacity constraints at both Cardiff Central and Newport stations
Opportunities	Confirmation of the Cardiff Capital Region City Deal	The City Deal includes £1.2 billion investment in the region's infrastructure, including £400m outside the Core Valleys Lines (CVL) area

Source: Eastern Valleys Rail Enhancement OBC, 2017

2.3.2 In addition to the above, there have been several changes to the existing transport networks and land uses as summarised in Table 2.

Table 2: Recent or forthcoming changes to transport networks and land uses

Issue	Impact/consequence
Abolition of Severn Bridge Tolls	Increase in traffic using the M4/M48 Severn Bridges following the abolition of tolls at the end of 2018. Figures published by Highways England indicates an initial 10% increase in traffic levels using the M4/M48 compared to the previous year. Traffic figures show 32,420 vehicles daily used the crossing in January 2019 and 35,457 in February 2019 compared with 28,897 and 31,866 for the same period in 2018.
Cancellation of the M4 Relief Road Scheme	On 4 June 2019, the First Minister decided not to authorise the orders associated with the Scheme. As part of the decision, a new commission has been established and charged with reviewing the evidence and making recommendations on alternative solutions to the M4 Relief Road.
M4 J28 Improvement	This £14m junction improvement scheme aims to reduce the delays on the M4 and encourage more local traffic to use the A48 Southern Distributor Road. The works involved reconfiguring two junctions, creation of a 'throughabout' widening lanes and installation of additional signals. The works were completed towards the end of 2018 but a number of operational difficulties arising from phasing of signals has resulted in a corrective period for the first part of 2019.
Appointment and start of the ODP contract	There is a contractual commitment for the introduction of an additional 1 TPH between Ebbw Vale Town and Newport from May 2021. This is dependent upon additional improvement works to the Ebbw Vale line being undertaken by the Welsh

Issue	Impact/consequence
	Government/Network Rail. The ODP contract will also see an improvement in the capacity of the trains as follows: - Existing class 150 – 145 seats - Interim 3 car class 170 – 171 seats - Proposed Stadler FLIRT 3 car – 143 seats - Proposed Stadler FLIRT 4 car – 202 seats
Improvement works to the Ebbw Vale line	Since 2017, Network Rail and Welsh Government have undertaken a number of infrastructure improvements to the existing Ebbw Vale line, with the aim of facilitating to two and potentially three passenger services per hour. This has involved lengthening the existing passing loop by approximately seven miles (between Crosskeys and Aberbeeg) with the 'plain line' track sections designed and already installed. At locations where more complex modifications are required, the work has not progressed and put on hold due to the increased costs associated with these modifications.
Additional land uses	New and emerging major event developments such as the Wales International Convention Centre at J24 of the M4 together with a new Cardiff Arena, which could lead to an uplift in event driven travel demand. Certain developments such as the 'Works', on the site of the former Ebbw Vale steelworks have seen significant progress in development levels – such as the completion of health, leisure, education and some commercial elements.

Source: Mott MacDonald

2.4 Case for change

2.4.1 Given the above, the case for change can be summarised as:

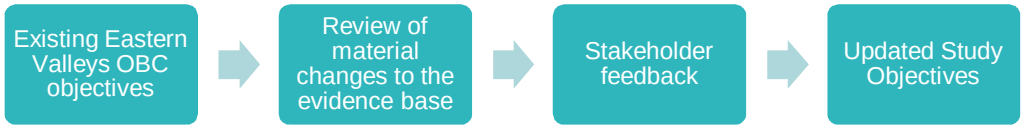
- **A requirement to improve accessibility and connectivity:** Existing poor access and connectivity, particularly to Abertillery and the Ebbw Fach valley, has partially contributed towards lower levels of economic and development activity in the area
- **A need to improve public transport provision:** Parts of the Ebbw Valley have relatively poor public transport networks with lower frequencies and lack of direct services. This is reinforced by the newly issued Principles for Connectivity issued by the Welsh Government and likely to form part of the emerging Wales Transport Strategy
- **Contribute towards reducing congestion on the M4 corridor and the northern fringes of Newport:** The combination of the cancellation of the M4 Relief Road, the abolition of the Severn Bridge tolls, and new developments such as the Wales International Convention Centre placing extra strain on the corridor
- **A need to improve air quality:** Worsening air quality problems in and around Newport are a major challenge. Whilst the likely shift to new technologies will improve the situation, increased traffic flows are likely to off-set some of this improvement
- **Longer-term rail passenger growth on the Ebbw Vale line may stall if additional improvements are not introduced:** Whilst the ODP will represent a significant improvement to the current service level and offering, the projected increase in demand in the Ebbw Vale line (205% by 2042 according to the Network Rail 2016 Wales Route Study) is likely to increase the possibility of longer-term overcrowding

2.5 Setting and confirmation of the objectives

Process

2.5.1 For this study, the objectives are based upon existing Eastern Valleys Rail Enhancement OBC but have been updated following a review of material changes to the evidence base and stakeholder feedback to subject to stakeholder feedback as shown in Figure 2. The original Eastern Valleys Rail Enhancement OBC Objectives are outlined in Table 3.

Figure 2: Setting and confirmation of the objectives



Source: Mott MacDonald

Table 3: Previous Eastern Valleys Rail Enhancement OBC Objectives

Issue	Objective
Constraint on the potential for modal shift	Reduce peak period overcrowding on the Ebbw Vale and Abergavenny-Cardiff services.
Access by public transport	Improve access to public transport by increasing the number of people who can access a rail station within a 15-minute walk from their home.
Facilitate economic growth	Encourage economic growth of Newport and access to the labour market by bringing more people within a 30-minute end-to-end commute by public transport.
Improve employment level	Reduce economic inactivity by improving public transport access from the Eastern Valleys to employment opportunities in Newport and Cardiff.
Facilitate economic growth	Create new sustainable transport focal points for housing and employment growth in areas of higher deprivation.
Tackle road congestion	Reduce road congestion on the northern fringes of Newport by reducing reliance on the private car for journeys to work.
Access by public transport	Maintain existing direct rail links from stations on the Ebbw Vale and Abergavenny-Cardiff lines to Cardiff Central.
Access by public transport	Improve public transport access to healthcare, education, and other key services.

Source: Eastern Valleys Rail Enhancement OBC, 2017

2.5.2 The **Stakeholder Workshop Notes** in the **Impacts Assessment Report** provides an outline of the main comments around the objectives. The broad thrust of the comments were:

- There needs to be a greater focus on the strategic and regional dimension
- Amend wording away from ‘representative and indicative journey times’ towards improving access to key centres and services
- Strengthen the modal shift element, particularly in the context of the M4 Relief Road cancellation, and the contribution of the scheme towards improving air quality. It was noted, for example, that Newport has the highest number of AQMAs in the whole of Wales
- Emphasise opportunities for public transport integration, particularly in light of the emerging Metro hub studies
- Also, at the same time, the need to protect existing public transport provision such as bus networks.

2.5.3 Other comments from stakeholders included:

- Some objectives are generic and should be more focussed around the problem
- A need to understand where demand and potential patronage is
- A need for an objective around air quality
- Consideration around improving rolling stock including longer trains;
- Greater emphasis on the aspirations and planned outcomes of the Local Development Plans.

Agreed objectives

2.5.4 Based upon the above, two of the previous objectives were replaced with two new ones. These are around the potential of the scheme to improve air quality, and the other around about optimising the longer-term financial sustainability of additional services. Table 4 shows the 'audit trail' of how the objectives were reshaped following the above process.

Table 4: Revised Objectives

Original objective	Workshop outcomes	Theme	What are we trying to achieve	Revised objective
Create new sustainable transport focal points for housing and employment growth in areas of higher deprivation.	Recast around underpinning development aspirations	Economic development	Help unlock economic development aspirations	1: Contribute towards unlocking new development in areas of higher deprivation
Encourage economic growth of Newport and access to the labour market by bringing more people within a 30-minute end-to-end commute by public transport.	Recast around improving access to employment, rather than journey times	Employment	Reduce economic inactivity by improving access to employment	2: Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales region
Reduce road congestion on the northern fringes of Newport by reducing reliance on the private car for journeys to work.	Recast around encouraging modal shift and improving air quality	Climate change	Promote modal shift to reduce greenhouse gas emissions	3: Address greenhouse gas emissions by promoting the use of rail for key trips and modal shift
Maintain existing direct rail links from stations on the Ebbw Vale and Abergavenny-Cardiff lines to Cardiff Central.	Drop this objective. Recast around protecting existing public transport networks	Protecting existing public transport networks	Ensure existing public transport provision is not adversely impacted	4: Maintain and enhance public transport provision to the Ebbw Valley and Newport
Improve public transport access to healthcare, education, and other key services.	Improve access to key services	Access to key services	Ensure access to services can be achieved by public transport	5: Improve public transport access to healthcare, education, and other key services
Reduce peak period overcrowding on the Ebbw Vale and related services.	Recast capacity improvement.	Access to public transport	"Improve capacity on rail services between Ebbw Vale, Cardiff and Newport. This can be a mixture of increased frequencies and longer trains	6: Enhance the attractiveness of public transport as a realistic mode through improved frequencies and longer trains
--	Specific objective on improving air quality	Environmental impact	Promote mode shift to address air quality improvement strategy for the Newport area	7: Reduce the impact of poor air quality by increasing the number of public transport journeys
--	Specific objective around the financial sustainability of additional services	Protecting existing public transport networks	Improve the financial sustainability of the TfW Rail franchise and reduce the risk of a long-term increase in rail subsidy requirements	8: Improve the financial sustainability of the TfW Rail franchise
Improve access to public transport by increasing the number of people who can access a rail station within a 15-minute walk from their home.	Drop this objective. No new stations are being proposed	--	--	--
Reduce economic inactivity by improving public transport access from the Eastern Valleys to employment opportunities in Newport and Cardiff.	Suggest this is linked to improving access to employment	--	--	--

Source: Mott MacDonald

2.6 Well-Being of Future Generations Act Requirement

2.6.1 As part of developing the scheme, there is a statutory requirement to show that the Scheme is aligned with the Well-Being of Future Generations Act. There is also a need to show the sustainable development principle is being applied through ways of working.

2.6.2 To show the potential contribution of the scheme objectives towards the Well-Being Goals, a mapping process has been undertaken. This is summarised in Table 5, with the wider assessment found in the **Well-Being Assessment Technical Note** in the **Impacts Assessment Report**. It showed the scheme is likely to have a greater impact towards the prosperous goal, particularly around unlocking new development and reducing economic inactivity. The other contributions are likely to be more modest and are likely to have indirect impacts as shown.

Table 5: Potential contribution of the Scheme Objectives towards the Well-Being Goals

Well-Being Goal	Relevant Scheme Objectives	Contribution towards the goal	Impact Area
Prosperous	1: Contribute towards unlocking new development in areas of higher deprivation	✓✓	Economic development
	2: Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales region	✓✓	Employment
	4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	✓	Protecting existing public transport networks
Resilient	4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	✓	Protecting existing public transport networks
	5: Improve public transport access to healthcare, education, and other key services	✓	Access to key services
	8: Improve the financial sustainability of the TfW Rail franchise	✓	Protecting existing public transport networks
Healthier	3: Address greenhouse gas emissions by promoting the use of rail for key trips and modal shift	✓	Climate change
	6: Enhance the attractiveness of public transport as a realistic mode through improved frequencies and longer trains	✓	Access to public transport
	7: Reduce the impact of poor air quality by increasing the number of public transport journeys	✓	Environmental impact
Equal	2: Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales region	✓	Employment
	4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	✓	Protecting existing public transport networks
	5: Improve public transport access to healthcare, education, and other key services	✓	Access to key services
	6: Enhance the attractiveness of public transport as a realistic mode through improved frequencies and longer trains	✓	Access to public transport
Cohesive	1: Contribute towards unlocking new development in areas of higher deprivation	✓	Economic development

Well-Being Goal	Relevant Scheme Objectives	Contribution towards the goal	Impact Area
	2: Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales region	✓	Employment
	4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	✓	Protecting existing public transport networks
	5: Improve public transport access to healthcare, education, and other key services	✓	Access to key services
	8: Improve the financial sustainability of the TfW Rail franchise	✓	Protecting existing public transport networks
Cultural and language	4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	✓	Protecting existing public transport networks
	5: Improve public transport access to healthcare, education, and other key services	✓	Access to key services
Globally	3: Address greenhouse gas emissions by promoting the use of rail for key trips and modal shift	✓	Climate change
	7: Reduce the impact of poor air quality by increasing the number of public transport journeys	✓	Environmental impact

Source: Mott MacDonald

2.6.3 Another aspect of the Well-being of Future Generations Act is to demonstrate how the sustainable development principle is being applied. There are two potential methods of demonstrating this, through the application of ways of working by the project team and against the objectives. Table 6: Assessment of ways of working against objectivesTable 6shows how the ways of working have been applied to the objectives.

Table 6: Assessment of ways of working against objectives

Objective	Collaboration	Integration	Involvement	Long term	Prevention	Meeting this objective will require:
1: Contribute towards unlocking new development in areas of higher deprivation		✓		✓	✓	Improved **integration** with other parts of the rail network, will help underpin new development and tackle some of the issues around deprivation **Long term** growth in demand will **prevent** some of the recurring causes of low levels of economic development
2: Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales region		✓		✓	✓	Improved **integration** with other parts of the rail network, will assist with improving access to employment **Long term** growth in demand will **prevent** some of the recurring causes of low levels of economic inactivity
3: Address greenhouse gas emissions by promoting the use of rail for key trips and modal shift				✓	✓	**Long term** growth in demand will **prevent** excessive reliance on car use, and provide a viable and realistic alternative

Objective	Collaboration	Integration	Involvement	Long term	Prevention	Meeting this objective will require:
4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	✓	✓	✓			**Collaboration and involvement** between operators together with improved **integration** will maintain and enhance public transport provision
5: Improve public transport access to healthcare, education, and other key services		✓				Improved **integration** with other parts of the rail network, will improve access to essential and key services
6: Enhance the attractiveness of public transport as a realistic mode through improved frequencies and longer trains				✓	✓	**Long term** growth in demand will **prevent** excessive levels of financial support
7: Reduce the impact of poor air quality by increasing the number of public transport journeys		✓		✓	✓	Improved **integration** with other parts of the rail network, will improve demand levels and the financial sustainability **Long term** growth in demand will **prevent** excessive levels of financial support
8: Improve the financial sustainability of the TfW Rail franchise		✓		✓	✓	Improved **integration** with other parts of the rail network, will improve demand levels and the financial sustainability **Long term** growth in demand will **prevent** excessive levels of financial support

Source: Mott MacDonald

2.7 Measures for Success

2.7.1 Building upon the above Well-Being assessment of scheme objectives and the identification of impact areas, a number of 'measures for success' have been identified for each of the objectives. Figure 3 outlines these, noting what the objective aims to achieve. The measures fall into two main categories. Direct measures which can be directly attributed to the scheme's potential impact while others are indirect, where the scheme is likely to make a positive contribution, but other factors are likely to come into play.

Figure 3: Measures for success

Objective	• *What are we are trying to achieve?* • Direct and/or indirect measure
1: Contribute towards unlocking new development in area of higher depreviation	• *Help unlock economic development aspirations* • Indirect: Uplift in land values, employment levels and housing completions
2: Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales Region	• *Reduce economic inactivity by improving access to employment* • Direct: Improvement in the ranking of the Welsh Index of Multiple Deprivation (WIMD) Access Indicator • Indirect: Uplift in employment levels
3: Address greenhouse gas emissions by promoting the use of rail for key trips and modal shift	• *Promote modal shift to reduce greenhouse gas emissions* • Direct: Modal split of travel to work journeys
4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	• *Ensure existing public transport provision is not adversely impacted* • Direct: Existing bus service network levels and geographical coverage, WIMD Access Indicator
5: Improve public transport access to healthcare, education, and other key services	• *Ensure access to services can be achieved by public transport* • Direct: WIMD Access Indicator
6: Enhance the attractiveness of public transport as a realistic mode through improved frequencies and longer trains	• *Improve capacity on rail services between Ebbw Vale, Newport and Cardiff* • Direct: Change in passenger numbers
7: Reduce the impact of poor air quality by increasing the number of public transport journeys	• *Promote mode shift to address the air quality improvement strategy in Newport* • Direct: Modal split of travel to work journeys • Indirect: Nitrogen Oxide and Particulate emission reporting as part of the AQMA requirements
8: Improve the financial sustainability of the TfW Rail Franchise	• *Improve the financial sustainability of the TfW Rail franchise and reduce the risk of a long term increase in rail subsidy requirement* • Direct: Patronage and revenue monitoring (may be subject to commercial confidentiality requirements)

2.8 Summary of the Strategic Case

2.8.1 The Strategic Case has shown the need for enhanced public transport provision along the Ebbw Valley remains. Whilst the ODP contractual commitment will bring about much needed capacity improvements including a direct service to Newport, other changes such as the cancellation of the M4 Relief Road Scheme, mean the pressure points on the transport network will remain.

2.8.2 The baseline review indicated that parts of the Ebbw Valley have poor levels of accessibility and connectivity by public transport. Some of the existing bus frequencies are relatively poor and in some cases, such as Abertillery to Cardiff, there are currently no direct services.

2.8.3 Following stakeholder consultation, objectives were revamped and include a stronger emphasis on strategic connectivity, the need for modal shift to assist with environmental improvement, and to sustain and promote existing public transport provision.

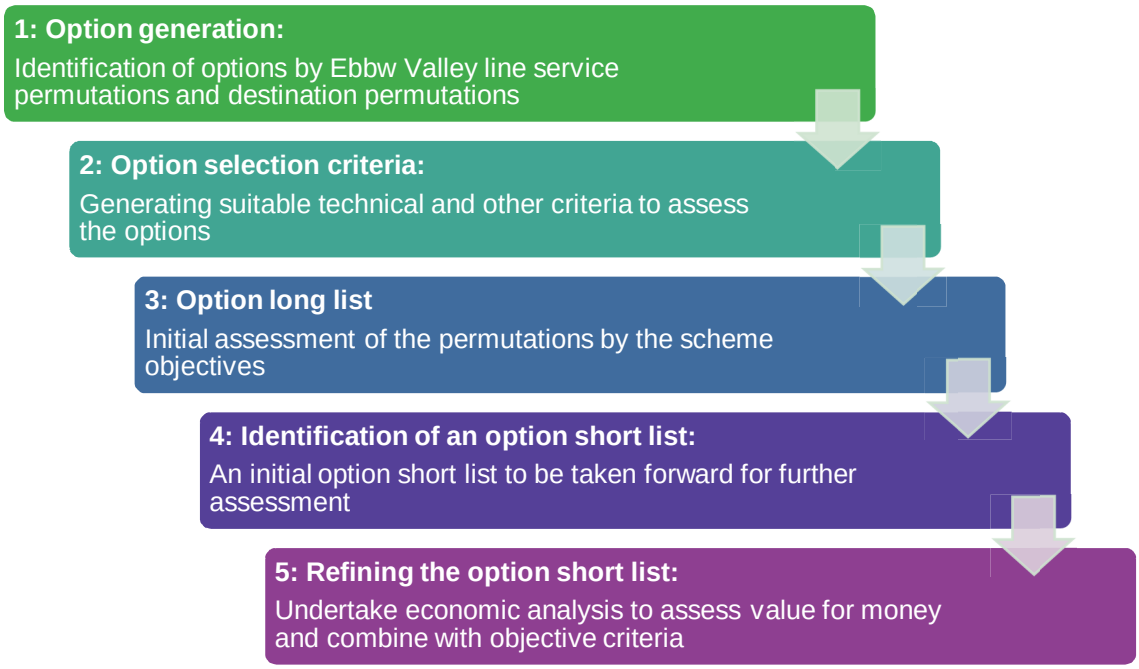
3 Option Development

This section outlines the approach and assessment of the generation and development of options. This section also includes an 'upfront' technical and operational assessment of the options. This is required given the extent of interdependencies that any improved services would need to include.

3.1 Overall approach to option development

3.1.1 Given the extent of the previous studies and a good working understanding of the potential outcomes, an initial 'upfront' technical and operational assessment of the options was undertaken. This was combined with an initial assessment against the scheme objectives, to ensure relatively good performing options were not inadvertently rejected at an early option development stage. Figure 4 summarises the approach that has been used, with further detail and analysis outlined in the **Option Development Technical Assessment Report** in the **Impacts Assessment Report**.

Figure 4: Overall approach to option development



Source: Mott MacDonald

3.1.2 The rationale for adopting this approach was to take account of:

- How increases in frequency on the Ebbw Valley Branch Line could impact on the wider South Wales rail network with knock-on effects
- The issues around the potential timetable options and the supporting infrastructure that would be required on the Ebbw Valley Line itself to sustain the improvement in services
- Balancing a general aspiration for an even spaced clockface timetable, in line with other planned improvements to other services in South Wales including the CVL

- Consideration of enhanced services to Newport (and destinations east) and to Cardiff (and destinations west), existing route capacity including other known planned changes
- The ease of turnaround at identified destinations or whether additional infrastructure would be required
- Relative journey times for services, likely demand along the route and impact on overall operating costs

3.2 Aspirations, constraints and showstoppers

3.2.1 The selection process has been critically informed by the aspirations for improvement, the constraints of infrastructure and timetable, and the existence of showstoppers. These are defined as significant problems requiring major expenditure and time to resolve them, to the extent that it would be difficult to justify doing so in this case.

3.2.2 Table 7 provides an overview of the identified key constraints. Although individually these represent a major problem in themselves, it is the interplay that has guided the option generation and development process.

Table 7: Summary of key constraints

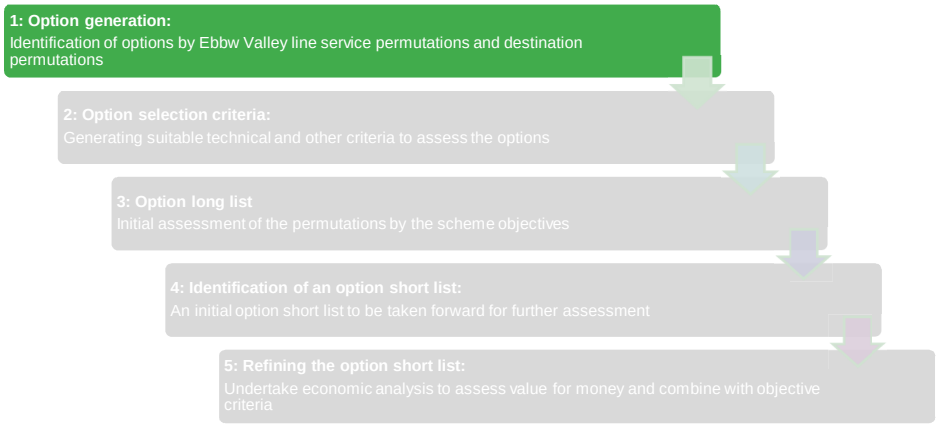
Location	Key constraint	Resolution
Ebbw Valley line – turnaround times	Insufficient timetable turnaround for reliable Ebbw Vale – Cardiff service	Either (i) find methods to speed up train running times (ii) run west of Cardiff to improve timetable productivity (iii) consider adjusting overall train paths to produce more turnaround time
Ebbw Valley line – number of station stops	Proposals for new stations slow down the service or intermediate stops cannot be served at an attractive frequency if skip-stopping is used	Consider value of skip-stopping or not developing the stops (+ integrated bus services in either case) or reconsider overall routeing proposals for Ebbw Valley services to permit station development
Abertillery service – economic case	Major aspiration to reinstate rail services to former branch line: Previous studies indicated relatively poor economic case	Work to (i) make the best case possible in the face of poor economic performance and (ii) consider 1tph service instead of 2 tph
Proposed frequency increases	Poor economic performance revealed by previous studies, suggests a major increase in subsidy needed is inevitable	Either (i) optimise around a lower level of overall frequency than 4 tph (ii) move in stages to 4 tph over a period of time or (iii) de-scope the planned provision
Newport station - turnback	Franchise plan suggests terminating / reversing moves in the station. This presents significant operational issues or cannot be accommodated without extensive works to provide a bay platform	Either (i) review and amend the overall requirement (ii) investigate the value for money of the required works (iii) find alternative locations for the potential turnback movements
Ebbw Junction	Capacity allows no more than 2 tph from Ebbw Junction westwards, placing an absolute capacity limit on Ebbw Valley-Cardiff frequency. Forces additional services to terminate elsewhere – Newport or points east	Either (i) accept the Ebbw Valley cannot receive more than a 2tph service to / from the Cardiff direction or (ii) convert junction to grade separated layout at a large cost and known physical constraints so allowing access to relief lines
Park Junction - Gaer Junction	Limited capacity of single-track link places restrictions on timetabling for Ebbw Valley – Newport / eastbound movements	Either expand capacity at a significant cost or optimise timetable around available capacity and main line timetable paths
Proposed new stations	Various new stations have been proposed over time, but are not examined in the business case, other than Abertillery	Either (i) amend the business case (ii) review the station proposals (iii) replace the proposals with integrated bus network

Location	Key constraint	Resolution
SMWL capacity	Currently sufficient for no more than an additional 2 tph from Ebbw Junction westwards, placing an absolute capacity limit on Ebbw Valley-Cardiff frequency. This could actually fall in the future with alternative, more attractive service proposals coming forwards.	Either (i) accept the Ebbw Valley cannot receive more than a 2tph service to / from the Cardiff direction or (ii) convert junction to grade separated layout at a large cost and known physical constraints so allowing access to relief lines
SW Relief Lines capability	Lines are only available for low speed operation, may require major upgrade (costs) which the Ebbw Valley business case cannot absorb	Upgrading the Relief Lines to a similar standard to the existing main lines – may need to be done in conjunction with other service proposals, otherwise their use would need to be avoided
Cardiff West Junction	Absolute limit on movements from Cardiff to Vale of Glamorgan line, preventing additional services from Ebbw Valley being linked to it. Also prevented by ODP commitments	Revisions to planned requirements to amend service levels or avoid inter-linking journeys between Ebbw Valley services and services running west of Cardiff to Vale of Glamorgan line.
Network-wide	Network Rail policy of not selling all available paths in aid of resilience, placing absolute capacity limits on existing network	Provision of appropriate level of capacity is the only solution if a satisfactory level of improved service cannot be developed within agreed capacity use policies

Source: Mott MacDonald

3.2.3 Of all of these constraints, possibly the one whose removal would create the most opportunities for service development, is the South Wales relief lines and particularly the means of access to them from the Ebbw Valley. Costs associated with any solution could easily extinguish the case for improving Ebbw Valley services and others, unless the issue is addressed as part of a wider 'network development' initiative.

3.3 Option generation (stage 1)



Source: Mott MacDonald

3.3.1 Whilst upgrading the Ebbw Valley Branch Line is the focus of this report, it draws in the wider network of regional routes due to the close interactions between them. This wider network is termed the 'South Wales Metro' in that services continue to operate over Network Rail infrastructure rather than the CVL which will operate on Welsh Government/TfW owned track.

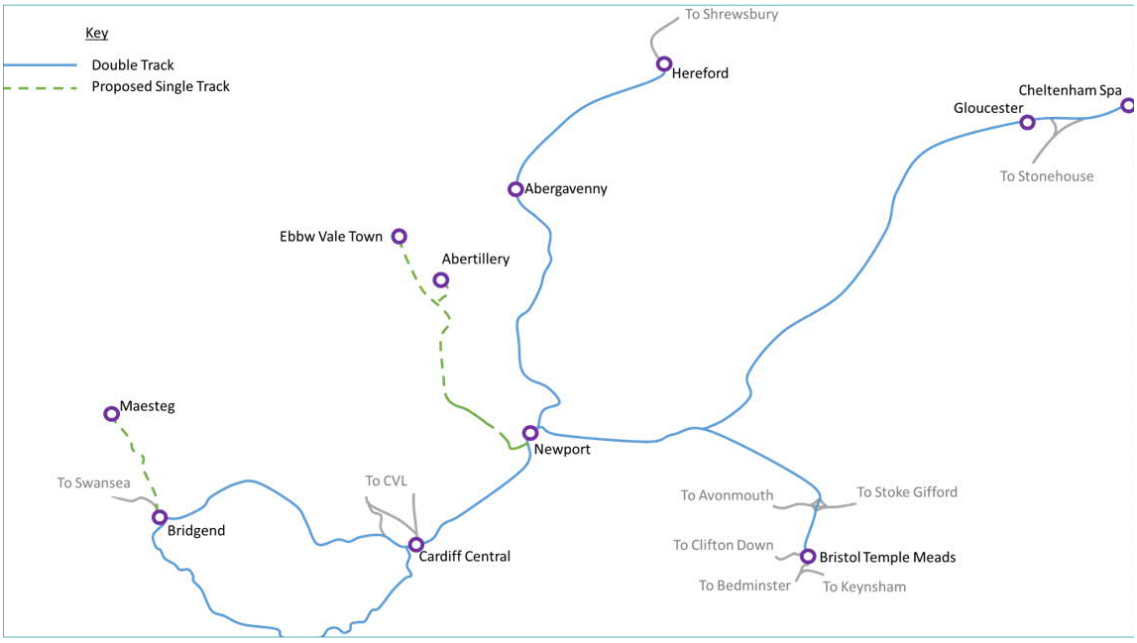
3.3.2 This wider network takes in the SWML between Bridgend and Severn Tunnel Junction with the following connecting routes as shown in Figure 5.

- The route from Severn Tunnel Junction to Bristol Temple Meads
- The Gloucester and Newport line (with connections to Cheltenham Spa)
- The Marches line (to Abergavenny / Hereford only)
- Ebbw Vale branch line
- Vale of Glamorgan line (Cardiff - Bridgend via Rhoose)
- Maesteg branch line

3.3.3 In terms of frequency, the starting point of the option development has been accommodating four trains per hour from the Ebbw Valley Branch Line. The implications of this starting point were:

- What balance of the 4 tph service runs respectively from Ebbw Vale and Abertillery?
- What destinations do the 4 tph head for once on the SW main line, taking the above network scope into account?
- How far beyond Cardiff and Newport do trains operate?
- What level of infrastructure upgrading is needed to support the enhanced timetable?
- What services (if any) cannot now commence but need infrastructure work implemented or other preparatory work?

Figure 5: Study extents



Source: Mott MacDonald

3.3.4 As a result, the pattern of operation were tabulated. All trains running from the Ebbw Valley Branch Line would run to one of the destinations either east of west of Pye Corner station and Park Junction as shown in Table 8. The full list of options generated by this process is provided in the **Option Assessment Spreadsheets** in the **Impacts Assessment Report**.

Table 8: Destinations east and west

Destinations - East	Destinations - West
Newport	Cardiff
Abergavenny (Marches line)	Bridgend via Vale of Glamorgan line
Hereford (Marches line)	Bridgend via S Wales Main Line
Gloucester (Birmingham line)	Maesteg via Bridgend + S Wales Main Line
Cheltenham Spa (Birmingham line)	
Bristol Temple Meads	

Source: Mott MacDonald

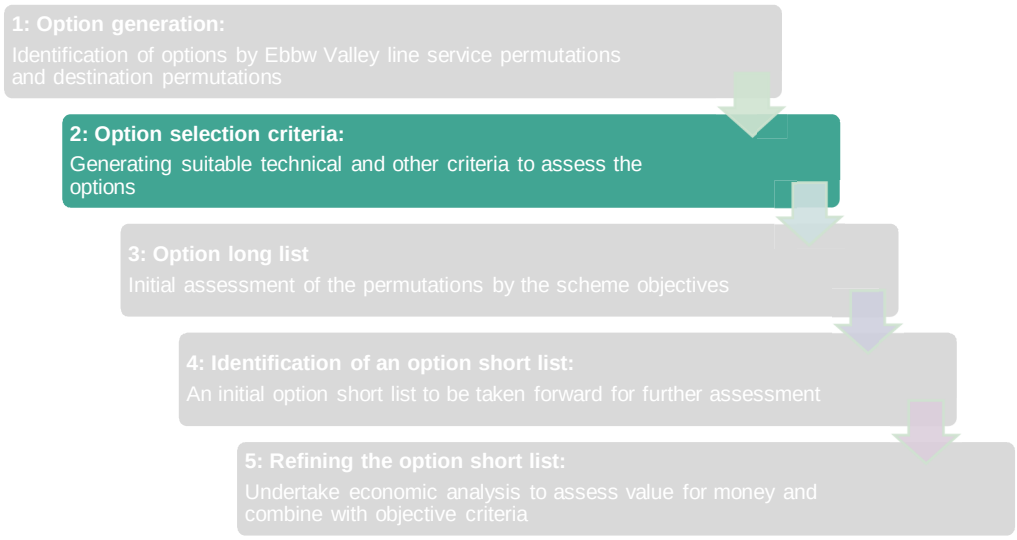
3.3.5 As part of the option generation and assessment process, a number of assumptions have been made. These are detailed in Table 9.

Table 9: Option assessment assumptions

Assumption	Description
New stations - Ebbw Valley Branch Line	One station included at Abertillery. No new other stations are considered
New stations - SWML	No proposed stations will be considered
Ebbw Vale station improvement	Assume no improvement to existing stations on the Ebbw Valley Branch Line which could result in an uplift in demand (improved park and ride provision, new hub development)
SWML Relief Line	The outcomes of the emerging business case into improving line speeds/capacity of the SWML relief line not factored in. The costs associated with upgrading the SWML relief line also have not been factored in.
ODP Contractual Commitment	Assume 2 additional TPH between Ebbw Vale - Newport and continuing east. No assumptions have been made about the operational impacts of the service on existing train movements at Newport station
ODP Contractual Commitment	Assume 4-vehicle FLIRT sets will be in operation. (202 seats)
Swansea to Bristol TM stopping service	Assume no impact of potential service or use of limited rail paths through the Severn Tunnel or Bristol East
GWML/SWML timetable recast (Dec 2019)	Based on the December 2019 timetable.

Source: Mott MacDonald

3.4 Option selection criteria (stage 2)



Source: Mott MacDonald

3.4.1 A range of infrastructure and operational related criteria was developed to sift the long list of options. This included the following factors and the application of a scoring system as outlined in Table 10.

- Rail operational factors –
  - Rolling stock requirements
  - Terminating + turning back capacity
  - Onward connections
  - Impact on other services (timetable)
- Rail infrastructure development requirements -
  - Signalling
  - Civils / trackwork
  - Stations

Table 10: Rail operational and infrastructure scoring

Criteria	Scoring Range	Scoring Methodology	
Number of Trainsets Required	1-5	1	11-13 trainsets required
		2	9-10 trainsets required
		3	7-8 trainsets required
		4	4-6 trainsets required
		5	2-3 trainsets required
Turnback Availability and Impact on Platform Occupancy	1-5	1	Cannot support turnback and requires additional infrastructure
		2	Cannot support turnback and requires modification to existing infrastructure
		3	Turnback supported but causes operational risks

Criteria	Scoring Range	Scoring Methodology	
		4	Turnback supported but requires modifications to existing infrastructure
		5	Turnback supported and requires minor modifications
Connectivity to number of onward routes (rail, bus and proximity to transport interchanges)	1-5	1	No connectivity to onward routes
		2	Low level of connectivity to onward routes (regional)
		3	Medium level of connectivity to onward routes (regional)
		4	Medium level of connectivity to onward routes (national)
		5	High level of connectivity to onward routes (UK wide)
Impact on Other Services	1-5	1	Major impact on multiple connecting routes and existing services, both passenger and freight
		2	Impacts on a multiple routes and existing services, both passenger and freight
		3	Impacts on a single route and existing services, both passenger and freight
		4	Possibility minor impacts on existing services, both passenger and freight
		5	No impact on existing services, both passenger and freight
Signalling	1-5	1	Major signalling intervention required
		2	New signalling infrastructure and modifications to existing infrastructure
		3	New signalling infrastructure required
		4	Minor modifications required
		5	No modifications required
Track / Civils	1-5	1	Major track intervention required
		2	New track infrastructure and modifications to existing infrastructure
		3	New track infrastructure required
		4	Minor modifications required
		5	No modifications required
Stations	1-5	1	Major station/civils intervention required
		2	New station/civils infrastructure and modifications to existing infrastructure
		3	New track infrastructure required
		4	Minor modifications required
		5	No modifications required

Source: Mott MacDonald

3.4.2 Following the assessment against infrastructure and operational criteria, the long list of options was assessed against the objectives. The objective scoring methodology was different, with scoring ranges defined by the possibility that the impact of a service proposal against an objective could be negative as well as positive in certain cases.

Table 11: Objective scoring criteria

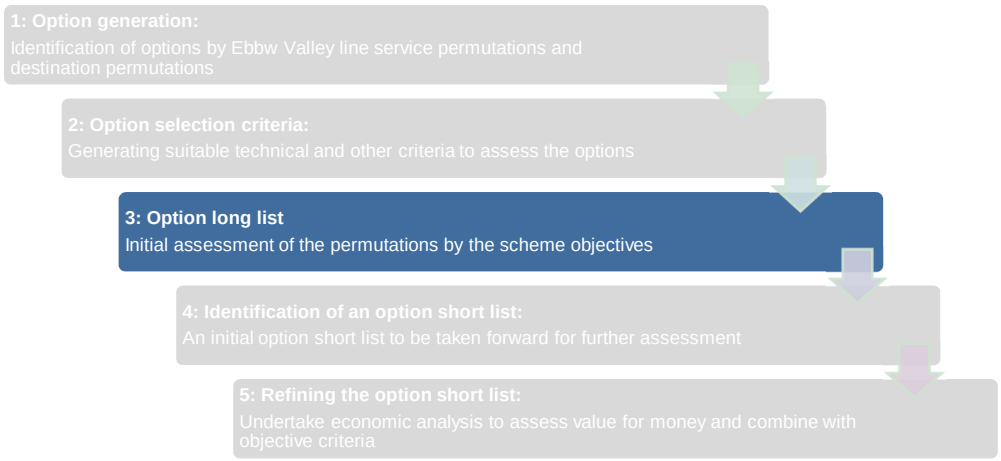
Objective	Scoring Range
Contribute towards unlocking new development in areas of higher deprivation	0 to +3
Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales region	0 to +3
Address greenhouse gas emissions by promoting the use of rail for key trips and modal shift	0 to +3
Maintain and enhance public transport provision to the Ebbw Valley and Newport	-3 to +3
Improve public transport access to healthcare, education, and other key services	0 to +3
Enhance the attractiveness of public transport as a realistic mode through improved frequencies and longer trains	-3 to +3
Reduce the impact of poor air quality by increasing the number of public transport journeys	0 to +3
Improve the financial sustainability of the TfW Rail franchise	-3 to +3

Source: Mott MacDonald

3.4.3 These scores can be subjective, depending on interpreting the likely impacts of the changes, which inevitably can be complex. For example, greenhouse gas impacts would arise from a measurable net mode shift from car trips to rail, taking into account the possibility of any released road capacity being refilled by more suppressed demand for car trips.

3.4.4 Given the differences between the infrastructure/operation and objective criteria, adding the all the scores together was considered not appropriate. Instead, both parts were kept separate and the objective assessment was used as a moderating factor which helped to differentiate options that had similar scoring.

3.5 Option longlisting (stage 3)



Source: Mott MacDonald

3.5.1 Based on the above approach, Table 12 to Table 17 provide the breakdown of the infrastructure and operational assessment. Further detail is provided in the **Option Development Technical Assessment Report** in the **Impacts Assessment Report**.

Table 12: Westbound operational scores

Destination	Additional trains per hour to destination	Operational Criteria: Number of Train Sets Required	Score	Existing Turnback Availability and Impact on Platform Occupancy	Score	Connectivity to Number of Onward Routes (rail, bus and proximity to transport interchanges)	Score	Impact on Other Services – Based on Technical Criteria Scoring	Score	Total Operational Score
Maesteg	1	For services from Ebbw Vale Town station to Maesteg station, the following number of train sets are required: 1 additional service - 4 2 additional services - 8	4	Currently infrastructure and platform occupancy would allow an increase from the existing 1tph to up to 3tph.	5	200m from Maesteg train station is Maesteg Bus Station which serves Maesteg town and the nearby communities of Nantyffyllon, Caerau, Croeserw and Cymmer.	3	Increasing service frequency from 1tph up to 3tph would not impact any other services on the branch line. However, there are no available paths across Ebbw Junction to allow a third service heading west.	5	17
	2		2		5		3		4	14
Bridgend (via SWML)	1	For services from Ebbw Vale Town station to Bridgend station via SWML, the following number of train sets are required: 1 additional service - 4 2 additional services - 7	4	Terminating at Bridgend via the SWML requires a shunt movement from Platform 1 to Platform 2 which requires 11 minutes. This could be considered a risk to performance and so it may be preferable to continue on through and terminate at another station.	4	Terminating service at Bridgend permits onward journeys to destinations in West Wales.	3	For 1-2tph to terminate at Bridgend via the SWML requires a shunt movement from Platform 1 to Platform 2 which requires 11 minutes. This could impact on TfW and GWR services. There are no available paths across Ebbw Junction to allow a third service west.	3	14
	2		3		3		3		2	11
Bridgend (via VoG)	1	For services from Ebbw Vale Town station to Bridgend station via VoG line, the following number of additional train sets are required: 1 existing service - N/A (linked service) 1 additional service - 5	5	Trains running via the VoG Line are able to turnback in Platform 1a.	5	Terminating service at Bridgend give onward journeys to destinations in West Wales. Running the service on the VoG line would also allow connectivity to Cardiff International Airport at Rhoose Cardiff International Airport train station.	4	A single service would include the extension of the existing service from Bridgend to Cardiff Central. A second service would be possible, though would probably take the path of a Cardiff-Barry Island service as well as some freight services will need to be retimed or removed. There are no available paths across Ebbw Junction to allow a third service west.	5	19
	2		4		5		4		2	15
Cardiff Central	1	For services from Ebbw Vale Town station to Cardiff Central station, the following number of train sets are required: 1 existing service - 3 1 additional service - 5	5	A second path per hour is available and platform space does not appear to be a constraint. There are no available paths across Ebbw Vale Junction to allow a third service west but should an additional path be found, then there is likely to be platform space at Cardiff to accommodate it.	5	Terminating service at Cardiff give onward journeys to destinations on the CVL, VOG and West Wales.	4	Running a second, or potentially a third service over the main lines using the existing SWML timetable, would interact with the main line London service timetable. There are no available paths across Ebbw Junction to allow a third service west.	5	19
	2		4		4		4		3	15

Source: Mott MacDonald

Table 13: Eastbound operational scores

Destination	Additional Services to Destination	Operational Criteria								Total Operational Score
		Number of Train Sets Required	Score	Existing Turnback Availability and Impact on Platform Occupancy	Score	Connectivity to Number of Onward Routes (rail, bus and proximity to transport interchanges)	Score	Impact on Other Services – Based on Technical Criteria Scoring	Score	
Newport	1	For services from Ebbw Vale Town station to Newport, the following additional train sets are required. 1 additional service – 2 2 additional services - 4	5	Current infrastructure cannot support a turnback service due to level of platform occupancy	2	Terminating service at Newport gives access to onward journeys to destinations in West Wales, North Wales, the Midlands, the North West, the South West and London	5	New platform at Newport with a direct connection to the Ebbw line will avoid restricting mainline capacity.	5	17
	2		4		2		5		5	16
Abergavenny	1	For services from Ebbw Vale Town station to Abergavenny, the following additional train sets are required. 1 additional service – 3 2 additional services - 6	5	Existing infrastructure and platform occupancy does not allow for easy turnback at Abergavenny Station.	2	Terminating service at Abergavenny gives access to onward journeys to destinations in North Wales and the North West	3	Reinstating the old platform 3 face would allow trains to stop at platform 3 without affecting trains running into Abergavenny from the north.	4	14
	2		3		2		3		2	10
Hereford	1	For services from Ebbw Vale Town station to Hereford, the following additional train sets are required. 1 additional service – 4 2 additional services – 8	4	With only three or four paths being available, particularly between Pontrilas and Abergavenny, all paths north of Abergavenny have already been taken in certain hours of the day. However, Hereford station already has theoretical platform capacity to accommodate a terminating service.	5	Terminating service at Hereford gives access to onward journeys to destinations in North Wales, the North West, the Midlands and London.	4	With only three or four paths being available, particularly between Pontrilas and Abergavenny, all paths north of Abergavenny have already been taken in certain hours of the day. However, not all freights are in use. Whilst the trains do not run, paths are protected with the expectation that they will be used by other freight services in the future.	2	15
	2		2		5		4		1	12
Severn Tunnel Junction	1	For services from Ebbw Vale Town station to Severn tunnel Junction, the following additional train sets are required. 1 additional service – 3 2 additional services – 5	5	There is space to accommodate the new service and it may even be possible for some longer ten-minute turnarounds to be arranged to give timetable resilience and comply with Timetable Planning Rules.	5	Terminating service at Severn Tunnel Junction gives access to onward journeys to destinations in the Midlands, the South West and London	4	An additional service to Severn Tunnel Junction would not impact existing services.	5	19
	2		4		5		4		5	18
Bristol Temple Meads	1	For services from Ebbw Vale Town station to Bristol Temple Meads, the following additional train sets are required. 1 additional service – 4 2 additional services – 8	4	Platform occupancy levels indicate that there should be space for an additional terminating train.	4	Terminating service at Bristol Temple Meads give access to onward journeys to destinations in the South West, the South East, the Midlands, the North West, the North East, London and Scotland	5	Analysis indicates that available train paths exist for an additional train service to Bristol Temple Meads. However, available paths through the Severn Tunnel may be an issue in the future.	4	17
	2		3		4		5		2	14
Cheltenham Spa	1	For services from Ebbw Vale Town station to Cheltenham Spa, the following additional train sets are required. 1 additional service – 4 2 additional services – 8	4	May be suitable for an occasional service though running an hourly clockface service will be difficult without significant changes to the timetable.	2	Terminating service at Cheltenham Spa give access to onward journeys to destinations in the Midlands, the North West, the North East and Scotland	4	May be suitable for an occasional service though running an hourly clockface service will be difficult without significant changes to the timetable.	3	13
	2		2		2		4		2	10
Gloucester	1	For services from Ebbw Vale Town station to Gloucester, the following additional train sets are required. 1 additional service – 4 2 additional services - 7	4	For trains of up to 105 metres in length, terminating at Gloucester should be easily achieved by using platform 3. Trains longer than 105 metres can also be accommodated by using platform 4 and shunting.	5	Terminating service at Gloucester give access to onward journeys to destinations in the South West, the South East, the Midlands, London and Scotland	4	Analysis indicates that available train paths exist for an additional train service to Gloucester.	4	17
	2		3		5		4		4	16

Source: Mott MacDonald

Table 14: Westbound infrastructure scores

Destination	Additional Services to Destination	Technical Criteria						Total Technical Score
		Infrastructure						
		Signalling	Score	Track / Civils	Score	Stations	Score	
Maesteg	1	Increasing the service frequency from the existing 1tph to 2tph would require minor signalling modification at Tondu Junction.	4	Increasing the service frequency from the existing 1tph to 2tph would require modification of Llynfi Loop.	4	Station works would be required for a service frequency to increase to 2 tph or more. To enable efficient journey times, the platform at Tondu Station will need relocation or extension to allow passenger trains traveling in either direction on the passing loop to stop at the station.	4	12
	2		3		3		3	9
Bridgend (via SWML)	1	No signalling works required to undertake turnback movements via the SWML.	5	No track works required to undertake turnback via the SWML. However, works would be required at Ebbw Junction to enable any higher frequency than 2 tph	5	No station/civils works required to undertake turnback movements via the SWML.	5	15
	2		5		5		5	15
Bridgend (via VoG)	1	No signalling works required to undertake turnback movements via the VoG Line.	5	No track works required to undertake turnback via the VoG Line. However, works would be required at Ebbw Junction to enable any higher frequency than 2 tph	5	No station/civils works required to undertake turnback movements via the VoG Line.	5	15
	2		5		5		5	15
Cardiff Central	1	No signalling works required to undertake turnback movements at Cardiff Central.	5	No track works required to undertake turnback at Cardiff Central. However, works would be required at Ebbw Junction to enable higher frequencies to Cardiff Central.	5	No station/civils works required to undertake turnback movements at Cardiff Central.	5	15
	2		5		5		5	15

Source: Mott MacDonald

Table 15: Eastbound infrastructure scores

Destination	Additional Services to Destination	Technical Criteria						Total Technical Score
		Infrastructure						
		Signalling	Score	Track / Civils	Score	Stations	Score	
Newport	1	Signalling works would be needed if a new platform was introduced to turnback services.	3	Track works would be needed if a new platform was introduced to turnback services.	3	Civils works would be needed if a new platform was introduced to turnback services.	3	9
	2		3		3		3	9
Abergavenny	1	Signalling works would be needed if platform 3 was to be reinstated.	3	Track works would be needed if platform 3 was to be reinstated.	4	Platform works would be needed if platform 3 was to be reinstated.	3	10
	2		3		4		3	10
Hereford	1	There are no signalling works needed for 1 tph but increases require additional block sections to lift overall route capacity.	5	There are no track works needed.	5	There are no civil works needed.	5	15
	2		1		5		5	11
Severn Tunnel Junction	1	There are no signalling works needed.	5	There are no track works needed.	5	There are no civil works needed.	5	15
	2		5		5		5	15
Bristol Temple Meads	1	There are no signalling works needed.	5	There are no track works needed.	5	There are no civil works needed.	5	15
	2		5		5		5	15
Cheltenham Spa	1	There are no signalling works needed.	5	There are no track works needed.	5	There are no civil works needed.	5	15
	2		5		5		5	15
Gloucester	1	There are no signalling works needed.	5	There are no track works needed.	5	There are no civil works needed.	5	15
	2		5		5		5	15

Source: Mott MacDonald

Table 16: Summary of westbound infrastructure and operational scores

Destination	Additional Services to Destination	Total Operational Score	Total Technical Score	Total Score
Maesteg	1	17	12	29
	2	14	9	23
Bridgend (via SWML)	1	14	15	29
	2	11	15	26
Bridgend (via VoG)	1	19	15	34
	2	15	15	30
Cardiff Central	1	19	15	34
	2	15	15	30

Source: Mott MacDonald

Table 17: Summary of eastbound infrastructural and operational scores

Destination	Additional Services to Destination	Total Operational Score	Total Technical Score	Total Score
Newport	1	17	9	26
	2	16	9	25
Abergavenny	1	14	10	24
	2	10	10	20
Hereford	1	15	15	30
	2	12	11	23
Severn Tunnel Junction	1	19	15	34
	2	18	15	33
Bristol Temple Meads	1	17	15	32
	2	14	15	29
Cheltenham Spa	1	13	15	28
	2	10	15	25
Gloucester	1	17	15	32
	2	16	15	31

Source: Mott MacDonald

3.5.2 The top three destinations for an eastbound service are as follows:

For 1 train per hour

- Additional service to Severn Tunnel Junction (scoring 34)
- Additional service to Bristol Temple Meads (scoring 32)
- Additional service to Gloucester (scoring 32)

For two trains per hour

- Additional service to Severn Tunnel Junction (scoring 33)
- Additional service to Gloucester (scoring 31)
- Additional service to Hereford (scoring 30)

3.5.3 The top two destinations for westbound services are as follows:

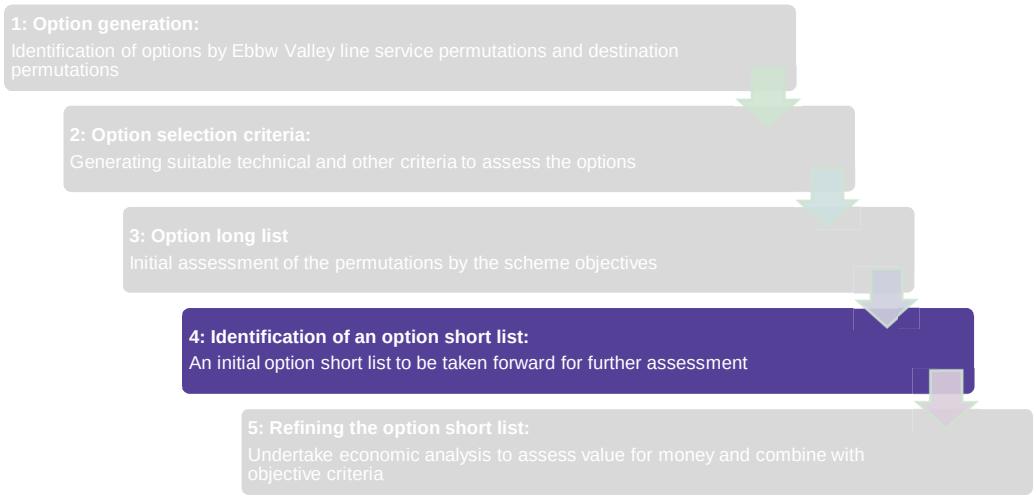
For 1 train per hour

- Additional service to Cardiff Central (scoring 34)
- Additional service to Bridgend via Vale of Glamorgan (scoring 34)

For 2 trains per hour

- Additional service to Cardiff Central (scoring 30)
- Additional service to Bridgend via Vale of Glamorgan (scoring 30)

3.6 Initial short list identification (stage 4)



Source: Mott MacDonald

3.6.1 The infrastructure and operational assessment indicated turnback at Severn Tunnel Junction as the strongest performer, with Hereford as the weakest performer. For westbound services, Cardiff Central emerged as the strongest performer, with Maesteg being relatively weak.

3.6.2 At this point, the assessment against objectives was introduced and summarised in Table 18.

Table 18: Assessment of destinations against objectives (rounding applied)

Objectives

	Frequency	Newport	Abergavenny	Hereford	Gloucester	Cheltenham	Severn Tunnel	Bristol TM	Cardiff Central	Bridgend (SWML)	Bridged (VOG)	Maesteg
1: Contribute towards unlocking new development in areas of higher deprivation	1tph	2	1	1	1	1	1	1	1	1	1	2
	2tph	2	1	1	1	1	1	1	2	1	1	2
2: Reduce economic inactivity by improving public transport access to employment from the Ebbw Valley to the wider SE Wales region	1tph	2	1	1	1	1	1	2	1	1	1	1
	2tph	2	1	2	2	1	1	3	3	1	1	1
3: Address greenhouse gas emissions by promoting the use of rail for key trips and modal shift	1tph	1	1	1	1	1	1	1	2	1	1	1
	2tph	2	2	1	1	1	1	2	2	1	1	1
4: Maintain and enhance public transport provision to the Ebbw Valley and Newport	1tph	1	1	1	1	1	1	1	1	1	1	1
	2tph	2	2	2	2	2	2	2	2	1	1	1
5: Improve public transport access to healthcare, education, and other key services	1tph	2	1	1	1	1	1	2	2	1	1	1
	2tph	3	2	2	2	2	1	3	3	1	1	1
6: Enhance the attractiveness of public transport as a realistic mode through improved frequencies and longer trains	1tph	0	1	1	1	1	1	1	2	1	1	1
	2tph	1	2	2	2	2	1	2	2	2	2	2
7: Reduce the impact of poor air quality by increasing the number of public transport journeys	1tph	2	1	1	1	1	1	1	2	1	1	1
	2tph	2	1	1	1	1	1	2	2	1	1	1
8: Improve the financial sustainability of the TfW Rail franchise	1tph	-1	-1	-2	-2	-2	-1	-1	0	-2	-2	-2
	2tph	-1	-2	-2	-2	-2	-2	1	1	-3	-3	-3
TOTAL - 1tph		**9**	**6**	**5**	**5**	**5**	**6**	**8**	**11**	**5**	**5**	**6**
TOTAL - 2tph		**13**	**9**	**9**	**9**	**8**	**6**	**16**	**17**	**5**	**5**	**6**

Source: Mott MacDonald

1.1.9 From this assessment against objectives, a clear outcome emerged in that connections to Cardiff performed strongly, with Bristol and Newport close behind. This outcome is based on issues linked to improving access to jobs and services. This indicated importance of serving Cardiff and Newport correlating well with the rail technical scores.

1.1.10 A further consideration in options east and west of Newport and Cardiff are the following infrastructure and operational constraints in additional to those identified in Table 7:

- Westbound there is a severe constraint at Cardiff West Junction, which limits the ability of additional services running onto the Vale of Glamorgan line from Cardiff. This removed a high scoring option but left serving Bridgend via the SWML and Maesteg as alternatives;
- In this context, the additional westbound services running beyond Cardiff would serve either Bridgend or Maesteg via Bridgend via the main line and linked with Abertillery
- Eastbound the timetabling constraints associated with Cheltenham indicated its removal but the retention of Gloucester
- Signal-based route constraints north of Abergavenny also removed Hereford. Abergavenny itself did not score well under the rail technical or objective and it is note that services will be improved by the ODP. On this basis, it was removed from the assessment

1.1.11 The service patterns linking the destinations was determined by timetable efficiency and the ability to offer a well-spaced pattern in the Ebbw Valley and the termini at Ebbw Vale Town and Abertillery.

1.1.12 Based on the above the following three options were developed for initial testing in the OBC:

Table 19: Option descriptions

Main component	Rationale
	Option 1 – minimum infrastructure
○ Ebbw Vale Town – Cardiff Central ○ Abertillery – Bridgend via S Wales Main Line ○ Ebbw Vale Town – Severn Tunnel Junction ○ Abertillery – Gloucester	The service to Cardiff Central would be a continuation of the existing service, so would not need additional infrastructure. The assessment found Severn Tunnel Junction to be the highest scoring destination traveling east. The service would require no new infrastructure at the terminus and would not have a significant impact on existing services. Bridgend and Gloucester are included, linked to Abertillery in this case. No additional infrastructure is needed for this permutation.
	Option 2 – medium infrastructure
○ Ebbw Vale Town – Cardiff Central ○ Ebbw Vale Town – Bristol Temple Meads ○ Abertillery – Maesteg ○ Abertilery - Gloucester	The service to Cardiff Central would be a continuation of the existing service, so would not need additional infrastructure. Bristol Temple Meads was one of the highest scoring eastbound destinations. The service would bring benefits by having a more frequent connection between Bristol and South Wales, calling at Newport and Severn Tunnel Junction. Bristol Temple Meads also appears efficient in terms of the fleet requirements, compared to some of the other destinations. The additional westbound service to Maesteg (from Abertillery) scored satisfactorily in the sifting process, only requiring works at Tondu Junction to allow a second service to run on the Maesteg branch line. The additional service to Maesteg would deliver benefits to passengers along the branch, where there is currently only 1 tph. This service would also benefit passengers from Bridgend who would gain an additional service to Cardiff Central. The final service would run from Abertillery to Gloucester, again addressing a higher-scoring destination.
	Option 3 – Maximum infrastructure
○ Ebbw Vale Town – Cardiff Central ○ Ebbw Vale Town – Bristol Temple Meads ○ Abertillery – Maesteg ○ Ebbw Vale Town – Gloucester	The service to Cardiff Central would be a continuation of the existing service, so would not need additional infrastructure. The other Ebbw Vale trains would serve Bristol and Gloucester leaving Abertillery to cover the additional Maesteg run. A longer section of double track is required in the Ebbw Valley to support the 3 tph frequency to Ebbw Vale.

Source: Mott MacDonald

3.7 Additional Considerations

3.7.1 The work up to now has focussed on producing permutations around a mix of the existing and planned services, to which is added uplifts in the service level of the Ebbw Vale Branch Line. The outcome packages are logical on that basis, but it would be possible to set option generation against a wider context, which may add value to the economic appraisal to be carried out. The following issues could be considered:

- The wider 'South Wales Metro' of which the Ebbw Vale line forms only a part. Some of this wider network features within the packages tested here
- The range of potential destination points, particularly east of Newport that could be served; so far, only those not obviously needing additional infrastructure have been considered;
- The development of additional stations has also been considered previously and further work on how they could be included could add benefit
- Finally, the options are all based around the aspiration for a 4 tph frequency: it may be that alternatives many be needed if the economic performance is challenging.

3.7.2 Finally, it is important to note that there are more train service options that could be added to those assessed up to now. This would include terminal locations such as Chepstow or Newport itself. Further work would be needed to assess the costs and benefits of including such examples.

3.8 Summary of the Option Generation task

3.8.1 Given the extent of the studies undertaken to date, an operational and infrastructure assessment led approach to the development of the options was undertaken. This was reinforced and moderated by an assessment against the objectives.

3.8.2 The option generation process confirmed that there are a number of operational and infrastructure challenges, linked to a number of interdependencies. The initial assessment indicated that services with turn backs at Cardiff Central and Severn Tunnel performed more strongly. Based on this, three core options were identified for further assessment testing:

- **Option 1 - Minimum infrastructure:** Services to Cardiff Central, Bridgend, Severn Tunnel Junction and Gloucester from Ebbw Vale Town and Abertillery
- **Option 2 - Medium infrastructure:** Services to Cardiff Central, Maesteg, Bristol Temple Meads and Gloucester from Ebbw Vale Town and Abertillery
- **Option 3 – Maximum infrastructure:** Services to Cardiff Central, Maesteg, Bristol Temple Meads and Gloucester (with a more standard service pattern along the Ebbw Vale Branch Line) from Ebbw Vale Town and Abertillery

4 Transport (Economic) Case

The aim of the Transport Case is to demonstrate whether the identified options present value for money. The focus here is to demonstrate the initial economic benefits and disbenefits associated with the options and to assess the potential environmental and social impacts.

4.1 Overall approach to the Transport Case

4.1.1 The overall approach to the Transport Case largely replicates the methodology utilised in the previous Eastern Valleys OBC. The focus is largely on the Level 1 economic impacts principally around the benefits and disbenefits for users. Level 2 assessments around changes in productivity and wider impacts such as GVA, at this point in time, have been excluded from the analysis.

4.1.2 The Transport Case also assesses the potential environmental and social impacts. The assessments for these impacts are largely qualitative, with the exception of some of the outputs arising from the economic modelling.

4.1.3 Whilst greater detail about the capital and operating costs underpinning the option packages are outlined in Section 6: The Financial Case, there are several elements that have underpinned the Transport Case, the pertinent items being:

- Application of optimism bias to the scheme costs as outlined in Section 6 Financial Case
- Inclusion of infrastructure development costs for the Ebbw Vale line, including reinstatement of the Abertillery branch
- Inclusion of costs relating to infrastructure costs for the Maesteg line
- Exclusion of costs at Newport station, Cardiff or works to the SWML relief lines.

4.2 Approach to the economic appraisal

4.2.1 The options have been appraised using a spreadsheet-based elasticity model approach. Elasticity models use existing rail demand data, service quality (frequency, destination, fare) information, competing mode data for car and bus, and population and socio-economic data for areas around stations to forecast flows. The UK rail industry's Passenger Demand Forecasting Handbook (PDFH) suggests an elasticity model approach for assessing proposed new services on existing rail lines, where a range of possible destinations are being served.

4.2.2 The demand forecasts have been translated into forecast benefits (Present Value of Benefits – PVB) using assumptions based on changes in passengers' end to end journey times, changes in fares paid by passengers and received by transport operators (including bus operators), and the net change in vehicle-kilometres on the highway network due to modal shift. Changes in vehicle-kilometres lead to external impacts on levels of congestion and knock-on environmental (noise, greenhouse gas) impacts, as well as changes in the number of road accidents taking place. A combination of local data and standard Department for Transport parameters (from WebTAG) have been used in estimating the PVB, which is presented in 2010 prices discounted to 2010 in line with WebTAG.

4.2.3 The following parameters have been used in the assessment:

- First benefits arise in 2025, based on demand from the forecasting model with forecast years 2021, 2026 and 2036

- Demand and benefits are capped at levels reached at the end of 2036 (20 years from final modelled year), in line with Department for Transport online appraisal guidance
- 60-year appraisal period, with benefits monetised up to 60 years from scheme opening (end of 2084)
- Demand from new developments is based on a combination of TEMPro 7.0 population, employment, and trip growth factors, and information on committed developments obtained from Local Development Plans
- Existing rail passenger demand, journey patterns, and fare levels are taken from the rail industry's MOIRA program and used as a basis for future passenger growth
- For this WelTAG Stage 2, the Present Value of Costs (PVC) are not broken down into component parts.
- Values of time and marginal external costs of congestion have been taken from the November 2018 version of the WebTAG data book provides a listing of the key assumptions used in this assessment.

4.2.4 Table 20 provides a listing of the key assumptions used in this assessment.

Table 20: Assumptions

Category	Description	Assumption
Line	New stations - Ebbw Vale	Assume no new additional stations on the Ebbw Vale line (between Ebbw Junction and Ebbw Town)
Line	New stations - SWML	Assume new stations at Cardiff Parkway, Llanwern and Miskin
Line	Ebbw Vale line station improvements	Assume no improvement to existing stations on the Ebbw Vale which could result in an uplift in demand (improved park and ride provision, new hub development)
Line	SWML Relief Line	The outcomes of the emerging business case into improving line speeds/capacity of the SWML relief line not factored in
Service	ODP Contractual Commitment	Assume 1 additional TPH between Ebbw Vale and Newport. No assumptions have been made about the operational impacts of the service on existing train movements at Newport station
Service	ODP Contractual Commitment	Assume the following change in rolling stock and increase in capacity - Existing class 150 – 145 seats - Interim 3 car class 170 – 171 seats - Proposed Stadler FLIRT 3 car – 143 seats Proposed Stadler FLIRT 4 car – 202 seats
Service	Swansea to Bristol TM stopping service	Assume no impact of potential service or use of limited rail paths around Bristol East Junction
Service	Minimum infrastructure (all 1tph)	Ebbw Vale - Cardiff; Ebbw Vale - Severn Tunnel Junction; Abertillery - Bridgend via SWML & Abertillery - Gloucester
Service	Medium infrastructure (all 1tph)	Ebbw Vale - Cardiff; Ebbw Vale - Bristol Temple Meads; Abertillery - Maesteg & Abertillery - Gloucester
Service	Maximum infrastructure (All 1 tph)	Ebbw Vale - Cardiff; Ebbw Vale - Bristol Temple Meads; Ebbw Vale - Gloucester & Abertillery - Maesteg

Source: Mott MacDonald

4.2.5 In addition, two types of sensitivity test have been run, firstly based on an amended service pattern:

- A phased service introduction test 'ST2+ST3' assumes 3tph until 2036 after which 4tph is operational. In this option the 3 tph variant adds an Abertillery – Cardiff service to the do-minimum of Ebbw Vale to Cardiff and Ebbw Vale to tSevern Tunnel Junction;At 2036 a fourth hourly service is introduced from Abertillery – Maesteg. This may improve the way service improvements and future local growth match up
- A Wales focussed 'ST3' assumes 4tph from the outset, but to the amended service specification, which effectively removes the English destinations of Gloucester and Bristol from the picture.

4.2.6 Operational costs are amended in both tests to reflect the Do-Minimum service having to run to Severn tunnel Junction, to avoid station redevelopment costs.

4.2.7 A second type of sensitivity test has also been carried out, adjusting some underlying critical test parameters, in a manner which is considered justifiable considering local circumstances:

- PDFH (Passenger Demand Forecasting Handbook) forecasting approach applied, applying average GJT trend change to the Do Minimum option; This and the 'no trend change' option above will tend to successively increase the demand level and present value of benefits;
- Use of the average trend demand growth, applying a real-world background demand growth of 2.55% rather than using PDFH approach. This increases the level of demand in the model for each test scenario.

4.3 Economic appraisal

4.3.1 Table 21 below provides a summary of the estimated demand for the core and full packages, broken down by main user type and by period. The table shows the extent of the uplift demand between 3 to 4 tph and over the 10-year period.

Table 21: Estimated demand for the full packages (all 4 tph)

Year	Commute	Business	Leisure	Total
Minimum infrastructure				
2026	189,153	18,458	211,687	419,298
2036	246,057	25,270	288,789	560,116
Medium infrastructure				
2026	223,899	20,657	236,412	480,967
2036	288,798	28,206	321,317	638,321
Maximum infrastructure				
2026	232,866	21,404	245,247	499,517
2036	300,161	29,222	333,280	662,662

Source: Mott MacDonald

Economic appraisal – options

4.3.2 From the above, it can be seen that demand growth by 2036 ranges from some 485,000 to 617,000. Considering that the current Ebbw Vale hourly service carries between 1.0 and 1.5 users per year, the quadrupling of train services does not have a proportionate impact on demand. It does have a proportionate impact on running costs and this gap can be plainly seen in the economic results of the tested options. Table 22 summarises the economic performance of the scheme in terms of Present Value of Costs and Benefits (PVC and PVB), Net Present Value (NPV) and benefit to Cost Ratio (BCR).

Table 22: Economic performance of the full packages (2010 prices)

Year	PVB	PVC	NPV	BCR
Minimum				
Infrastructure	£78.1m	£194.8m	-£116.7m	**0.40**
Medium				
Infrastructure	£99.5m	£262.9m	-£163.3m	**0.38**
Maximum				
Infrastructure	£106.9m	£273.0m	-£166.1m	**0.39**

Source: Mott MacDonald

4.3.3 These findings do not suggest the scheme represents good value for money, with the scale of operating costs apparently influencing the PVC values for the full options to a large extent.

4.3.4 This outcome has been used to help frame suitable sensitivity tests, which aim to probe the way in which practical changes in service specification as well as varying key parameters in the appraisal process can produce different outcomes.

Economic appraisal – sensitivity tests

4.3.5 Table 23 below provides a summary of the estimated demand for two types of sensitivity test broken down by main user type and by demand segment. The tables all show the extent of the uplift in demand and other changes arising over and above the 2 trains per hour service level included in the Grant Agreement.

4.3.6 Retaining the base case appraisal parameters but rationalising the services as noted in 4.2.5, produces these outcomes.

Table 23: Estimated demand for the sensitivity tests

Year	Commute	Business	Leisure	Total
ST2 +3 Phased introduction				
2026	84,705	9,574	102,148	196,427
2036	249,983	25,237	287,035	562,255
ST3 - Wales focussed				
2026	192,312	18,391	210,011	420,714
2036	249,983	25,237	287,035	562,255

Source: Mott MacDonald

4.3.7 The comparable economic performance of the two tests is shown below.

Table 24: Economic performance for the sensitivity tests (2010 prices)

Year	PVB	PVC	NPV	BCR
ST2 + 3				
Phased intro	£71.9m	£110.9m	-£39.0m	**0.65**
ST3				
Wales focussed	£79.1m	£133.2m	-£54.1m	**0.59**

Source: Mott MacDonald

4.3.8 The impact can be seen as having a marked impact on the PVC (cost) value whilst not losing very much of the benefit. This produces an improvement in the net present value of the scheme and an improvement in the respective BCRs.

4.3.9 A second level of sensitivity testing has been carried out by the applying changed demand modelling parameters noted above, in the form of the Generalised Journey Time 'GJT trend' variable and finally the use of a local growth profile for rail use rather than the PDFH recommendation of TEMPro based forecast rates. The impact of these changes on the full packages is shown in Table 25 / Table 26.

Table 25: Estimated demand for the full packages (Gen Journey Time assumption)

Year	Commute	Business	Leisure	Total
Minimum infrastructure				
2026	216,405	21,094	242,001	479,500
2036	297,457	30,498	348,695	676,649
Medium infrastructure				
2026	256,113	23,610	266,855	546,578
2036	348,942	34,037	380,922	763,900
Maximum infrastructure				
2026	266,521	24,459	280,374	571,354
2036	363,031	35,260	402,383	800,674

Source: Mott MacDonald

Table 26: Estimated demand for the full packages (local growth assumption)

Year	Commute	Business	Leisure	Total
Minimum infrastructure				
2026	250,539	23,538	270,476	544,554
2036	374,846	35,016	402,538	812,401
Medium infrastructure				
2026	297,213	26,371	302,412	625,996
2036	444,324	39,141	449,047	932,512
Maximum infrastructure				
2026	309,063	27,312	313,552	649,928
2036	462,224	40,560	465,856	968,641

Source: Mott MacDonald

4.3.10 The resulting comparative economic performance is provided in Table 27 / Table 28.

Table 27: Economic performance of the full packages – GJT assumption (2010 prices)

Year	PVB	PVC	NPV	BCR
Minimum				
Infrastructure	£93.7m	£188.4m	-£94.7m	**0.50**
Medium				
Infrastructure	£118.6m	£256.0m	-£137.4m	**0.46**
Maximum				
Infrastructure	£128.7m	£265.5m	-£136.8m	**0.48**

Source: Mott MacDonald

Table 28: Economic performance of the full packages – local growth (2010 prices)

Year	PVB	PVC	NPV	BCR
Minimum				
Infrastructure	£113.6m	£181.4m	-£67.7m	**0.63**
Medium				
Infrastructure	£146.3m	£247.9m	-£101.6m	**0.59**
Maximum				
Infrastructure	£156.9m	£257.3m	-£100.4m	**0.61**

Source: Mott MacDonald

4.3.11 In short, application of amended parameters improves the performance of the full packages to something similar to the sensitivity test packages at base case level.

4.3.12 The next step is to assess what the impact of these amended parameters would be on the sensitivity tests' demand and economic results. These are shown in Table 29 to Table 32.

Table 29: Estimated demand for the sensitivity tests (GJT assumption)

Year	Commute	Business	Leisure	Total
ST2 +3 Phased introduction				
2026	97,571	11,021	117,683	226,275
2036	302,742	30,526	347,297	680,565
ST3 - Wales focussed				
2026	220,245	21,045	240,371	481,661
2036	302,742	30,526	347,297	680,565

Source: Mott MacDonald

Table 30: Estimated demand for the sensitivity tests (local growth assumption)

Year	Commute	Business	Leisure	Total
ST2 +3 Phased introduction				
2026	111,281	12,324	130,896	254,500
2036	384,598	35,247	403,504	823,349
ST3 - Wales focussed				
2026	256,238	23,585	269,933	549,757
2036	384,598	35,247	403,504	823,349

Source: Mott MacDonald

Table 31: Economic performance for the sensitivity tests (GJT assumption)

Year	PVB	PVC	NPV	BCR
ST2 + 3				
Phased intro	£86.7m	£105.2m	-£18.4m	**0.82**
ST3				
Wales focussed	£95.0m	£127.2m	-£32.2m	**0.75**

Source: Mott MacDonald

Table 32: Economic performance for the sensitivity tests (local growth)

Year	PVB	PVC	NPV	BCR
ST2 + 3				
Phased intro	£107.3m	£98.5m	£8.8m	**1.09**
ST3				
Wales focussed	£116.8m	£120.2m	-£3.3m	**0.97**

Source: Mott MacDonald

4.3.13 By considering the combination of the service package and amended appraisal parameter sensitivity tests, it is possible to capture most of the additional demand and benefits, whilst removing most of the costs. **This brings about a major improvement in the net present value of the scheme and its BCR comes close to or exceeds the break-even point**. Note that in the instance where BCR is greater than 1, the NPV value also becomes a positive value.

4.3.14 Further work to validate these findings would be worthwhile to support the vision for the Ebbw Valley Branch Line services. A copy of the supporting documentation including the TEE, PA and AMCB tables are in the **WelTAG Impacts Assessment Report.**

4.3.15 It is important to stress that the above Tables do not capture the full range of economic benefits. These include Level 2 benefits such as:

- **Changes in productivity –** due to labour availability and agglomeration effects. The ODP contract requires the introduction of a Newport service, which will improve labour availability between the Ebbw Valley area, the Newport area and connections further east
- **Local economy impacts –** potential gross value added (GVA) increases. Wider economic benefits principally focussed around stations from improved services need to be captured
- **Changes to development site viability –** essentially this is about the land impacts. Improved services are likely to have beneficial impacts particularly on development sites earmarked in Local Development Plans (LDPs). For example, through services to/from Bristol may have a positive impact on the continued development of 'the Works' site located near Ebbw Vale Town station and the prospective impact of rail being reintroduced to Abertillery.

4.3.16 Although Level 2 benefits can be reported at WelTAG Stage 2 there are advantages this work to be undertaken at WelTAG Stage 3. This ensures the actual wider benefits reflect the preferred option rather than a series of options still under development. This is the recommended approach in this case.

4.3.17 Another important point to stress is that the above presents the 'economic' value for money case. The Scheme value for money is wider and considers a range of environmental and social assessments. These play a more important role where environmental and social impacts are particularly negative and more significant (for example, major environmental impacts).

4.4 Assessment of environmental impacts

4.4.1 The assessment to the environmental impacts is largely qualitative, although the analysis around greenhouse gases, air pollution and noise is informed by the economic modelling outputs. The focus is largely on the Ebbw Valley (from Ebbw Junction to Ebbw Vale Town), although in specific instances, the environmental impacts occur over a greater area.

4.4.2 Table 33 summarises the outcome of the environmental assessment. The main elements being:

- The environmental impacts are likely to be the same for all three option packages, with no substantial differences between them;
- There will be very minor and marginal improvements around greenhouse gases, local air quality and noise, based on the economic modelling;
- There is likely to be a neutral or negligible impact on landscape, townscape, historic environment, biodiversity and water environment.

4.4.3 The specific environmental impacts of reopening the Abertillery route are noted separately in Table 34.

4.5 Assessment of social impacts

4.5.1 The assessment of the social impacts is largely qualitative, with the focus largely on the Ebbw Valley itself (from Ebbw Junction to Ebbw Vale Town). In specific instances, there may be some social impacts outside this immediate area.

4.5.2 Table 9 provides an overview of the social impacts for the three packages. The assessment suggests there are no major differences as follows:

- Slight benefits for non-business users and reduction in accidents

- Slight beneficial improvements around physical activity, improved journey quality and access to services
- Neutral or negligible changes to personal security, increased affordability and option/non-use values
- A slight adverse impact from increased severance. This is primarily around the number of level crossings and the increased number of barrier down times.

4.5.3 The specific social impacts of reopening the Abertillery route is noted separately in Table 36.

Table 33: Environmental impacts – Ebbw Valley line

Impact area	Minimum infrastructure	Medium infrastructure	Maximum infrastructure
Greenhouse gases	**Minor positive for all options** Mode shift effects from car to rail should reduce greenhouse gas emissions in the line's catchment area		
Air quality	**Minor positive for all options** A small improvement should be facilitated by movement by rail rather than road vehicles		
Noise	**Minor positive for all options** Mode shift effects from car to rail should reduce noise impacts in the line's catchment area		
Landscape	**Neutral for all options** The additional signalling, loop extension and additional station platforms are likely to have a negligible impact on the existing landscape		
Townscape	**Neutral for all options** The additional works will be within the existing railway boundary, with no direct impacts on surrounding townscapes		
Historic environment	**Neutral for all options** No significant change expected given the extent of the additional signalling, track and station works are within the existing railway boundary		
Biodiversity	**Neutral for all options** The additional works will be within the existing railway boundary, with no substantive change to existing habitats		
Water environment	**Neutral for all options** The additional signalling, loop extension and additional station platforms are likely to have a negligible impact on the existing water environment		

Source: Mott MacDonald

Table 34: Environmental impacts – Abertillery branch

Impact area	Minimum infrastructure	Medium infrastructure	Full infrastructure
Greenhouse gases	**Minor positive for all options** Mode shift effects from car to rail should reduce greenhouse gas emissions in the line's catchment area		
Air quality	**Minor positive for all options** A small improvement should be facilitated by movement by rail rather than road vehicles		
Noise	**Slight adverse for all options** Scheme introduces noise from transport operations into currently quiet area		
Landscape	**Neutral for all options** The works will be within the former railway boundary and the route was retained intact for use as a cycleway. Rail reinstatement is therefore not likely to have any direct impacts on surrounding landscapes		
Townscape	**Neutral for all options**		

Impact area	Minimum infrastructure	Medium infrastructure	Full infrastructure
	The works will be within the former railway boundary and the route was retained intact for use as a cycleway. Rail reinstatement is therefore not likely to have any direct impacts on surrounding townscapes		
Historic environment	**Neutral for all options** The works will be within the former railway boundary and the route was retained intact for use as a cycleway, with preservation of some historic railway features within the right of way. Rail reinstatement is therefore not likely to have any detrimental impacts on the historic (railway) environment		
Biodiversity	**Neutral for all options** The additional works will be within the former railway boundary: conversion into a cycleway may have created additional habitat development opportunities but rail reinstatement should not require substantive change to existing habitats. A neutral score is assumed, to be confirmed by ecology surveys prior to seeking statutory powers.		
Water environment	**Neutral for all options** The new branch line signalling, trackwork and platform construction are likely to have a negligible impact on the existing water environment		

Source: Mott MacDonald

Table 35: Social assessment – Ebbw Valley line

Impact area	Minimum infrastructure	Medium infrastructure	Maximum infrastructure
Non-business users	Not available as disaggregated value from appraisal, however significantly increased commuter / leisure use is anticipated as a result of the scheme's development		
Increased **physical activity** (walking and cycling)	**Slight beneficial for all options** None of the packages will provide additional stations on the Ebbw Vale line. However, the uplift in demand from 2 tph, as part of the ODP contractual commitment, will result in an increase in walking and cycling to/from stations		
Improved **journey quality** (comfort/information)	**Slight beneficial for all options** The ODP contractual commitment will result in improved capacity and the introduction of new Stadler FLIRT trains which will result in an improvement in journey quality through a better ambience. The three packages are unlikely to result in a significant improvement in journey quality although there may be reduced overcrowding (despite the uplift in the number of passengers)		
Reduced **accidents**	**Moderate beneficial for all options** The mode shift to rail from road vehicles will produce accident savings through transferring some trips to a safer mode.		
Improved **personal security** for travellers	**Slight beneficial for all options** The major uplift in frequency at valley line stations will reduce wait times, reducing risk exposure. Similarly, increase use of the service would improve 'social overlooking' at stops and on-trains, reducing potential for anti-social behaviour.		
Improved **access to services (health, education)**	**Slight beneficial for all options** The increase in services above the ODP contractual commitment will improve access to key services such as Further Education campuses such as Coleg Gwent at Crosskeys and Ebbw Vale. There is also improved access to the Royal Gwent Hospital in Newport, although the opening of the new Critical Care Specialist Hospital on the edge of Cwmbran in 2021 could diminish potential demand		

Impact area	Minimum infrastructure	Medium infrastructure	Maximum infrastructure
Increased **affordability** of travel	**Neutral for all three options** The improvement in service levels is unlikely to impact on the relative affordability for passengers		
Reduced **severance**	**Slight adverse for all options** 4 tph will entail extension of loops around Cwm and Rogerstone, including a new platform. These will be within the existing railway boundary. 3 tph also requires the same level of infrastructure on operational grounds. However, increased services will increase the number of 'barrier down' times on the level crossings on the Ebbw Vale line. On this basis, severance will deteriorate marginally		
New travel option (**option / non-use value**)	**Moderate beneficial for all options** The introduction of services should produce positive option / non-use valuations, as there is no convenient alternative to rail for several key journey classes from Abertillery		

Source: Mott MacDonald

Table 36: Social assessment – Abertillery branch

Impact area	Minimum infrastructure	Medium infrastructure	Maximum infrastructure
Non-business users	**Slight beneficial for all options** The uplift in demand from should result in an increase in walking and cycling to/from stations affected, particularly Abertillery.		
Increased **physical activity** (walking and cycling)	**Slight beneficial for all options** The uplift in demand from should result in an increase in walking and cycling to/from stations affected, particularly Abertillery.		
Improved **journey quality** (comfort/information)	**Large beneficial for all options** Introduction of services to Abertillery is likely to represent a large benefit for most journey purposes. The new Stadler FLIRT trains should produce improvements in journey quality than the bus / car alternatives.		
Reduced **accidents**	**Minor beneficial for all options** The mode shift to rail from road vehicles will produce accident savings through transferring some trips to a safer mode.		
Improved **personal security** for travellers	**Neutral for all options** The introduction of a new stop does not improve personal security or safety as such. The main comparator is with the bus, which has similar wait / travel characteristics to local rail.		
Improved **access to services (health, education)**	**Moderate beneficial for all options** The introduction of services will bring significant accessibility benefits for Abertillery, through making key services, facilities and employment easier and quicker to reach than by any other mode.		
Increased **affordability** of travel	**Neutral for all three options** The introduction of a rail service is unlikely to impact on the relative affordability of travel for passengers		
Reduced **severance**	**Slight adverse for all options** The Abertillery reinstatement entails use of the Ebbw Fach cycle route, which will be retained, but a proposed / new crossing at Six Bells needs a dedicated bridge to be provided. Two further PROW diversions are likely, entailing additional walk distances for users.		

Impact area	Minimum infrastructure	Medium infrastructure	Maximum infrastructure
New travel option (**option / non-use value**)	**Large beneficial for all packages** The introduction of services should produce positive option / non-use valuations, as there is no convenient alternative to rail for several key journey classes from Abertillery.		

Source: Mott MacDonald

4.6 Summary of the Transport (Economic) Case

Implications for future work

4.6.1 The option testing set out in the Economic Case suggests that high frequencies (4 tph) could initially show economic poor value for money. Whilst there will be an uplift in demand, this uplift does not offset the capital and operating costs associated with an improved service.

4.6.2 By tackling the fundamental generators of demand and controlling costs in parallel, it is also shown that a break-even position is possible in value for money terms.

4.6.3 The environmental and social impacts indicate very little difference between the options, with minor improvements arising from any potential scheme.

4.6.4 Experience of testing service options suggests improvements in appraisal performance could be achieved by considering matters such as the following:

- Including analysis of wider economic benefits of the better performing tested options;
- Considering the demand potential of new stations, different timetable options, park and ride and better public transport integration;
- The possibilities for and demand potential of speeding up services;
- Alternative service terminal points;
- The demand potential of the service options within England, which may be under-represented in the current appraisal;
- Possibilities for improved operational resource management to reduce operating costs;
- The full impact of ‘demand consolidation’ over time resulting from the overall Welsh Government approach to developing the S Wales Metro.

4.6.5 The critical matter of operational costs is open to more in-depth investigation, which is recommended. The overall figure can be broken into its key components:

  - Fuel usage
  - Staff
  - Network Rail
  - Leasing and non-leasing costs
  - Station access charges

Implications for scheme delivery

4.6.6 From the current position, franchise managers may take some confidence that a viable scheme for improving rail services within the Ebbw Valley is achievable but that risks are also evident with significant financial and management implications for the Authority.

4.6.7 The vision-led four trains per hour ambition for the Ebbw Valley may still present the largest challenge, as a phased step up from two to three trains per hour apparently does not cause major issues of viability.

4.6.8 The desire to restore services to Abertillery is also not the cause of viability issues and would be a logical next step in a phased approach to service improvement.

4.6.9 Moving directly to a four trains per hour service in the mid-2020s does pose more challenges and therefore should be the subject of more detailed investigation to establish the underlying strength of the proposal.

5 Management (Delivery) Case

The Management Case aims to set out how the scheme can be successfully delivered. It considers the level of risks associated with the delivery of the scheme and whether these are significant. The Management Case also considers stakeholder and public management, and whether the project management structures and processes are robust to deliver the scheme.

5.1 Implementation planning

5.1.1 TfW has developed experience in managing the Wales and Borders rail franchise and has extensive experience of procuring and delivering transport capital expenditure schemes across rail and road modes, acting as a management and delivery agent for Welsh Government. The present scheme is part of the Welsh Government's desire to develop the rail system, providing for a major uplift in service frequency plus other infrastructure and capacity enhancements. The new ODP commenced operation on October 2018, with an improvement pathway particularly for the period up to 2025.

Work Streams

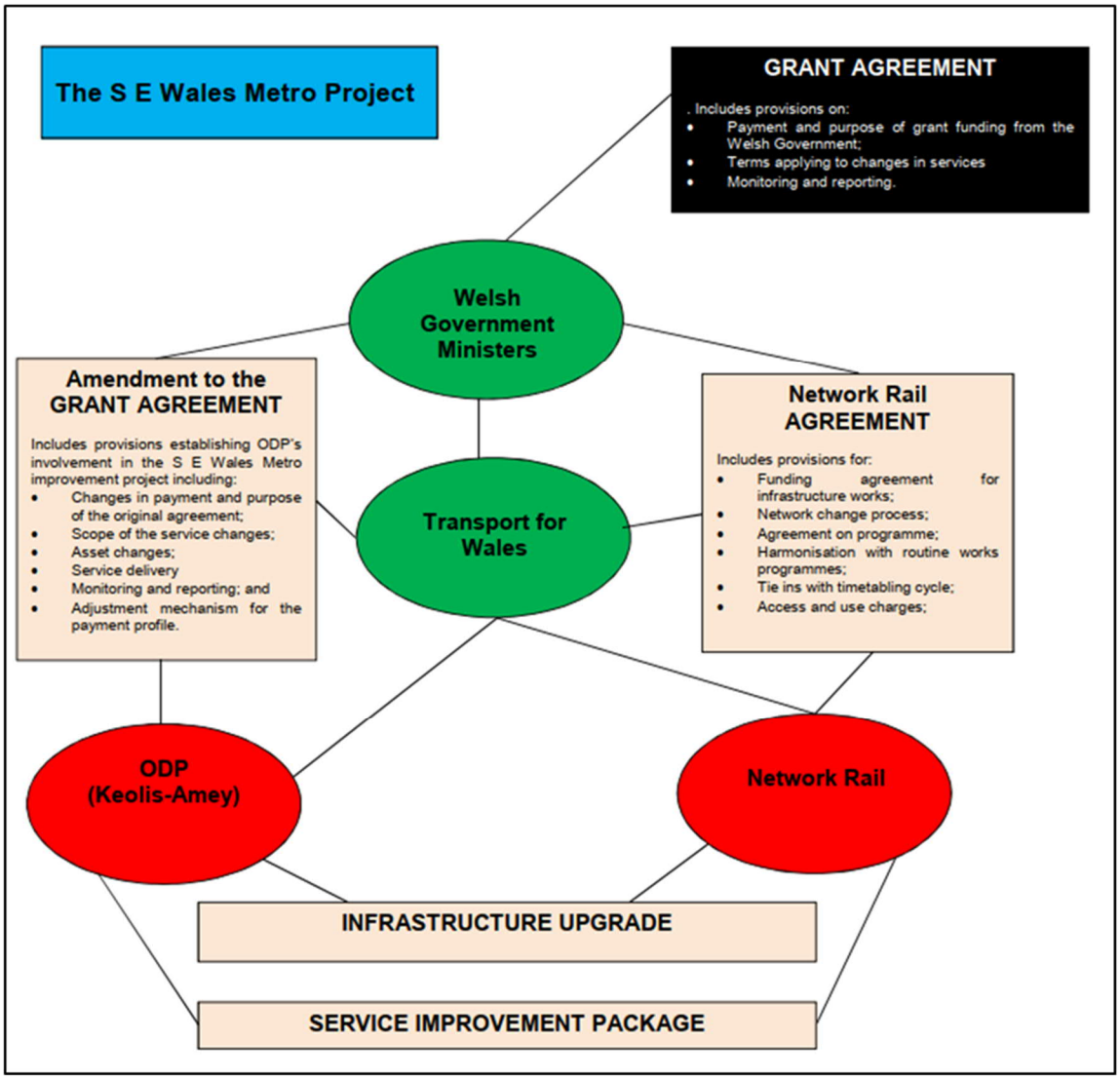
5.1.2 Delivery of the scheme requires parallel development of both the infrastructure and rail service. TfW will progress the scheme with the following workstreams, working either directly, or via Network Rail and the ODP:

- Business case development
- Ongoing infrastructure planning work – Ebbw Valley and other locations
- Service planning – timetable and resource specification
- Stakeholder engagement and public consultation
- Surveys
- Procurement of additional rolling stock
- Design work for infrastructure package
- Contractor procurement
- Legal / contractual framework
- Consenting strategy for Abertillery branch
- Welsh Government and TfW approvals
- Awards of contract
- Detailed design, construction methodology planning and delivery
- Delivery oversight and programme management
- Statutory permissions
- Testing and acceptance of the rolling stock
- Project snagging and handover
- Commencement of service.

Project structure

5.1.3 The nature of the scheme requires a series of contractual agreements to be put in place covering the key outputs resulting from the relationship between the delivery stakeholders, as shown below.

Figure 6: Proposed project structure



Source: Mott MacDonald

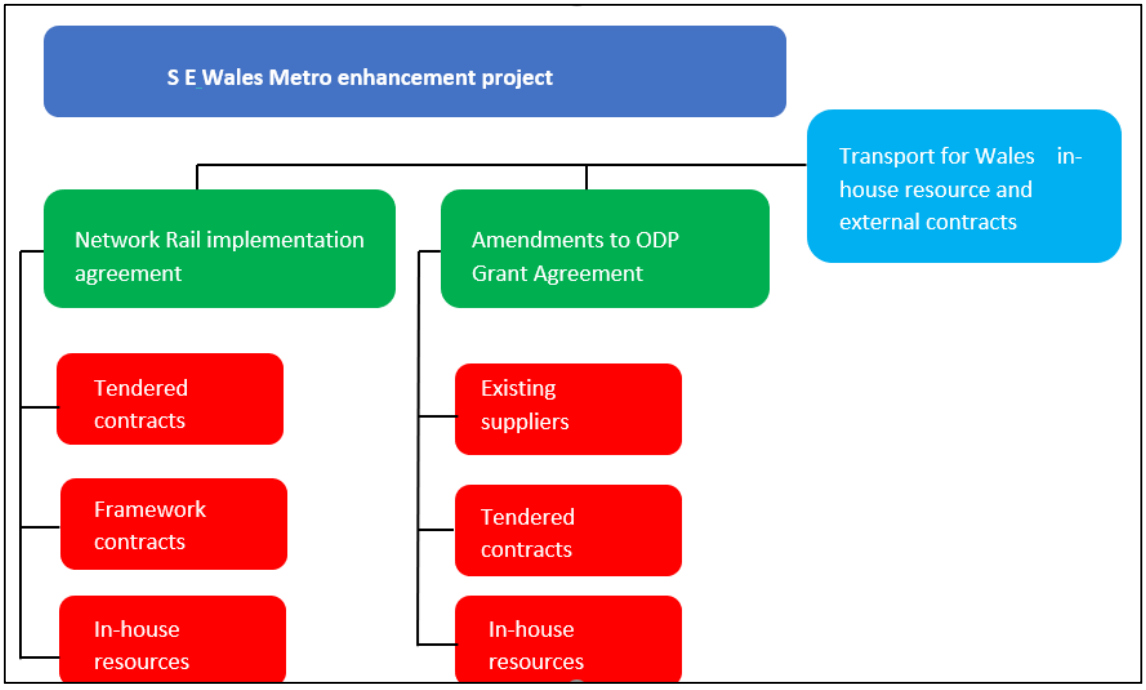
5.1.4 Within TfW's agreement with Network Rail, several key areas will require coverage in the conditions. The contract will make provision for topics covering the following subject areas.

- Project Delivery (Scope / Cost / Time)
- Project Governance;
- Agreed roles, responsibilities and obligations
- Compliance with Funding requirements
- Risks apportionments and management - framework for allocating risks in line with Roles and Responsibilities
- Monitoring arrangements
- Procedures for variations, compensation events and remedies
- Control mechanisms to ensure parties fulfil their obligations.

5.1.5 Beneath TfW's agreement with Network Rail lie separate agreements concluded by Network Rail for the delivery of the works, which TfW is not involved with. TfW's relationship with the ODP is via the Grant Agreement, which requires to be amended to capture the planned changes in service levels.

5.1.6 Subsidiary procurements will therefore take place by Network Rail and the ODP and TfW may also need to secure supporting resources for those tasks it carries out in-house.

Figure 7: Contractual arrangements



Source: Mott MacDonald

5.2 Project programme

5.2.1 The planned project key programme dates are subject to agreement between the Welsh Government and other key stakeholders. It is anticipated that the project will then be organised around the following milestones, as set out below.

Table 37: Outline of key milestones

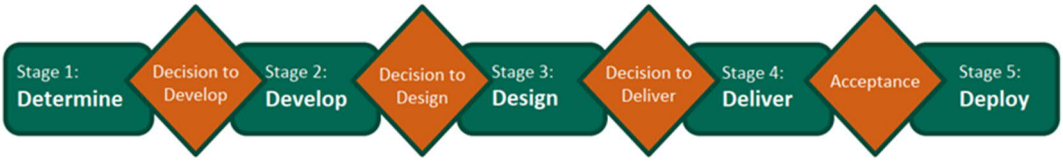
Activity	Comment
Completion of outline business case / RNEP 2	Currently underway
Funding confirmation	Welsh Government to lead
Cost confirmation, supporting infrastructure	Dialogue with Network Rail required
Legal agreements	Welsh Government to lead
Timetable planning	Long term NR timetable planning cycle
Rolling stock procurement	Variation Order(s) with current suppliers
Procurements, infrastructure	Undertaken by Network Rail
Full Business Case / Rail Network Enhancement Pipeline (RNEP) 3	Should take place post-procurement
Operational resourcing / mobilisation	Main delivery phase, <24 months

Activity	Comment
Construction period	Ebbw Vale and possibly the Maesteg lines
Shadow service operation	To be determined
Opening to traffic	Date to be confirmed

Source: Mott MacDonald

5.2.2 The Rail Network Enhancements Pipeline (RNEP), is a process developed by the DfT to help prioritise third party development schemes that the DfT would be expected to fund. The stages are as shown below, with 1 – 3 being aligned with the Strategic Outline, Outline and then Full business case stages in the WelTAG development sequence.

Figure 8: RNEP stages



Source: Department for Transport

5.2.3 With the S E Wales Metro scheme, funding routes have not as yet been confirmed and it is not clear whether a DfT sign-off will be called for. The DfT still centrally controls spending on and development of rail infrastructure but may not be called on to fund the scheme. Other than RNEP, delivery is expected to be organised in accordance with the procedural steps in GRIP (Network Rail).

Critical path

5.2.4 Any delays to key decision points during the project could have an impact on the completion date. The most important decisions are related to the acceptance of a preferred option for development and the conclusion of the necessary supporting agreements. Once these are in place, a conventional development and procurement process can take place guided by the programme milestones noted.

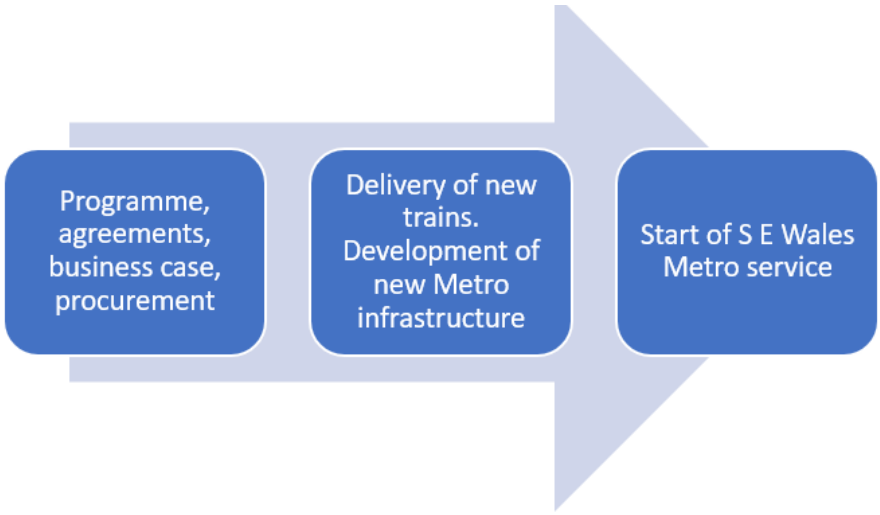
Dependencies and key development sequence

5.2.5 The development of the scheme contains three principal interdependencies:

- Service uplifts require suitable infrastructure to be available
- New infrastructure requires ‘powers to construct’ to be available
- Sufficient operating resources must be in place from the start
- Agreements between the Welsh Government and providers must be in place.

5.2.6 These are arranged in a logical sequence (shown below), based around development timescales in line with a possible opening in the mid-2020s.

Figure 9: Development sequence



Source: Mott MacDonald

5.2.7 The scheme will require the planning, business case and agreement activities to be completed before embarking on significant expenditure, to obviate development risk as the programme moves forward. Once the new infrastructure is in place and the operating resources ready, the enhancement can be delivered. The importance of harmonising the development workstreams is vital to manage risk and ensure a successful start to service operation.

5.2.8 A Consenting Strategy will be needed in respect of the Abertillery branch. Legally, a Transport and Works Act Order will be needed, which entails a Public Inquiry. Compulsory Purchase powers are conferred by the process, although they may not be needed if all required sites are secured through treaty.

Impacts of Delay

5.2.9 Any major delay is likely to result in increase in costs as follows:

- Inflation in material and resourcing costs
- Costs linked to changes to milestones agreed with external parties
- Possible 'stop and start' penalties if development needs to be paused
- Absence of income
- Possible changes in strategic / policy context impacting scheme scope

5.2.10 In addition, there is a need for scheme development to fit within Network Rail's timetable planning cycle and infrastructure works programmes. Any delays could lead to the works being reprogrammed with a likely uplift in costs.

5.3 Project governance

5.3.1 Welsh Government is likely to take the lead role for progressing the preferred option. However, the governance structure will depend on the procurement route adopted and cannot be finalised at this stage. The Government is looking to convene a high level 'Project Management Group' to control the Ebbw Valley and other projects, which would operate to shared Terms of Reference.

5.3.2 A two-level structure would apply with Management Board and Delivery Team levels. The project delivery team would be put together and managed by the TfW Infrastructure Projects

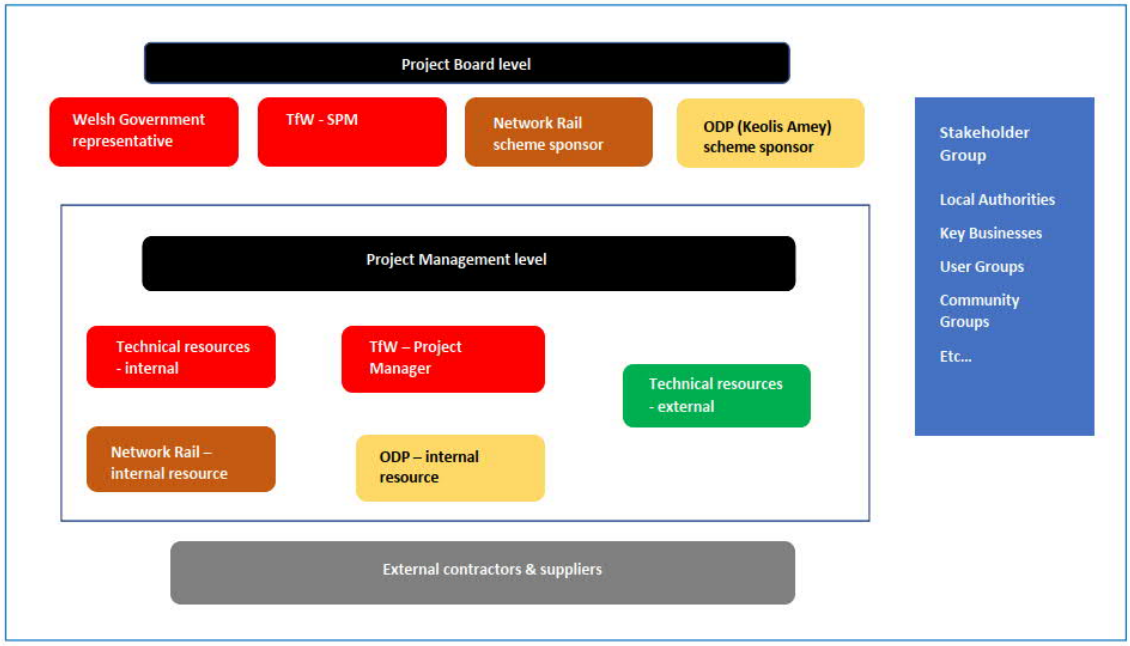
Team including a Senior Programme Manager (SPM), who would be accountable for the programme and ensuring it meets its objectives and realises the expected benefits. The SPM has overall accountability for ensuring that the project meets its objectives and delivers the projected benefits.

5.3.3 Controlling the project flows from the SPM via the Scheme Sponsor and Programme Management to the Project Manager (PM). Day to day activities are managed by the PM, supported as necessary by staff involved in construction elements and supporting tasks such as project controls, commercial management and health & safety.

5.3.4 It is likely that TfW will manage the service procurement process through the new Wales and Borders Rail Services Contract.

5.3.5 The overall structure is expected to be organised along similar lines to the diagram below.

Figure 10: Project Management organogram



Source: Mott MacDonald

5.4 Assurance and approvals

5.4.1 All TfW projects are required to follow the Welsh Government's developing Project Management Procedures. This is a mandatory set of stages that together comprise a single standard assessment process that any project promoted by TfW is required to follow before resources can be permitted to be released to progress the project from concept proposal through to physical development.

5.4.2 TfW's process is based on Network Rail GRIP stages 1 - 8, with the current project aligned to stages 2 and 3 (pre-feasibility / option selection). The WelTAG equivalent indicates a project at a late Strategic Outline / early Outline Case position.

5.4.3 The completion of activities in each stage is marked by a Gateway. The Gateways are breaks in the project lifecycle that group together related activities. In addition to satisfying internal criteria that demonstrate that the project is commercially sound, where Welsh Government funds are used, a further series of gateways need to be satisfied through the external review process.

5.5 Stakeholder management and project communications

5.5.1 Consultation is an integral part of the communication strategy. To date, the main local authorities have been engaged. Public consultation has not occurred so far but will feature in later stages to ensure input is obtained. This is likely to involve:

- Geographical mapping of impacted areas to identify any properties likely to be affected by infrastructure works or service changes
- Distribution of relevant consultation materials
- Ongoing engagement and dialogue with key stakeholders
- Open public consultation in Ebbw Valley if deemed necessary by the impact of change

Stakeholder Management Plan

5.5.2 A supporting team will be responsible for carrying out engagement with stakeholders as follows:

Table 38: Key project stakeholders

Stakeholder	Role
ODP	Keolis - Amey are the current franchisee who operates and maintains the Welsh rail franchise. The current contract runs until 2032. The contractor will have a role to ensure that the desired service patterns are met and the quality and reliability of service is maintained across the network
Network Rail	Network Rail run, maintain and develop Britain's National Rail tracks, signalling, bridges, tunnels, level crossings and key stations. All scheme options will interface with existing heavy rail network. Procurement options available include ability to engage Network Rail and utilise their implementation agreements or their list of approved contractors and suppliers to deliver the scheme.
Great Western Railways	Franchisee for the Inter City service between S Wales and London and local services in the west of England.
Rail freight operators	Freight operator(s) operate in South Wales providing train services for moving goods
Transport for Wales	The strategic transport authority for Wales. Strategy and programme development, approvals and assurance are ultimately the responsibility of the WG, working through TfW.
Welsh Government	WG has responsibility for a wide range of devolved functions, including acting as franchising authority for the Wales & Borders franchise, key stakeholder in the resulting franchise and transport planning body through TfW. Ultimate funding body for rail improvement schemes.
Local Authorities	Local authorities have an involvement with the scheme as planning authorities, local transport planning organisations and community representatives. Four core authorities are impacted by the scheme, Blaenau Gwent, Caerphilly, Rhondda Cynon Taf, Newport and Cardiff, with potential wider interest from Vale of Glamorgan, Bridgend and Bristol City Council / West of England Combined Authority in England.
DfT	DfT works with agencies and partners to support and develop the transport network. They will have a strong interest as a potential funding partner and as a sponsor of national rail.
Bus operators	Local bus operators will be interested to understand the commercial aspects of the proposal. Liaison will be required on that basis, also bearing in mind the potential implications of bus franchising on the local network.
Local businesses / landowners	Engagement with land owners and local businesses affected by the scheme is needed to manage any impacts arising from the development work,

Stakeholder	Role
	particularly construction. Businesses will ultimately benefit from the enhanced connectivity to market their services and to draw new employees.
ORR	The ORR is the independent safety and economic regulator for Britain's railways ensuring safe and reliable operation of the network. The ORR also ensures that passenger and freight operators have fair access to the rail network. The ORR is regulatory body ensuring satisfactory interface between trains with existing railway stations, facilities and infrastructure.

Source: Mott MacDonald

Stakeholder and public acceptability

5.5.3 For this scheme, engagement with a wider range of stakeholder has commenced, taking advantage of the accepted ODP proposal to enhance Ebbw Vale line frequencies to half hourly and the strong support for this from the Welsh Government.

5.5.4 As part of this OBC, the following stakeholders have been consulted:

- Welsh Government
- Transport for Wales
- Network Rail
- Blaenau Gwent CBC
- Caerphilly CBC
- Newport CC
- ODP
- Stagecoach buses
- Monmouthshire CC

5.5.5 A number of comments were received from the stakeholders and these informed the option development process. A listing of the comments received can be found in the **Stakeholder Feedback Technical Note** in the **Impacts Assessment Report**.

5.6 Risk management

5.6.1 The management of risk is an integral part of TfW's programme and project management processes. The approach to managing risk is to establish an iterative and on-going cycle of risk management activity, covering the identification, assessment, mitigation, reporting (including escalation) and reviewing risk.

5.6.2 This business case has not reached the point where TfW requires Quantitative Risk Analysis (QRA). When it does, a suitable risk register will be assessed using Monte Carlo analysis for input to the economic appraisal. Going forward, the common principles of risk management will be followed:

- Risks are identified and recorded
- Responsibility for risk management is assigned to the relevant party
- Risks are analysed and evaluated in terms of their likelihood and impact estimates. This assessment covers – cost, schedule, reputation, and magnitude
- Relevant action is taken to mitigate, treat or accept the risks
- Risks are monitored and updated through project development

5.6.3 An important principle is that the risk owner should be the person best able to manage the risk. This is often the person, with the appropriate accountability, that is closest to the risk. Where an individual does not have accountability, the risk will need to be escalated and managed at a higher level. Risk escalation levels are shown below. Risks flow upwards from 1-4:

1. Project team
2. Project Management Co-ordination
3. Senior Responsible Owner
4. Project Board

5.6.4 A series of risks applicable to this type of project are set out in the risk register. The nominated client project manager will arrange for this to be taken forward once confirmation is received of a desire to proceed to a design development phase. For more detail on the information summarised in Table 39, please the **Risk Register** in the **Impacts Assessment Report**.

Table 39: Risk register

Risk identified	Impact	Severity	Impact	Overall Risk Rating
BREXIT	Completely unknown	5	5	25
UK political instability	Completely unknown	5	5	25
Improved rail service impacts local bus networks in Ebbw Valley area	Loss of commercial bus services, higher subsidy requirements	5	4	20
Change in policy/scheme priority by Welsh Government	Delay to programme start, contractor appointment delay, cost implications	4	4	16
Change of policy support by Local Authorities	Impact on programme as additional support and alternative resources are identified;	2	2	4
Difficulty of TfW / WG finding its share of scheme cost	Funding shortfall, programme delay, impact on other Council programmes	4	4	16
Changes to transport funding system	Delay to programme start, contractor appointment delay, cost implications	2	2	4
Ability to deliver new rolling stock required in time for service start	Delay to start of service, possible contractual impacts on Grant Award terms	5	3	15
Uncertainty of start date + potential for phasing	Delay to programme start, cost and revenue implications	4	4	16
Insufficiency of resources to complete project (signals)	Reduced benefits, cost and revenue implications	3	4	12
Insufficiency of resources to complete project (other)	Reduced benefits, cost and revenue implications	2	4	8
Possible need for infrastructure development - Newport station	Increased costs, revised operating plan, impact on programme	2	3	6
Possible need for infrastructure development - Cardiff station	Increased costs, revised operating plan, impact on programme	2	3	6
Possible need for infrastructure development - Severn Tunnel Junction station	Increased costs, revised operating plan, impact on programme	2	3	6
Possible need for infrastructure development - Bridgend station	Increased costs, revised operating plan, impact on programme	2	2	4

Risk identified	Impact	Severity	Impact	Overall Risk Rating
Possible need for infrastructure development - Ebbw Vale station	Increased costs, revised operating plan, impact on programme	2	2	4
Possible need for infrastructure development - Bristol Temple Meads station	Increased costs, revised operating plan, impact on programme	3	3	9
Planning risks – reopened Abertillery station and branch line	Delay of land acquisition resulting in increased costs and delay to programme	3	3	9
Capacity constraints - Severn Tunnel	Increased costs, revised operating plan, impact on programme	1	1	1
Capacity constraints - Severn Tunnel	Possible absolute pathing constraint, could remove option of serving Bristol	0	0	0
Capacity constraints - Ebbw Vale line	Increased costs, revised operating plan, impact on programme	3	3	9
Capacity constraints - S Wales main line (fast lines) eastbound	Increased costs, revised operating plan (may force use of relief lines), impact on programme	2	2	4
Capacity constraints - S Wales main line (fast lines) westbound	Increased costs, revised operating plan (may force use of relief lines), impact on programme	4	4	16
Capacity constraints - S Wales main line (relief lines) westbound	Costs to upgrade as necessary, impact on programme	4	4	16
Capacity constraints - Vale of Glamorgan line	Revised operating plan, impact on CVL services	2	4	8
Capacity constraints - Maesteg line	Increased costs, revised operating plan, impact on programme	2	3	6
Higher costs to revenue position with 4 tph options	Higher call on operational subsidy budgets to TfW / WG	0	0	0
Loss of white periods, depending on revised service pattern and deployment strategy	Loss of higher revenue services?	4	5	20
Insufficiency of drivers to operate timetable	Programme delay from delayed start of service, higher costs	4	3	12
Insufficiency of driver training resources	Programme delay from delayed start of service, higher costs	2	2	4
Key insolvency in supply chain - resource shortage / replacement cost	Programme delay, higher costs	2	2	4
Poor commercial performance of improved service	Reputational risk to stakeholders, impact on Welsh Govt	4	3	12
Poor operational performance of new service	Increased delays, loss of reputation and patronage	4	3	12
Increases in frequency on level crossings may lead to their closure	Cost of replacement, social impact, highway impact	4	4	16

Source: Mott MacDonald

5.6.5 As noted above there are various points in the overall programme where delays could impact on the completion date, principally:

- Wider Brexit or '*Force Majeure*' events
- Contractual negotiations with Network Rail, the ODP or suppliers such as rolling stock
- Planning permissions, if needed
- Interfaces with DfT and ORR

5.7 Benefits, monitoring and evaluation

5.7.1 As part of the implementation of the scheme, a monitoring and evaluation plan will be prepared to capture the following:

- Delivery of the scheme
- Technical performance
- Wellbeing performance

5.7.2 As part of this process, data collection will be needed. There will be scope to utilise existing data sources which are set out as part of the ODP Grant Agreement but additional data may be required. The monitoring and evaluation plan will indicate the extent of additional data that will be recorded.

5.7.3 A separate Benefits Realisation Plan will also be completed and this will outline how the intended benefits of the scheme (see Section 2 Strategic Case) will be captured.

5.8 Summary of the Management Case

5.8.1 The Management Case has sought to assess whether the scheme can be delivered. The assessment indicates that there are no significant barriers to potential delivery, but there are several major risks.

5.8.2 The major risks include the extent of interdependencies, securing capital funding, insufficient revenue or loss of revenue from other services, procuring rolling stock and land acquisition. The level of interdependencies is a major feature of the scheme with the availability and timing of pathways on the SWML being critical.

5.8.3 Other aspects of the Management Case such as project governance and stakeholder engagement, suggest there are no major significant issues although the approach will need to be strengthened and refined as the scheme is developed further.

6 Financial Case

The aim of the Financial Case is to demonstrate whether the Scheme is affordable. This should consider the total life time costs, and whether funding is available to cover both the capital and operating costs.

6.1 Capital costs

6.1.1 Capital costs for the principal infrastructure elements associated with each of the options are as shown in Table 40. This includes a 60% uplift for risk in the form of Optimism Bias, also included in the economic analysis.

6.1.2 For all three short-listed options, expenditure will be required to upgrade the Ebbw Valley Branch Line for 4 tph frequency, and the reinstatement of the Abertillery branch line and station.

Different levels of expenditure are needed for the valley line's upgrading and additional works

Table 40: Capital costs by option (2018 prices including Optimism Bias)

Package	Option 1 – Minimum infrastructure	Option 2 – Medium infrastructure	Option 3 – Maximum infrastructure
Ebbw Vale Line Cost	£98.5m	£123.3m	£125m
Maesteg Improvement	--	£13.1m	£13.1m
Total	£98.5m	£136.4m	£138.1m

Source: Mott MacDonald

6.1.3 Key assumptions underpinning these costs are:

- **Option 1 Minimum Infrastructure –** This option includes double tracking from Rogerstone to Risca and Pontymister, and Crosskeys to Aberbeeg Junction in addition to the new spur and platform at Abertillery. The option also includes additional platforms at Rogerstone, Newbridge and Llanhilleth Stations
- **Option 2 Medium infrastructure –** This option includes double tracking from Rogerstone to Risca and Pontymister, and Crosskeys to Aberbeeg Junction. It also includes a new spur to with two platforms at Abertillery. The option incorporates additional platforms at Rogerstone, Newbridge and Llanhilleth Stations as well as a new platform and track at Ebbw Vale Town. Given the option also includes an additional service to Maesteg, the overall cost includes an additional loop on that line
- **Option 3 Maximum Infrastructure –** This option includes double tracking from Rogerstone to Risca and Pontymister, and Crosskeys to north of Aberbeeg Junction. It also includes a new spur and a new platform at Abertillery. The option incorporates additional platforms at Rogerstone, Newbridge and Llanhilleth Stations as well as a new platform and track at Ebbw Vale Town. Given the option also includes an additional service to Maesteg, the overall cost includes an additional loop on that line

6.1.4 The above costings include the infrastructure that has not been completed to date as part of the Ebbw Vale Branch Line Frequency Enhancement Scheme.

6.1.5 No allowance for works at Severn Tunnel junction, to be used as a turnback in the minimum package, the same for Bridgend, used as a turnback in the Maximum package, and no costs

linked with gaining access to Bristol Temple Meads, which features in the core and Maximum packages.

6.2 Cost profile

6.2.1 The profile spread over the period up to planned opening in 2025 is shown in Table 41 below. The spending profile is based on the programme as outlined in the Management Case. There is one major exception to the profile, which relates to the costs around land acquisition and whether the additional land can be secured through agreement with recourse to a compulsory purchase order. This may result in some higher up-front costs.

Table 41: Indicative cost profile (2018 prices)

Option	2019/20	2020/1	2021/2	2022/3	2023/4	2024/25	2025/26	Total
1 – Minimum Infrastructure	**£2.3m**	**£2.3m**	**£9.0m**	**£9.0m**	**£18.1m**	**£53.3m**	**£4.5m**	**£98.5m**
2 – Medium Infrastructure (Ebbw Vale)	£2.8m	£2.8m	£11.3m	£11.3m	£22.6m	£66.5m	£5.6m	£123.3m
2 – Medium Infrastructure (Maesteg)	£0.6m	£1.2m	£1.2m	£2.4m	£7.7m	--	--	£13.1m
2 – Medium Infrastructure Total	**£3.4m**	**£4.0m**	**£12.5m**	**£13.7m**	**£30.3m**	**£66.5m**	**£5.6m**	**£136.4m**
3 – Maximum Infrastructure (Ebbw Vale)	£2.8m	£2.8m	£11.3m	£11.3m	£22.6m	£68.2m	£5.6m	£125m
3 – Maximum Infrastructure (Maesteg)	£0.6m	£1.2m	£1.2m	£2.4m	£7.7m	--	--	£13.1m
3– Maximum Infrastructure Total	**£3.4m**	**£4.0m**	**£12.5m**	**£13.7m**	**£30.3m**	**£68.2m**	**£5.6m**	**£138.114 m**

Source: Mott MacDonald

6.3 Inflation assumptions

6.3.1 The costs noted above are considered to be outturn figures with no Optimism Bias added. An element of inflation is built into the estimates, based on the application of the GDP deflator averaged over the 2010 - 2024 period, 2% p.a.

6.4 Optimism Bias, Contingencies and QRA

6.4.1 The figures include optimism bias as follows:

- Additional works to be complete from the Network Rail Ebbw Vale Branch Line Frequency Enhancement Scheme - 40%
- Additional new works – 50%
- Maesteg costs – 60%

6.4.2 A Quantified Risk Assessment (QRA) has not been carried out with the project at an early stage of development. The high value of OB is assumed to cover the required project contingency sum, thus a separate estimate for this is not necessary

6.5 Operating costs

6.5.1 Operating costs for the financial case are assessed as the difference between the do-minimum and the proposed service patterns for each option, reflecting the additional capacity delivered the SE Wales Metro scheme, therefore the forecast operating costs represent the *incremental* uplift defined by the proposed service pattern.

The definition of such annual recurring charges includes the following categories of expenditure:

- Fuel: assumed to be diesel
- Staff costs
- Network Rail
- Leasing & non-leasing charges (rolling stock)

Note the infrastructure costs cover the lifecycle costs of fixed infrastructure items, taken to be associated with Network Rail.

6.5.2 Taking the sensitivity test appraisal scenarios into account, results for the 'phased service introduction' and 'Wales focussed' options are shown in the following tables. Note that the monetary values in all cases are presented in 2010 prices.

6.5.3 Information for individual selected years of the appraisal plus the overall (60 year) total is provided. Note that this runs well beyond the franchise period, so a steady-state condition over the longer term must be assumed. This is not entirely realistic but is a by-product of public sector appraisal conventions.

Table 42: Annual operating costs by package at 2010 prices (phased introduction)

Package	2026	2046	2066	2084	Appraisal total
ST2+3 phased service introduction	£881,930	£6,197,194	£7,435,196	£9,043,292	**£360,112,162**

Source: Mott MacDonald

Table 43: Annual operating costs by package at 2010 prices (Wales-focussed)

Package	2026	2046	2066	2084	Appraisal total
ST3 Wales focussed services	£5,053,192	£6,197,194	£7,435,196	£9,043,292	**£408,245,990**

Source: Mott MacDonald

6.6 Passenger revenues

6.6.1 As with operating costs, passenger revenues for the financial case are assessed as the difference between the do-minimum and the proposed service patterns for each option, reflecting the additional capacity delivered the S E Wales Metro scheme, therefore the forecast operating costs represent the *incremental* uplift defined by the proposed service pattern.

6.6.2 The comparative position for the sensitivity test appraisal scenarios are also presented, with results for the 'phased service introduction' and 'Wales focussed' options are shown in the following tables. Note that the monetary values in all cases are presented in 2010 prices.

6.6.3 Information for individual selected years of the appraisal plus the overall (60 year) total is provided.

Table 44: Annual passenger revenue by package at 2010 prices (base)

Package	2026	2046	2066	2084	Appraisal total
Option 1 - Minimum infrastructure	£1,231,993	£1,691,685	£1,751,265	£1,806,679	**£101,121,449**
Option 2 - Medium infrastructure	£1,373,314	£1,885,479	£1,951,884	£2,013,647	**£112,706,982**
Option 3 – Maximum infrastructure	£1,440,918	£1,978,319	£2,047,994	£2,112,798	**£118,256,367**

Source: Mott MacDonald

Table 45: Annual passenger revenue by package at 2010 prices (phased introduction)

Package	2026	2046	2066	2084	Appraisal total
ST2+3 phased service introduction	£727,593	£1,584,421	£1,640,223	£1,692,124	**£91,700,833**

Source: Mott MacDonald

Table 46: Annual passenger revenue by package at 2010 prices (Wales-focussed)

Package	2026	2046	2066	2084	Appraisal total
ST3 Wales focussed services	£1,157,577	£1,584,421	£1,640,223	£1,692,124	**£94,736,449**

Source: Mott MacDonald

6.6.4 As an illustrative of the value to be retained by the sensitivity tests, the average revenues of the three main options over the appraisal period comes to some £110.7m, while the average of the two sensitivity tests is £93.2m, approximately 84% of the main option revenue. By this means, most of the revenues are retained by the suggested service changes, whilst nearly half of the costs are lost.

6.7 Funding arrangements

Cost estimation

6.7.1 Given that the investment in the SE Wales Metro requires upfront capital expenditure and has ongoing requirements to operate and maintain over an extended lifespan, a long-term appraisal period of 60 years is adopted, which considers in overview:

- Upfront capital investment reflecting costs associated with infrastructure costs and procurement of additional rolling stock, plus project delivery;

- Incremental operation and maintenance costs reflecting infrastructure access charges, the contracted costs for the ODP for implement the revised service pattern under the MCIP investment scenario;
- Incremental passenger revenues that would accrue to TfW resulting from the additional services provided.

Funding strategy

6.7.2 The costs of the do-minimum scheme would be met from a number of sources as follows:

- Operating costs are met by Welsh Government, with net costs paid to the ODP;
- Specific rolling stock costs are met by Welsh Government through a lease agreement with L&G, with stock made available to the ODP through the Grant Agreement;
- Infrastructure capital expenditure will fall into one of five sub-categories:
  - Works already funded and partly carried out by Network Rail to the Ebbw Vale branch;
  - Works carried out by Network Rail as part of its regular HLOS-related workload, which may facilitate the scheme;
  - Works associated with the S Wales major resignalling and electrification projects, which may facilitate the scheme;
  - Specific SE Wales Metro works, which falls between the Welsh Government and the UK Government in combination;
  - For the wider package, additional funders may be drawn into the picture, including the Cardiff City Region, other local authorities and others, including the UK Government.

The final details of the funding package have yet to be agreed.

Accountancy implications

6.7.3 Each element of the project generates an ongoing and different cost-based risk. These risks fall upon the rail industry organisations and the Welsh Government. The principal concern will be the financial sustainability of the project over the course of the franchise, with the risks being centred on revenue requirements falling outside the Grant Agreement provisions.

6.7.4 The current position is that the Ebbw Vale line requires an operating subsidy and that the Grant Agreement includes provision for service enhancement to two trains per hour on the Ebbw Valley line. The ongoing financial implications of this uplift are deemed accepted by the Welsh Government.

6.7.5 Previous work on the valley's rail service suggested the scheme's value for money in social cost benefit terms would be in excess of 1.0. Though not indicative of future subsidy requirements, this suggests that with better definition of the costs, particularly operating costs, a firm financial appraisal will be possible. These factors will require additional investigation to determine the medium-term sustainability position.

Financial sustainability

6.7.6 Using the outputs from the Economic Case appraisal, it is possible to provide an indication of the likely impact on long term subsidy requirements arising from the different service options and sensitivity test options that have been considered.

6.7.7 The following presents the differences between revenue and operating costs in particular years, starting with the base case options and two service option sensitivity tests. As previously, the 2010 price base has been used.

Table 47: Annual costs and revenues by package at 2010 prices (base case)

	2026	2046	2066	2084
Option 1 – Minimum infrastructure				
Opex Costs	£8,572,806	£10,231,882	£11,810,750	£13,852,016
Revenue	£1,231,993	£1,691,685	£1,751,265	£1,806,679
Difference	-£7,340,813	-£8,540,197	-£10,59,485	-£12,045,337
Option 2 – Medium infrastructure				
Opex Costs	£11,423,832	£13,763,940	£16,111,889	£19,152,942
Revenue	£1,373,314	£1,885,479	£1,951,884	£2,013,647
Difference	-£10,050,518	-£11,878,461	-£14,160,005	-£17,139,295
Option 3 – Maximum infrastructure				
Opex Costs	£11,909,806	£14,377,397	£16,877,977	£20,117,770
Revenue	£1,440,918	£1,978,319	£2,047,994	£2,112,798
Difference	-£10,468,888	-£12,399,078	-£14,829,983	-£18,064,972

Source: Mott MacDonald

Table 48: Annual costs and revenues by package at 2010 prices (phased introduction)

Package	2026	2046	2066	2084
Test ST2+ST3: phased introduction of services				
Opex Costs	£881,930	£6,197,194	£7,435,196	£9,043,292
Revenue	£727,593	£1,584,421	£1,640,223	£1,692,124
Difference	-£154,337	-£4,612,773	-£5,794,973	-£7,351,168

Source: Mott MacDonald

Table 49: Annual costs and revenues by package at 2010 prices (Wales-focussed)

Package	2026	2046	2066	2084
Test ST3: Wales – Focussed service pattern				
Opex Costs	£5,053,192	£6,197,194	£7,435,196	£9,043,292
Revenue	£1,157,577	£1,584,421	£1,640,223	£1,692,124
Difference	-£3,895,615	-£4,612,773	-£5,794,973	-£7,351,168

Source: Mott MacDonald

6.7.8 From this analysis, the sensitivity tests enable a sizeable reduction in the call for subsidy per year. Note that in the phased introduction test, the shortfall is predicted to be very small in 2026, this coinciding with the period of 3 trains per hour running, before the build up to 4 tph in 2036.

6.7.9 Applying the appraisal parameter changes produces successively improved outputs as shown in the following tables.

Table 50: Annual costs and revenues by package (GJT assumption – base case)

	2026	2046	2066	2084
Option 1 – Minimum infrastructure				
Opex Costs	£8,572,806	£10,231,882	£11,810,750	£13,852,016
Revenue	£1,417,145	£2,062,900	£2,135,554	£2,203,128
Difference	-£7,155,661	-£8,168,982	-£9,675,196	-£11,648,888
Option 2 – Medium infrastructure				
Opex Costs	£11,423,832	£13,763,940	£16,111,889	£19,152,942
Revenue	£1,572,688	£2,288,647	£2,369,252	£2,444,221
Difference	-£9,851,144	-£11,475,293	-£13,742,637	-£16,708,721
Option 3 – Maximum infrastructure				
Opex Costs	£11,909,806	£14,377,397	£16,877,977	£20,117,770
Revenue	£1,658,260	£2,414,068	£2,499,090	£2,578,167
Difference	-£10,251,546	-£11,963,329	-£14,378,887	-£17,539,603

Source: Mott MacDonald

Table 51: Annual costs and revenues by package (GJT assumption – phased intro)

Package	2026	2046	2066	2084
Test ST2+ST3: phased introduction of services				
Opex Costs	£881,930	£6,146,958	£7,361,274	£9,043,292
Revenue	£838,941	£1,929,122	£2,000,524	£2,063,825
Difference	-£42,989	-£4,217,836	-£5,360,750	-£6,979,467

Source: Mott MacDonald

Table 52: Annual costs and revenues by package (GJT assumption – Wales focussed)

Package	2026	2046	2066	2084
Test ST3: Wales – Focussed service pattern				
Opex Costs	£5,053,192	£6,146,958	£7,361,274	£9,043,292
Revenue	£1,331,720	£1,929,122	£2,000,524	£2,063,825
Difference	-£3,721,472	-£4,217,836	-£5,360,750	-£6,979,467

Source: Mott MacDonald

Table 53: Annual costs and revenues by package (local growth assumption – base case)

	2026	2046	2066	2084
Option 1 – Minimum infrastructure				
Opex Costs	£8,572,806	£10,231,882	£11,810,750	£13,852,016
Revenue	£1,608,989	£2,472,745	£2,564,268	£2,645,407
Difference	-£6,963,817	-£7,759,137	-£9,246,482	-£11,206,609
Option 2 – Medium infrastructure				
Opex Costs	£11,423,832	£13,763,940	£16,111,889	£19,152,942
Revenue	£1,794,828	£2,758,348	£2,860,441	£2,950,953
Difference	-£9,629,004	-£11,005,592	-£13,251,448	-£16,201,989
Option 3 – Maximum infrastructure				
Opex Costs	£11,909,806	£14,377,397	£16,877,977	£20,117,770
Revenue	£1,880,101	£2,889,398	£2,996,342	£3,091,154
Difference	-£10,028,705	-£11,487,999	-£13,881,635	-£17,026,616

Source: Mott MacDonald

Table 54: Annual costs and revenues by package (local growth assumption – phased intro)

Package	2026	2046	2066	2084
Test ST2+ST3: phased introduction of services				
Opex Costs	£881,930	£6,146,958	£7,361,274	£9,043,292
Revenue	£956,638	£2,346,068	£2,428,695	£2,505,545
Difference	+£74,708	-£3,802,890	-£4,932,579	-£6,537,747

Source: Mott MacDonald

Table 55: Annual costs and revenues by package (local growth assumption – Wales focussed)

Package	2026	2046	2066	2084
Test ST3: Wales – Focussed service pattern				
Opex Costs	£5,053,192	£6,146,958	£7,361,274	£9,043,292
Revenue	£1,523,922	£2,346,068	£2,428,695	£2,505,545
Difference	-£3,529,270	-£3,802,890	-£4,932,579	-£6,537,747

Source: Mott MacDonald

6.7.10 The highlights of the sensitivity testing on sustainability are that:

- The net performance of the 'full' packages (as tested) always give rise to a large subsidy requirement, although applying sensitivity tests can trim the overall take slightly
- The largest impacts on subsidy requirements come from phasing service introduction and boosting demand
- The 3 trains per hour frequency could effectively be a break-even situation, but that adding a fourth service per hour definitely generates an ongoing increase in subsidy requirements;
- Despite this, there is a potentially large saving in subsidy call for a 4 tph pattern, available through careful specification of the services to be operated.

6.8 Summary of the Financial Case

6.8.1 From this analysis, the key to achieving financial sustainability would appear to be controlling costs whilst doing as much as possible to generate additional demand. If this is not done, the outlook is for a sustained need for additional subsidies to fulfil the 4 trains per hour frequency ambition, over and above the provisions of the Grant Agreement.

6.8.2 However, it has been shown that improvements are possible without causing financial deterioration to occur, within the limits of the appraisal carried out: these possibilities have only received partial attention within this business case, but there are known to be other relevant actions that could be considered that would further improve the scheme's financial performance.

6.8.3 The capital costs of the scheme (all options) are relatively small in relation to the total operating costs.

6.8.4 Delivery of the scheme, through the Grant Agreement's contractual provisions and the management mechanisms of the Welsh Government and Transport for Wales will permit close financial control of the project and its ongoing management over the course of the franchise

7 Commercial Case

The Commercial Case sets out whether the Scheme can be commercially delivered. Given aspects of the procurement are generally not finalised until a preferred option has been identified together with design work, the assessment presented at this stage is an outline. This general approach to the Commercial Case is recognised in the WelTAG guidance.

7.1 Overview

7.1.1 TfW are the Welsh Government's delivery agent for transport scheme planning, development and delivery and will oversee the management and delivery of the scheme. The main elements of the Commercial Case are:

- An understanding of the output specification as currently understood
- The outcomes that would be supported by these requirements
- The procurement objectives, outcomes and constraints
- As assessment of emerging procurement options

7.2 Output specification

7.2.1 The approach to procurement is based on the framework being developed as part of the South Wales Metro as follows:

- Delivery of the scheme within the available funding
- Delivery of the scheme to programme
- Ensuring full commitment of the ODP and key stakeholders
- Ensuring Best Value is delivered
- Offering an affordable 'whole life' cost solution
- Reducing risks to a level that is as low as practicably possible
- Establish contractor and stakeholder engagement throughout the whole process from early-planning to full scheme delivery
- Ensuring proposals comply with applicable provisions of the ODP Grant Agreement

7.2.2 Following the completion of the value for money assessment, the proposed Scheme specification will be developed, where the scope of work is likely to include:

- Rail operational infrastructure development - permanent way, signalling, infrastructure and railway stations
- Rail service operating specifications – timetable planning within rail industry processes, stopping patterns, hours of operation and tie-in with infrastructure planning and development activities to support the service plan
- Rolling stock acquisition and allocation as necessary
- Staff resourcing and diagramming, along with any changes to supporting facilities as may be needed
- Operating agreement between the Welsh Government and the ODP
- Legal Agreements encompassing all necessary provisions for scheme implementation between the core stakeholders (Welsh Government, ODP, Network Rail, other TOCs and DfT)

- Negotiation and agreement with affected stakeholders for the development of new stations, where and if these form part of the scheme

7.2.3 The principal reference materials available to support procurement activities will be:

- Engineering specifications for all infrastructure works
- Service needs determined by the business case and key stakeholder decisions
- Rolling stock and other operational resources determined by the timetable
- Managerial / legal arrangements will be determined by the degree of change to be introduced.

Key decisions and actions to progress this work have not yet taken place, although TfW's project team has a good understanding of the overall situation and their responsibilities through experience establishing the ODP framework and acting as its managing client.

7.3 Procurement strategy

Rail infrastructure

7.3.1 Delivery of the infrastructure (track / signalling + telecoms elements) of the scheme will be governed by Network Rail's existing frameworks covering works in these respective areas. The current position is as follows:

- Some trackwork on the Ebbw Vale Branch has been already provided by Network Rail and its sub-contractors in preparation for running a 2 tph service (the ODP commitment) but more remains to be done for the scheme to be completed.
- Signalling work covering Governance for Railway Investment Projects (GRIP) 1-3 for both the Ebbw Vale and Maesteg branches is being implemented currently. On completion, GRIP 4 onwards will need to be taken forward in the signalling and other domains.

7.3.2 As the framework(s) were originally procured through an Official Journal of European Union (OJEU) process, resulting in several contractors available for the pool for work in South Wales, there will be no further need for procurement. Network Rail will select the contractor at GRIP5 stage, with the works occupying GRIP stages 4-8 inclusive.

7.3.3 Network Rail's usual selection methodology pitches responsibility for producing a costed offer to the prime framework contractor, who will cascade it to the second echelon if they are unable to fulfil the terms of Network Rail's delivery programme. The work cascades to the third if the second are also unable to respond satisfactorily, and so on. It is anticipated that infrastructure works to the Ebbw Vale line and other affected locations will be managed by Network Rail in this manner.

Rolling stock

7.3.4 Rolling stock has been procured by the ODP from a number of sources, with CAF and Stadler being principal suppliers of the major new fleets of rolling stock. The Ebbw Vale line forms part of the "South Wales Metro" service group, which it is intended to be served by Stadler 'Flirt' of 4 car length.

7.3.5 Delivery of these units is due to commence in 2022 with all delivered by 2025. As the prospective service commences in 2025, this provides enough leeway to ensure the planned service has enough units available for the start date.

7.3.6 Issues may arise if additional units are needed. Escalation of train frequencies will demand more, with at least 6 needed for the wider SE Wales network if the ODP level of service is provided, an increase in 2 over the current operational situation.

Table 56: Rolling stock requirements per option

Option	Units	Comments
Minimum infrastructure	14	All packages based around 4 x 1 tph services from Ebbw Vale and Abertillery: Additional units may be needed for timetable robustness purposes, due to potentially limited turnaround allowances:
Medium infrastructure	15	
Maximum infrastructure	15	

Source: Mott MacDonald

7.3.7 Procurement of additional vehicles may take place by placing a variation order to that already in process. This would enable the additional units to be secured for pre-defined contractual terms and that a separate procurement exercise would not need to be carried out.

Service provision

7.3.8 Development of the service packages will need to be procured by the Welsh Government from the ODP through the provisions of the Grant Agreement, which makes particular provision for this type of change. It is not the equivalent process to the infrastructure development context, as service changes are effectively dealt with by a financial adjustment formally signed off between the partners, with the terms of the agreement specifying the financial and other conditions applying to the parties, consequent upon the service change agreed between them. As the ODP's operational remit covers all the associated aspects, issues such as driver training, staffing, publicity, operational costs etc. would all fall within the scope of any Grant Agreement variation.

Programme

7.3.9 All infrastructure works are currently intended to be complete and handed over to Network Rail by August 2025. Critical issues to meeting this deadline are:

- Determining the preferred option
- Completion of business case activities in line with the DfT's Rail Network Enhancement Pipeline (RNEP) process
- Gaining DfT sign-off
- Providing sufficient notice to the rolling stock supplier, enabling them to build extra units
- Agreeing scheme delivery with Network Rail, enabling infrastructure works to be completed

Risk allocation and transfer

7.3.10 The general principal in risk management is that risks should be passed to the party best able to manage them. The risks shown below are seen from Welsh Government/TfW's standpoint as client for the proposals. The 'contractor' below could be the ODP as delivery agent for the service package, or Network Rail (NR) for the infrastructure.

Table 57: Risk allocations

Category	TfW	Contractor	Shared	Notes
Development risk	X			TfW bears prime responsibility that its scheme is a well-planned and deliverable proposal.
Procurement risk	X			TfW responsible for key procurements and their effectiveness.
Design risk			X	Detailed design is a NR / contractor responsibility for built elements, but TfW is concerned with service design aspects.
Construction risk (infrastructure)		X		Contractor as delivery organisation.
Programme risk			X	TfW bears funding-related risks and the contractor, those affecting delivery.
Implementation risk			X	Joint co-ordination of construction activities.
Operating risk		X		ODP as operator
Revenue risk	X			TfW bears revenue related risks
Termination risk			X	Contractor carries most risk of early termination, but some remains with TfW
Financing risks	X			Payment and funding responsibility ultimately lies with TfW.

Source: Mott MacDonald

7.3.11 As the sponsor for the package, Welsh Government/TfW are the last resort funder who may need to underwrite any cost overrun if cost is incurred. It is expected that contingencies will be included in the contracts devised to ensure cost overruns due to delays in delivery are absorbed by the contractor.

7.4 Sourcing options

7.4.1 The different elements of the scheme will be delivered by stakeholders using appropriate procurement routes and contract types:

- Infrastructure works by Network Rail through existing supplier frameworks
- Rail rolling stock requirements by the ODP through established supplier contracts
- Rail service and HR requirements by the ODP via in-house resources
- Client-stakeholder agreements to be rendered through in-house staff with retained technical and legal advice as needed.

7.5 Financial transactions

7.5.1 The position within each key stakeholder's context will be determined by the contractual terms applying in each case. The critical issue for the scheme will be the manner of handling the contractual changes to the ODP Grant Agreement, which specifies the relationship between the Welsh Government and the ODP and the provisions applying to variations in service provision

7.5.2 Regular subsidy payments are made under the Grant Agreement, with monthly accounts being raised by the ODP. Any changes consequent on the South Wales metro scheme would fall under this regime, with adjustments met as necessary. Schedule 8 covers the payment

mechanisms that apply. A profit-sharing approach exists to cover instances where increases in ODP income enables subsidy requirements to fall.

7.6 Contract management

7.6.1 Contractors and other consultant support will be procured for the full scope of works in line with the procurement strategy. The relevant client business and procurement representatives will work together with retained consultant support to identify and develop the detailed sourcing requirements.

7.6.2 TfW has sufficient internal resources to project manage external consultants and contractors to be appointed to deliver the project. A dedicated Project Manager would be identified to manage the contract and liaison tasks, with supporting staff covering risk, communications, cost planning, accounts, quality assurance and legal advice.

7.6.3 There are no employment terms' or transfer of employment issues associated with the project, however the operation of additional services will require staffing numbers to grow to a level sufficient for the revised train service plan.

7.7 Summary of the Commercial Case

7.7.1 It is common practice that an outline assessment can only be made at OBC stage whether the Scheme can be commercially procured and delivered. Nevertheless, the outline analysis indicates that many of the components are already in place and a framework exists for the delivery for the scheme.

7.7.2 The main issues arising from the Commercial Case revolve around the need for fully integrated working between a number of stakeholders. Notably, the Welsh Government, TfW, DfT, Network Rail and the ODP.

7.7.3 The analysis indicates that existing mechanisms around the approval and construction of infrastructure can be deployed in this instance. Procurement of additional services including rolling stock could potentially utilise the existing ODP Grant Agreement, although bespoke and specific variations are likely.

8 Conclusions and Recommendations

8.1 Principal conclusions

8.1.1 This WelTAG Stage 2 OBC has aimed to assess the case for increasing the number of trains to/from the Ebbw Valley at a frequency of 4 tph. Reintroducing a rail service to Abertillery forms part of the case, with a service level of either 1 or 2 tph, with the balance (2 or 3 tph) running to/from Ebbw Vale.

8.1.2 The assessment has also considered the potential destinations for services running from the Ebbw Vale Branch Line. Currently the hourly service runs to Cardiff while the OBC notes that an improved 2 tph service along the Ebbw Vale line with a new hourly service to Newport is expected to be delivered as part of the ODP Grant Agreement. This 2 tph service level is taken as the 'do minimum' scenario, with all of the proposed new service options further improving upon this contractual level of service. It is also assumed that the Abertillery branch will definitely reopen.

8.1.3 The Welsh Government's desire that the improvement scheme be in place by the mid-2020s has informed the demand assessment and economic appraisal.

8.1.4 A rail technical assessment has been undertaken that examined the operational and infrastructural constraints around delivering 4 tph to the Ebbw Valley line, covering options for the origins and destinations of potential services. Three packages emerged from this technical optioneering work, which formed the basis of the WelTAG five case assessment.

8.1.5 The assessment for the Strategic Case has shown that there is a **strong case for enhanced public transport provision in the Ebbw Valley**. The assessment confirms the underlying economic underperformance and social deprivation particularly in the upper Ebbw Valley, which can be partially attributed to poor levels of accessibility and connectivity.

8.1.6 The option testing set out in the Economic Case suggests that high frequencies (4 tph) could initially show economic poor value for money. Whilst there will be an uplift in demand, this uplift does not offset the capital and operating costs associated with an improved service.

8.1.7 Despite this finding, by **tackling the fundamental generators of demand and controlling costs in parallel, it is also shown that a break-even position is possible in value for money terms.** This could be further improved upon by including wider economic benefits and other factors, such as new stations, timetable options, better public transport integration and speeding up services.

8.1.8 The **Management Case confirms there are several risks and uncertainties around delivering the improved service**. Whilst deliverable, the principal risks identified focus on the planning stage, with several agreements amongst core stakeholders and procurement exercises to be carried out. It is noted that the scheme is mainly delivered through Network Rail and the ODP rather than directly by the Welsh Government, making co-ordination vital.

8.1.9 The Financial Case confirms the capital costs are largely consistent between 3 and 4 tph on the Ebbw Vale line itself, although westbound services for 4tph are likely to require upgrades to the SWML relief line and further afield such as on the Maesteg line. However, **operating costs are a key differentiator between the options, with 4 tph representing a significant increase**. The operational costs are a major element within the financial appraisal, and it is considered that more work to identify a realistic cost position would strengthen the case for the scheme.

8.1.10 The financial sustainability of the service improvement options covers a wide spread, the more generous provisions requiring increased annual subsidies, whilst phased service introduction being almost revenue neutral to the Welsh Government.

8.1.11 The Commercial Case is concerned with the procurement tasks with a **need for integrated working between partners to deliver the scheme**. Procurement is therefore a matter of legal agreements between the partners facilitating NR and ODP to procure infrastructure and rolling stock and for the operation of services.

8.2 Recommended next steps

8.2.1 It is important to note this OBC reflects the context as of October 2019. It is clear further work would strengthen the business case and recommend the following next steps:

- Further work on option development with the aim of reducing capital and operating costs
- Further economic testing of options around development levels and passenger growth rates
- Work to refine performance of the demand forecasting and operational costing model
- Calculation and inclusion of the wider economic benefits in the value for money appraisal
- Consideration of additional measures to improve demand such as further station improvements and better public transport integration
- More assessment of the phasing enhanced frequencies towards the 4 tph aspiration, as improving services earlier may also generate more investment growth
- Undertaking a Quantified Risk Assessment of future preferred option(s)

8.2.2 Work is recommended to confirm the status of identified interdependencies and to account for their impacts on the South Wales Metro proposals:

- The outcome of the business case into upgrading the SWML relief lines which will deliver additional capacity
- How the ODP will deliver the additional 1 tph service on the Ebbw Vale line, and address the capacity constraints at Newport
- Considering the wider need for infrastructure improvements to support the S Wales Metro concept
- Accounting for other aspirations around improving rail services in South Wales, including Open Access
- Taking account of the emerging work from and potential of the new M4 Corridor Around Newport Commission
- Considering the overlap between the Welsh Government's aspirations for South Wales and those for service improvement in South West England.
- This may include proposals around improving rail services in the Newport to Chepstow corridor, as identified in the findings of the City Region strategy.

Glossary

AADT	Average Annual Daily Traffic
AMCB	Analysis of Monetised Costs and Benefits
AQMA	Air Quality Management Area
BCR	Benefit Cost Ratio
CVL	Core Valley Lines
DEMU	Diesel Electric Multiple Unit
DfT	Department for Transport
GDP	Gross Domestic Product
GRIP	Governance for Railway Investment Projects
GVA	Gross Value Added
GWEP	Great Western Electrification Programme
GWML	Great Western Main Line
IAR	Impacts Assessment Report
LDP	Local Development Plan
LTP	Local Transport Plan
NO_2	Nitrogen Dioxide
NPV	Net Present Value
OBC	Outline Business Case (WelTAG Stage 2)
ODP	Operator and Developer Partner (KeolisAmey)
OJEU	Official Journal of the European Union
ORR	Office of Rail and Road
PA	Public Accounts
PDFH	Passenger Demand Forecasting Handbook
PVB	Present Value of Benefits
PVC	Present Value of Costs
QRA	Quantified Risk Analysis
RNEP	Rail Network Enhancements Pipeline
SPM	Senior Programme Manager
SWML	South Wales Main Line
SWOT	Strengths Weaknesses Opportunities Threats
TEE	Transport Economic Efficiency

TfW	Transport for Wales
TOC	Train Operating Company
TPH	Train per Hour
TUPE	Transfer of Undertakings Protection of Employment
VOG	Vale of Glamorgan Line
WelTAG	Welsh Transport Appraisal Guidance
WIMD	Welsh Index of Multiple Deprivation